PDP11/60

PDP-11/60 WCS DIAGNOSTIC

MD-11-DQKUA-A

EP-DQKUA-A-DL

COPYRIGHT © 1977

FICHE 1 OF 2

JAN 1978

digital

MADE IN USA

PDP11/60

PDP-11/60 WCS DIAGNOSTIC

MD-11-DQKUA-A

EP-DQKUA-A-DL

COPYRIGHT © 1977

FICHE 2 OF 2

JAN 1978

digital

MADE IN USA

IDENTIFICATION

PRODUCT CODE	MAINDEC-11-DQKUA-A-D
PRODUCT NAME	PDP-11/60 WCS Diagnostic
DATE CREATED	October, 1977
LAST REVISION	October, 1977
AUTHOR	Jim Kapadia

COPYRIGHT (C) 1977

DIGITAL EQUIPMENT CORPORATION
146 Main Street
Maynard, Massachusetts, USA 01754

This software is furnished to the purchaser under a license for use on a single computer system, and can be copied (with inclusion of DIGITAL's copyright notice) only for use in such system, except as may otherwise be provided in writing by DIGITAL

The information in this document is subject to change without notice, and should not be construed as a commitment by DIGITAL EQUIPMENT CORPORATION. DIGITAL EQUIPMENT CORPORATION assumes no responsibility for any errors that may appear in this document

DIGITAL assumes no responsibility for the use or reliability of its software on equipment not supplied by DIGITAL or its affiliated companies

The following are trademarks of DIGITAL EQUIPMENT CORPORATION

DIGITAL	PDP	UNIBUS	MASSBUS
	DECUS	DECTAPE	

TABLE OF CONTENTS

. ABSTRACT

2.0 REQUIREMENTS
2.1 HARDWARE
2.2 PRE-REQUISITE PROGRAMS
2.3 EXECUTION TIME

3.0 PROGRAM STRUCTURE AND DESCRIPTION
3.1 AGNOSTIC PHILOSOPHY
3.2 PROGRAM STRUCTURE
3.3 PROGRAM DESCRIPTION

4.0 STARTING PROCEDURE
4.1 PROGRAM LOADING
4.2 STARTING ADDRESS
4.3 PROGRAM AND OPERATOR ACTION

5.0 OPERATIONAL SWITCH SETTINGS

6.0 ERROR REPORTING

7.0 PROGRAM RECOVERY
7.1 POWER-FAIL
7.2 SPURIOUS ERRORS

8.0 MODE AND ACTAPT COMPATABILITY

9.0 EXAMPLE ABSTRACTS

1 0 ABSTRACT

THE WCS DIAGNOSTIC PROGRAM IS INTENDED TO BE USED FOR CHECKING THE WRITABLE CONTROL STORE OPTION OF THE PDP 11/60 PROCESSOR IT HAS BEEN DESIGNED TO VERIFY THAT THE WCS OPERATES CORRECTLY AND ATTEMPTS TO DIAGNOSE FAULTS THAT MAY OCCUR THEREIN

THE WCS IS A PDP 11/60 OPTION THAT PROVIDES THE USER WITH AN ABILITY TO DO HIS/HER OWN MICRO-PROGRAMMING THE MICRO-CODE CAN BE LOADED AND STORED IN THE WCS AND EXECUTED UPON SPECIFIC INSTRUCTIONS FROM THE BASE MACHINE

2 0 REQUIREMENTS

2 1 HARDWARE

THIS PROGRAM NEEDS THE FOLLOWING HARDWARE FOR PROPER EXECUTION

1 PDP 11/60 C P U

2 16 K OF MEMORY

3 WCS MODULE

4 CONSOLE TTY

2 2 PRE-REQUISITE PROGRAMS

THIS PROGRAM ASSUMES A GOOD CPU, MEMORY, CACHE AND CONSOLE TTY HENCE APPROPRIATE DIAGNOSTIC PROGRAMS SHOULD BE RUN TO MAKE SURE THAT THE ABOVE HARDWARE IS GOOD

2.3 EXECUTION TIME

THE FIRST PASS OF THE PROGRAM WILL BE A QUICK-VERIFY PASS SUBSEQUENT PASSES HAVE TEST ITERATIONS

FIRST PASS TIME.	20 SEC	(FAULT-FREE EXECUTION)
SUBSEQUENT PASSES	120 SEC	

3 0 PROGRAM STRUCTURE AND DESCRIPTION

3 1 DIAGNOSTIC PHILOSOPHY

THE PROGRAM USES A LOGICAL HIERCHY OF TESTING FOR THE WCS MODULE IN THE BEGINNING SIMPLE TESTS ARE DONE TO CHECK THE PRIMITIVE LOGICAL FUNCTIONS THESE TESTS HAVE BEEN SELECTED TO CHECK THE SMALLEST DISTINGUISHABLE PIECE OF HARDWARE THUS PREVIOUSLY CHECKED HARDWARE IS USED IN SUBSEQUENT TESTS TO CHECK LARGER PORTIONS OF THE LOGIC WHEN A FAULT IS DETECTED, IT CAN BE ASSOCIATED WITH THE PORTION OF HARDWARE BEING TESTED

3 2 PROGRAM STRUCTURE

THE PROGRAM IS ORGANIZED IN THE FOLLOWING MANNER

1 COMMON DATA STORAGE CONSISTING OF
   A TRAP-CATCHER
   B PARAMETER-TABLES AND TEMPORARY STORAGE LOCATIONS
   C ERROR ITEM TABLE
   D BIT DEFINITIONS

2 ERROR RECOVERY AND INITIALIZATION CONSISTING OF
   A UNEXPECTED TRAP HANDLER (TO VECTOR 4)
   B UNEXPECTED PARITY ERROR TRAP HANDLER
   C INITIALIZATION CODE SETTING UP VARIOUS VECTORS AND PARAMETERS

3 TEST MODULES
   THIS SECTION CONTAINS THE INDIVIDUAL TESTS EACH TEST IS PRECEEDED BY A HEADER EXPLAINING THE PURPOSE OF THE TEST

4 SUBROUTINES

5 ASCII MESSAGES

6 MICRO-CODE
   THIS SECTION CONTAINS THE MICRO-CODED TESTS WHICH WILL BE LOADED INTO THE WCS PRIOR TO EXECUTION

3 3 PROGRAM DESCRIPTION

UPON STARTING, THE PROGRAM IDENTIFIES ITSELF

MAINDEC-11-DQKUA-A WCS DIAGNOSTIC

THE FIRST GROUP OF TESTS CHECK OUT THE INTERFACE OF THE WCS TO THE BASE MACHINE, VARIOUS REGISTERS ARE REFERENCED AND TESTED READ/WRITE BITS OF THE STATUS REGISTER ARE CHECKED

THEN VERY BASIC WRITE/READ FUNCTIONS OF THE WCS ARE PERFORMED USING THE WCS ADDRESS AND DATE REGISTER EXPECTED BITS IN STATUS REGISTER ARE CHECKED

HAVING CHECKED OUT THE WRITE/READ/SELECT LOGIC, THE HIGH AND LOW BYTE PARITY GENERATORS ARE TESTED THE DIAGNOSTIC FUNCTION OF FORCING WRONG PARITY IS USED TO TEST THE PARITY ERROR DETECTION LOGIC, PARITY TRAP LOGIC ETC

AT THIS POINT THE BASIC OPERATIONS CAN BE PERFORMED AND EXTENSIVE CHECKING OF THE ADDRESS AND DATA PATHS IS DONE TESTS OF THE WCS DATA MEMORY ARE INCLUDED

UP TO THIS POINT, THE WCS HAS BEEN CHECKED FOR ITS ABILITY TO LOAD, STORE AND OUTPUT DATA THE FIRST STEP IN USING THE WCS AS A CONTROL STORE IS TO TRANSFER CONTROL TO THE MICRO-CODE RESIDING IN IT TESTS ARE DONE TO CHECK OUT ALL POSSIBLE WAYS OF TRANSFERRING CONTROL TO AND ENTERING THE WCS. PRIOR TO TRANSFERRING OF CONTROL, THE WCS IS PROPERLY LOADED WITH THE MICRO-CODE TEST WHICH WILL BE EXECUTED FROM THE WCS A RETURN IS MADE TO THE BASE MACHINE AND IT IS CHECKED IF THE CONTROL WAS TRANSFERRED TO THE RIGHT POINT IN WCS

FINALLY, VARIOUS BLOCK-TRANSFER FUNCTIONS OF THE WCS (LIKE LOAD GR'S STORE GR'S ETC) ARE CHECKED OUT

AT THE END OF PASS OF THE PROGRAM AN END OF PASS MESSAGE IS GIVEN

END PASS N .WHERE N IS THE PASS NUMBER

4 0 STARTING PROCEDURE

4 1 PROGRAM LOADING

THE PROGRAM CAN BE LOADED FROM THE PAPER TAPE USING THE ABSOLUTE LOADER AND THE NORMAL LOADING PROCEDURE FOR ABSOLUTE FORMATTED BINARY TAPES

IF AN XXDP DEVICE IS AVAILABLE, THE PROGRAM CAN BE LOADED USING THE STANDARD LOAD COMMANDS OF THE XXDP

4 2 STARTING ADDRESS

STARTING ADDRESS IS 200 (OCTAL)

4 3 PROGRAM AND OPERATOR ACTION

AFTER LOADING THE PROGRAM INTO THE MEMORY, THE SWITCH REGISTER SHOULD BE CLEARED FOR NORMAL PROGRAM OPERATION THEN LOAD ADDRESS 200 ON THE PDP 11/60, DEPRESS THE CONTROL AND START SWITCHES TOGETHER TO START THE PROGRAM

IF ANY SWITCH OPTION IS TO BE SELECTED, THEN LOAD THE OCTAL EQUIVALENT OF THE SWITCH OPTION INTO THE SWITCH REGISTER THIS CAN BE DONE BY FIRST KEYING IN THE OCTAL EQUIVALENT NUMBER AND THEN DEPRESSING "LSWR" SWITCH (LOAD SWITCH REGISTER) THEN THE PROGRAM CAN BE STARTED

SWITCH NO	OCTAL EQUIVALENT
0	000001
1	000002
2	000004
3	000010
4	000020
5	000040
6	000100
7	000200
8	000400
9	001000
10	002000
11	004000
12	010000
13	020000
14	040000
15	100000

ONCE STARTED, THE PROGRAM WILL CONTINUE TO RUN UNLESS HALTED BY THE USER DEPRESS "CONTROL" AND "HALT" SWITCHES TOGETHER TO HALT THE PROGRAM

AN ERROR FREE PASS OF THE PROGRAM WILL APPEAR AS

```
MAINDEC-11-DQKUA-A WCS DIAGNOSTIC
END PASS 1
END PASS 2
```

IF AUTOMATIC RECOVERY AND RESTART OF THE PROGRAM IS DESIRED ON POWER-FAIL, THEN THE THREE POSITION SWITCH BOOT/RUN/HALT SHOULD BE LEFT IN THE "RUN" POSITION

5.0 OPERATIONAL SWITCH SETTINGS

IN ORDER TO PROVIDE FLEXIBILITY OF OPERATION WHILE TROUBLE-SHOOTING THE FOLLOWING OPERATIONAL SWITCHES ARE PROVIDED IT SHOULD BE NOTED THAT THE PDP 11/60 HAS KEYPAD SWITCHES AND NON-MECHANICAL SWITCH REGISTER IN ORDER TO SELECT A CERTAIN SWITCH OPTION, THE OCTAL EQUIVALENT OF THE SWITCH SHOULD BE KEYED IN AND THEN THE "LSWR" SWITCH DEPRESSED COMBINATION OF SWITCH OPTIONS MAY BE SELECTED BY JUST "OR"ING TOGETHER THE INDIVIDUAL OCTAL EQUIVALENTS THUS, IF SWITCH 15, 14 ARE TO BE SELECTED, THEN LOAD THE SWITCH REGISTER WITH OCTAL 140000

SW <15> = 1 OCTAL 100000 HALT ON ERROR

THE PROGRAM WILL HALT WHEN AN ERROR OCCURS

SW <14> = 1 OCTAL 040000 LOOP ON TEST

IF THIS SWITCH IS SET WHEN AN ERROR OCCURS, THE PROGRAM WILL LOOP ON THE TEST HAVING THE ERROR

SWITCH 13 = 1 OCTAL 020000 INHIBIT ERROR TYPEOUTS

SW <11> = 1 OCTAL 004000 INHIBIT ITERATIONS

THIS SWITCH INHIBITS TEST ITERATIONS NOTE THAT THE FIRST PASS IS A QUICK-VERIFY PASS AND HENCE HAS NO TEST ITERATIONS

SW <10> = 1 OCTAL 002000 RING BELL ON ERROR

SW <9> = 1 OCTAL 001000 LOOP ON ERROR

WHEN AN ERROR OCCURS LOOPING IS DONE UPTO THE POINT OF ERROR (WHERE THE ERROR CALL IS LOCATED)

SW <8> = 1 OCTAL 000400 LOOP ON TEST N SW <7 0>

THE TEST SELECTED IN SW<7 0> IS LOOPED ON

SW <7 0>

TEST NUMBER FOR LOOPING WHEN SW <8> = 1

= 0 ERROR REPORTING

WHEN THE DIAGNOSTIC PROGRAM DETECTS A FAULT, AN ERROR IS REPORTED IN A STANDARD FORMAT AS FOLLOWING

ERROR MESSAGE
DATA HEADER
ERROR DATA

THE ERROR MESSAGE DESCRIBES THE NATURE OF THE PROBLEM THE DATA HEADER DEFINES THE VARIOUS ITEMS PRINTED OUT AS A PART OF THE ERROR DATA, RELEVANT TO THE ERROR THE ERROR MESSAGE ALWAYS CONTAINS THE "PC", THE PROGRAM LOCATION WHERE THE ERROR CALL WAS MADE! THE ERROR "PC" IS THE CROSS-REFERENCE TO THE LISTINGS IF THE USER WANTS MORE INFORMATION ON THE ERROR OR THE DESCRIPTION OF THE TEST THAT WAS BEING DONE, HE SHOULD REFER TO THE ERROR "PC" IN THE LISTING WHEREVER NECESSARY, AN EXTENSIVE EXPLAINATION IS GIVEN BESIDE THE ERROR CALL AND A PROBABLE FAULT DIAGNOSIS IS INCLUDED

AT THE BEGINNING OF EACH TEST, A DESCRIPTION OF THE TEST IS GIVEN ALONG WITH THE LOGICAL FUNCTIONS OR PORTIONS IT IS TESTING THE USER IS ADVISED TO REFERENCE THIS, IN CASE HE NEEDS MORE INFORMATION ON THE NATURE OF THE PROBLEM

PROGRAM READER

7 1 POWER-FAIL RECOVERY

IF A POWER-FAIL OCCURS WHILE RUNNING, THE PROGRAM SAVES THE NEEDED INFORMATION TO RESTART ON SUBSEQUENT POWER-UP THE PROGRAM PRINTS OUT "POWER" INDICATING THERE WAS A POWER FAILURE AND RESTARTS AUTOMATICALLY IT SHOULD BE NOTED THAT THE BOOT/RUN/HALT SWITCH SHOULD BE IN THE "RUN" POSITION FOR AUTOMATIC RESTART AFTER POWER-FAIL

7 2 SPURIOUS ERRORS

THE PROGRAM IS CAPABLE OF HANDLING TWO TYPES OF SPURIOUS ERRORS AND RECOVERING FROM THEM CPU ERRORS RESULTING IN TRAPS TO VECTOR 4 ARE SERVICED BY THE CPU ERROR HANDLER THE "PC" AT THE TIME OF THE TRAP IS PRINTED OUT, THE CONTENTS OF THE CPU ERROR REGISTER ARE ALSO GIVEN THE CAUSE OF THE TRAP CAN BE FOUND OUT BY INSPECTING THE CPU ERROR REGISTER CONTENTS RETURN IS MADE TO THE TEST NEXT TO THE ONE IN WHICH THE CPU ERROR OCCURED A MESSAGE INDICATING THAT THE TEST WAS CORRECTED IS ALSO REPORTED

PARITY ERRORS RESULTING IN TRAPS TO 114 ARE SERVICED BY THE UNEXPECTED PARITY ERROR HANDLER THE SPURIOUS PARITY ERROR COULD HAVE OCCURED IN THE CACHE MEMORY, MAIN MEMORY OR THE WCS IF THERE WAS A CACHE PARITY ERROR A SIMPLE RETURN (FROM INTERRUPT) IS MADE TO CONTINUE WITH THE TEST THAT WAS IN PROGRESS AT THE TIME OF THE ERROR HOWEVER, IF THE PARITY ERROR WAS FROM THE MEMORY OR WCS THE PC AT THE TIME OF THE PARITY ERROR IS REPORTED AND CONTROL IS TRANSFERRED TO THE TEST NEXT TO THE ONE IN WHICH THE PARITY ERROR OCCURED A MESSAGE INDICATING THAT THE TEST WAS ABORTED IS ALSO REPORTED

E 0 XXDP AND ACT/APT COMPATABILITY

THE WCS DIAGNOSTIC PROGRAM CAN BE RUN UNDER THE XXDP SYSTEM NORMAL LOADING AND STARTING PROCEDURES SHOULD BE FOLLOWED THE PROGRAM IS COMPATIBLE WITH ACT AND APT SYSTEMS

9 0 SUBROUTINE ABSTRACTS

9 1 SPURIOUS ERROR HANDLERS

THERE ARE TWO ROUTINES WHICH ARE CALLED BY UNEXPECTED TRAPS TO EITHER VECTOR 4 (CPU ERROR) OR VECTOR 114 (PARITY ERROR). THE CPU ERROR HANDLER "BADTMO" TYPES OUT THE PC AT THE TIME OF TRAP, AND SKIPS TO THE NEXT TEST THE PARITY ERROR HANDLER "BADPAR" CHECKS IF THE PARITY ERROR WAS FROM THE MAIN MEMORY, CACHE MEMORY OR WCS IF THE PARITY ERROR WAS FROM THE MAIN MEMORY OR WCS, THE PC AT THE TIME OF TRAP IS REPORTED AND CONTROL IS PASSED TO THE NEXT TEST

9 2 SCOPE HANDLER

THIS ROUTINE IS CALLED (VIA AN IOT INSTRUCTION) AT THE BEGINNING OF ALL TESTS IT CONTROLS THE OPERATIONAL FUNCTIONS OF LOOPING ON TEST, ITERATION, ETC

9 3 ERROR HANDLER

THIS ROUTINE IS CALLED (OVA AN EMT) TO TYPE OUT AN ERROR REPORT IT CONTROLS THE OPERATIONAL FUNCTIONS OF HALTING ON ERROR, INHIBITING ERROR PRINTOUT, LOOPING ON ERROR, BELL ON ERROR, ETC

9 4 TRAPCATCHER

THIS CONSISTS OF A " +2", "HALT" SEQUENCE REPEATED IN THE LOWER PART OF THE MEMORY (VECTOR AREA) FOR THE PURPOSE OF CATCHING ANY SPURIOUS TRAPS SUCH A TRAP WILL RESULT IN A HALT AT THE TRAP VECTOR PLUS TWO

9 5 POWER DOWN, POWER UP ROUTINE

THIS ROUTINE IS CALLED WHEN AN UNEXPECTED POWER DOWN OCCURS WHILE THE PROGRAM IS RUNNING WHEN THE POWER IS RETURNED THE PROGRAM WILL RESTART AFTER TYPING OUT "POWER"

9 6 LDWCS - WCS LOADER

THIS ROUTINE IS CALLED TO LOAD A SECTION OF MICRO-CODE FROM THE MEMORY INTO THE WCS AFTER LOADING THE WCS THE LOADER CHECKS IF THE MICRO-CODE WAS LOADED CORRECTLY

9 7 MISCELLENEOUS ROUTINES

TYPE - TO TYPE OUT AN ASCII STRING
TYPOC - TO TYPE OUT AN OCTAL NUMBER
TYPDS - TO CONVERT BINARY TO DECIMAL AND TYPE OUT THE NUMBER
TRAP - TRAP DECODER
EOF - END OF PASS ROUTINE

EVERY ROUTINE THAT HAS BEEN USED IN THE PROGRAM, IS PRECEEDED BY A BRIEF EXPLAINATION OF WHAT THE ROUTINE DOES AND CALLING CONVENTIONS

16 BASIC DEFINITIONS
127 TRAP CATCHER
136 STARTING ADDRESS(ES)
139 APT PARAMETER BLOCK
161 ACT11 HOOKS
171 COMMON TAGS
233 APT MAILBOX-ETABLE
301 ERROR POINTER TABLE
1287 PROGRAM STARTS HERE
1361 T1 CHECK THAT WCS REGISTERS CAN BE ADDRESSED
1402 T2 CHECK WCS STATUS REGISTER, !D BIT, WCS PRESENT BIT
1457 T3 CHECK STATUS REGISTER, SET 'WWP' & 'PARDIS' BITS
1523 T4 CHECK 'WRITE' AND 'READ' OF LOCATION 0 IN WCS, EVEN PATTERN
1630 T5 CHECK 'WRITE' AND 'READ' OF LOCATION 0 IN WCS, ODD PATTERN
1722 T6 CHECK WRITE PULSES WP0, WP1, WP2 USING WRITE/READ (LOC 0,2000,4000
1827 T7 CHECK PARITY GENERATOR FOR HI BYTE DATA
1924 T10 CHECK PARITY GENERATOR FOR LO BYTE DATA
2019 T11 CHECK THAT WRONG PARITY CAN BE GENERATED, WHEN WWP IS SET
2117 T12 CHECK TRAP ON PARITY ERROR, TRAP INHIBITING, AND PARITY ERROR CLEARING LOGIC
2351 T13 CHECK THAT BAD PARITY 'PAR0' CAN FORCE A TRAP
2461 T14 CHECK THAT BAD PARITY 'PAR1' CAN FORCE A TRAP
2570 T15 CHECK THAT BAD PARITY 'PAR2' CAN FORCE A TRAP
2678 T16 CHECK WCS DATA PATH DBUF (15 0), BUS DIN (15 0), LOC 0
2755 T17 CHECK WCS DATA PATH BUS DIN (31 16), LOC2000
2837 T20 CHECK WCS DATA PATH BUS DIN (47:32), LOC 4000
2920 T21 CHECK THE THREE HI-BYTE PARITY CHECKERS
3096 T22 CHECK THE THREE LO-BYTE PARITY CHECKERS
3270 T23 CHECK ADDRESSING FOR DATA ARRAY <11.0>, ADDRESS<9 0>
3425 T24 CHECK ADDRESSING FOR DATA ARRAY (23·12),ADDRESS(7:0)
3575 T25 CHECK ADDRESSING FOR DATA ARRAY (23.12), ADDRESS (9 8)
3723 T26 CHECK ADDRESSING FOR DATA ARRAY (35 24), ADDRESS (7 0)
3872 T27 CHECK ADDRESSING FOR DATA ARRAY (35 24), ADDRESS (9 8)
4020 T30 CHECK ADDRESSING FOR DATA ARRAY (47 36),ADDRESS (9 0)
4169 T31 CHECK ADDRESS REGISTER - ADREG(11 0)
4206 T32 TEST DATA ARRAY-MARCHING 1'S AND 0'S
4291 T33 TEST DATA ARRAY MARCHING 0'S AND 1'S
4376 T34 TEST PARITY BIT STORAGE CHIPS-MARCHING 1'S AND 0'S
4503 T35 TEST PARITY BIT STORAGE CHIPS, MARCHING 0'S AND 1'S
4629 T36 CHECK WCS WATCH-DOG TIMER
4670 T37 CHECK THE WCS INITIALIZATION BY BM MICRO-CODE
4738 ---TEST OF WCS XFC OPCODE DISPATCH---
4745 T40 CHECK "OTHER USER" DISPATCH TO 6001, XFC=076000-076077
4844 T41 CHECK "OTHER USER" DISPATCH TO 6011, XFC=076100-076177
4943 T42 CHECK "OTHER USER" DISPATCH TO 6012, XFC=076200-076277
5037 T43 CHECK "OTHER USER" DISPATCH TO 6013, XFC=076300-076377
5131 T44 CHECK "OTHER USER" DISPATCH TO 6014, XFC=076400-076477
5230 T45 CHECK "OTHER USER" DISPATCH TO 6015, XFC=076500-076577
5329 T46 CHECK "USER" DISPATCH TO 6002, XFC=076700-076777
5425 T47 CHECK "ODD PC" DISPATCH TO WCS AT 6004
5518 T50 CHECK "MICRO-BREAK" DISPATCH TO WCS AT 6000
5614 T51 CHECK "FLAG<7> WCS SERVICE" DISPATCH TO WCS AT 6005
5704 T52 CHECK "RESERVED INSTRUCTION" DISPATCH TO 6003 IN WCS
5800 T53 CHECK THAT XFC TRAPS OUT AS RESVD-INST WHEN WCS S DISABLED
5898 ---CHECK OF TMS ROM FUNCTIONS---
5905 T54 CHECK BLOCK MOVE OF GR'S TO WCS
6042 T55 CHECK BLOCK MOVE FROM WCS TO GR'S

6208 T56 CHECK BLOCK MOVE OF FLOATING POINT REGISTERS TO WCS
6323 T57 CHECK BLOCK MOVE FROM WCS TO WFP REGISTERS
6487 T60 CHECK BLOCK MOVE OF C-SCRATCH PAD REGISTERS TO WCS
6605 T61 CHECK BLOCK MOVE FROM WCS TO C-SCRATCH PAD, CSP
6761 T62 CHECK BLOCK MOVE OF USER-SCRATCH PAD REGISTERS TO WCS
6873 T63 CHECK BLOCK MOVE FROM WCS TO USER-SCRATCH PAD,USP
7021 T64 CHECK BLOCK STORE OF LOAD-WRITE-2 TO WCS
7137 T65 CHECK BLOCK LOAD OF LOAD-READ-2 FROM WCS
7252 T66 CHECK BLOCK STORE OF SET-STORE, WRITE-2 TO WCS
7368 T67 CHECK BLOCK LOAD OF SET-LOAD, INC-READ-2 FROM WCS
7483 T70 CHECK BLOCK STORE OF WRITE-INDIRECT TO WCS
7601 T71 CHECK BLOCK LOAD OF READ-INDIRECT FROM WCS
7719 T72 CHECK BLOCK STORE OF WFP AC 0 1 TO WCS
7846 T73 CHECK BLOCK STORE OF WFP AC 2 3 TO WCS
7972 T74 CHECK BLOCK STORE OF WFP AC 4 5 TO WCS
8095 T75 CHECK BLOCK LOAD OF WFP AC 0 1 FROM WCS
8221 T76 CHECK BLOCK LOAD OF WFP AC 2 3 FROM WCS
8344 T77 CHECK BLOCK LOAD OF WFP AC 4 5 FROM WCS
8470 T100 CHECK BLOCK STORE OF ASPAD 00 37 TO WCS
8647 T101 CHECK BLOCK STORE OF BSPAD 00 37 TO WCS
8821 T102 CHECK BLOCK STORE OF CSPAD 17 00 TO WCS
8976 T103 CHECK BLOCK LOAD OF ASPAD 00 37 FROM WCS
9189 T104 CHECK BLOCK LOAD OF BSPAD 00 37 FROM WCS
9406 T105 CHECK BLOCK LOAD OF CSPAD 17 00 FROM WCS
9584 T106 CHECK BLOCK STORE OF A&BSP TEMPS TO WCS
9737 T107 CHECK BLOCK LOAD OF A&BSP TEMPS FROM WCS
9909 T110 END
9922 END OF PASS ROUTINE
10415 SCOPE HANDLER ROUTINE
10479 ERROR HANDLER ROUTINE
10531 ERROR MESSAGE TYPEOUT ROUTINE
10578 BINARY TO OCTAL (ASCII) AND TYPE
10655 CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
10722 TYPE ROUTINE
10801 APT COMMUNICATIONS ROUTINE
10858 TRAP DECODER
10881 TRAP TABLE
10897 POWER DOWN AND UP ROUTINES
10947 MESSAGES
11051 ERROR MESSAGES
11984 ERROR DATA HEADERS
12151 ERROR DATA VECTORS
12163 MICRO-CODE

```
                                        ENABL  ABS,AMA

                                 TITLE  PDP-11/60 WCS DIAGNOSTIC
                                ,*COPYRIGHT (C) 1977
                                ,*DIGITAL EQUIPMENT CORP.
                                ,*MAYNARD, MASS. 01754
                                ,*
                                ,*PROGRAM BY JIM KAPADIA
                                ,*
                                ,*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ,*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977
                                ,*

                                 SBTTL  BASIC DEFINITIONS

                                ,*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
        001100                  STACK=  1100
                                 EQUIV  EMT,ERROR        ,,BASIC DEFINITION OF ERROR CALL
                                 EQUIV  IOT,SCOPE        ,,BASIC DEFINITION OF SCOPE CALL

                                ,*MISCELLANEOUS DEFINITIONS
        000011                  HT=     11              ,,CODE FOR HORIZONTAL TAB
        000012                  LF=     12              ,,CODE FOR LINE FEED
        000015                  CR=     15              ,,CODE FOR CARRIAGE RETURN
        000200                  CRLF=   200             ,,CODE FOR CARRIAGE RETURN-LINE FEED
        177776                  PS=     177776          ,,PROCESSOR STATUS WORD
                                 EQUIV  PS,PSW
        177774                  STKLMT= 177774          ,,STACK LIMIT REGISTER
        177772                  PIRQ=   177772          ,,PROGRAM INTERRUPT REQUEST REGISTER
        177570                  DSWR=   177570          ,,HARDWARE SWITCH REGISTER
        177570                  DDISP=  177570          ,,HARDWARE DISPLAY REG STER

                                ,*GENERAL PURPOSE REGISTER DEFINITIONS
        000000                  R0=     %0              ,,GENERAL REGISTER
        000001                  R1=     %1              ,,GENERAL REGISTER
        000002                  R2=     %2              ,,GENERAL REGISTER
        000003                  R3=     %3              ,,GENERAL REGISTER
        000004                  R4=     %4              ,,GENERAL REGISTER
        000005                  R5=     %5              ,,GENERAL REGISTER
        000006                  R6=     %6              ,,GENERAL REGISTER
        000007                  R7=     %7              ,,GENERAL REGISTER
        000006                  SP=     %6              ,,STACK POINTER
        000007                  PC=     %7                PROGRAM COUNTER

                                 *PRIORITY LEVEL DEFINITIONS
        000000                  PR0=    0               ,,PRIORITY LEVEL 0
        000040                  PR1=    40              ,,PRIORITY LEVEL 1
        000100                  PR2=    100             ,,PRIORITY LEVEL 2
        000140                  PR3=    140             ,,PRIORITY LEVEL 3
        000200                  PR4=    200             ,,PRIORITY LEVEL 4
        000240                  PR5=    240             ,,PRIORITY LEVEL 5
        000300                  PR6=    300             ,,PRIORITY LEVEL 6
        000340                  PR7=    340             ,,PRIORITY LEVEL 7

                                ,*"SWITCH REGISTER" SWITCH DEFINITIONS
```

```
        100000          SW15=   100000
        040000          SW14=   40000
        020000          SW13=   20000
        010000          SW12=   10000
        004000          SW11=   4000
        002000          SW10=   2000
        001000          SW09=   1000
        000400          SW08=   400
        000200          SW07=   200
        000100          SW06=   100
        000040          SW05=   40
        000020          SW04=   20
        000010          SW03=   10
        000004          SW02=   4
        000002          SW01=   2
        000001          SW00=   1
                         EQUIV  SW09,SW9
                         EQUIV  SW08,SW8
                         EQUIV  SW07,SW7
                         EQUIV  SW06,SW6
                         EQUIV  SW05,SW5
                         EQUIV  SW04,SW4
                         EQUIV  SW03,SW3
                         EQUIV  SW02,SW2
                         EQUIV  SW01,SW1
                         EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
        100000          BIT15=  100000
        040000          BIT14=  40000
        020000          BIT13=  20000
        010000          BIT12=  10000
        004000          BIT11=  4000
        002000          BIT10=  2000
        001000          BIT09=  1000
        000400          BIT08=  400
        000200          BIT07=  200
        000100          BIT06=  100
        000040          BIT05=  40
        000020          BIT04=  20
        000010          BIT03=  10
        000004          BIT02=  4
        000002          BIT01=  2
        000001          BIT00=  1
                         EQUIV  BIT09,BIT9
                         EQUIV  BIT08,BIT8
                         EQUIV  BIT07,BIT7
                         EQUIV  BIT06,BIT6
                         EQUIV  BIT05,BIT5
                         EQUIV  BIT04,BIT4
                         EQUIV  BIT03,BIT3
                         EQUIV  BIT02,BIT2
                         EQUIV  BIT01,BIT1
                         EQUIV  BIT00,BIT0

                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
```

```
                000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
                000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
                000014          TBITVEC=14              ;;"T" BIT
                000014          TRTVEC= 14              ;;TRACE TRAP
                000014          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
                000020          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
                000024          PWRVEC= 24              ;;POWER FAIL
                000030          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
                000034          TRAPVEC=34              ;;"TRAP" TRAP
                000060          TKVEC=  60              ;;TTY KEYBOARD VECTOR
                000064          TPVEC=  64              ;;TTY PRINTER VECTOR
                000240          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR

                                 SBTTL  TRAP CATCHER

                000000                  =0
                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                000174                  =174
        000174  000000          DISPREG  .WORD  0               ;;SOFTWARE DISPLAY REGISTER
        000176  000000          SWREG     WORD  0               ;;SOFTWARE SWITCH REGISTER
                                 SBTTL  STARTING ADDRESS(ES)
        000200  000137  001450          JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM

                                 SBTTL  APT PARAMETER BLOCK

                                ;;*****************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;*****************************************************************
                000204                  $X=     ;;SAVE CURRENT LOCATION
                000024                  =24     ;;SET POWER FAIL TO POINT TO START OF PROGRAM
        000024  000200                  200     ;;FOR APT START UP
                000044                  =44     ;;POINT TO APT INDIRECT ADDRESS PNTR
        000044  000204                  $APTHDR ;;POINT TO APT HEADER BLOCK
                000204                  = $X    ; RESET LOCATION COUNTER
                                ;;*****************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC

        000204                  $APTHD
        000204  000000          $HIBTS   WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR
        000206  001236          $MBADR   WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
        000210  000036          $TSTM    WORD   30      ;;RUN TIM OF LONGEST TEST
        000212  000024          $PASTM   WORD   20      ;;RUN TIME IN SECS  OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
        000214  000000          $UNITM   WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
        000216  000052                  .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                                 SBTTL  ACT11 HOOKS

                                ;*****************************************************************
                                 HOOKS REQUIRED BY ACT11
                000220                  $SVPC=                  ;SAVE PC
                000046                  =46
        000046  036514                  $ENDAD                  ;;1)SET LOC 46 TO ADDRESS OF $ENDAD IN  $EOP
                000052                  =52
        000052  000000                  WORD    0               ;;2)SET LOC 52 TO ZERO
```

```
1c3          000220                    =$SVPC                  ;; RESTORE PC
```

```
                                  SBTTL  COMMON TAGS

                                ;;*****************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM

          001100                          =1100
  001100                        $CMTAG                          ;;START OF COMMON TAGS
  001100  000000                          WORD    0
  001102     000                $TSTNM   BYTE    0              ;;CONTAINS THE TEST NUMBER
  001103     000                $ERFLG   BYTE    0              ;;CONTAINS ERROR FLAG
  001104  000000                $ CNT    WORD    0              ;;CONTAINS SUBTEST ITERATION COUNT
  001106  000000                $LPADR   WORD    0              ;;CONTAINS SCOPE LOOP ADDRESS
  001110  000000                $LPERR   WORD    0              ;;CONTAINS SCOPE RETURN FOR ERRORS
  001112  000000                $ERTTL   WORD    0              ;;CONTAINS TOTAL ERRORS DETECTED
  001114     000                $ITEMB   BYTE    0              ;;CONTAINS ITEM CONTROL BYTE
  001115     001                $ERMAX   BYTE    1              ;;CONTAINS MAX  ERRORS PER TEST
  001116  000000                $ERRPC   WORD    0              ;;CONTAINS PC OF LAST ERROR INSTRUCT ON
  001120  000000                $GDADR   WORD    0              ;;CONTAINS ADDRESS OF 'GOOD' DATA
  001122  000000                $BDADR   WORD    0              ;;CONTAINS ADDRESS OF 'BAD' DATA
  001124  000000                $GDDAT   WORD    0              ;;CONTAINS 'GOOD' DATA
  001126  000000                $BDDAT   WORD    0              ;;CONTAINS 'BAD' DATA
  001130  000000                         WORD    0              ;;RESERVED--NOT TO BE USED
  001132  000000                         WORD    0
  001134     000                $AUTOB   BYTE    0              ;;AUTOMATIC MODE INDICATOR
  001135     000                $INTAG   BYTE    0              ;;INTERRUPT MODE INDICATOR
  001136  000000                         WORD    0
  001140  177570                SWR      WORD    DSWR           ;;ADDRESS OF SWITCH REGISTER
  001142  177570                DISPLAY   WORD   DDISP          ;;ADDRESS OF DISPLAY REGISTER
  001144  177560                $TKS    177560                  ;;TTY KBD STATUS
  001146  177562                $TKB    177562                  ;;TTY KBD BUFFER
  001150  177564                $TPS    177564                  ;TTY PRINTER STATUS REG  ADDRESS
  001152  177566                $TPB    177566                  ;TTY PRINTER BUFFER REG. ADDRESS
  001154     000                $NULL    BYTE    0              ;;CONTAINS NULL CHARACTER FOR FILLS
  001155     002                $FILLS   BYTE    2              ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
  001156     012                $FILLC   BYTE    12             ;;INSERT FILL CHARS  AFTER A "LINE FEED"
  001157     000                $TPFLG   BYTE    0              ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
  001160  000000                $REGAD   WORD    0              ;;CONTAINS THE ADDRESS FROM
                                                                ;;WHICH  ($REG0) WAS OBTAINED
  001162  000000                $REG0    WORD    0              ;;CONTAINS (($REGAD)+0)
  001164  000000                $REG1    WORD    0              ;;CONTAINS (($REGAD)+2)
  001166  000000                $REG2    WORD    0              ;;CONTAINS (($REGAD)+4)
  001170  000000                $REG3    WORD    0              ;;CONTAINS (($REGAD)+6)
  001172  000000                $REG4    WORD    0              ;;CONTAINS (($REGAD)+10)
  001174  000000                $REG5    WORD    0              ;;CONTAINS (($REGAD)+12)
  001176  000000                $REG6    WORD    0              ;;CONTAINS (($REGAD)+14)
  001200  000000                $REG7    WORD    0              ;;CONTAINS (($REGAD)+16)
  001202  000000                $TMP0    WORD    0              ;;USER DEFINED
  001204  000000                $TMP1    WORD    0              ;;USER DEFINED
  001206  000000                $TMP2    WORD    0              ;;USER DEFINED
  001210  000000                $TMP3    WORD    0              ;;USER DEFINED
  001212  000000                $TMP4    WORD    0              ;;USER DEFINED
  001214  000000                $TMP5    WORD    0              ;;USER DEFINED
  001216  000000                $TMP6    WORD    0              ;;USER DEFINED
  001220  000000                $TMP7    WORD    0              ;;USER DEFINED
  001222  000000                $TIMES  0                       ;MAX  NUMBER OF  TEPHT  N
```

```
001224  000000                  $ESCAPE 0                       ;;ESCAPE ON ERROR ADDRESS
001226  177607  000377          $BELL    ASCIZ  <207><377><377> ;;CODE FOR BELL
001232     077                  $QUES    ASCII  /?/             ;;QUESTION MARK
001233     015                  $CRLF    ASCII  <15>            ;;CARRIAGE RETURN
001234  000012                  $LF      ASCIZ  <12>            ;;LINE FEED
                                ;;*****************************************************************
                                 SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                 EVEN
001236                          $MAIL                           ;;APT MAILBOX
001236  000000                  $MSGTY   WORD   AMSGTY          ;;MESSAGE TYPE CODE
001240  000000                  $FATAL   WORD   AFATAL          ;;FATAL ERROR NUMBER
001242  000000                  $TESTN   WORD   ATESTN          ;;TEST NUMBER
001244  000000                  $PASS    WORD   APASS           ;;PASS COUNT
001246  000000                  $DEVCT   WORD   ADEVCT          ;;DEVICE COUNT
001250  000000                  $UNIT    WORD   AUNIT           ;;I/O UNIT NUMBER
001252  000000                  $MSGAD   WORD   AMSGAD          ;;MESSAGE ADDRESS
001254  000000                  $MSGLG   WORD   AMSGLG          ;;MESSAGE LENGTH
001256                          $ETABLE                         ;;APT ENVIRONMENT TABLE
001256     000                  $ENV     BYTE   AENV            ;;ENVIRONMENT BYTE
001257     000                  $ENVM    BYTE   AENVM           ;;ENVIRONMENT MODE BITS
001260  000000                  $SWREG   WORD   ASWREG          ;;APT SWITCH REGISTER
001262  000000                  $USWR    WORD   AUSWR           ;;USER SWITCHES
001264  000000                  $CPUOP   WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                                ;*                              BITS 15-11=CPU TYPE
                                 *                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                ;*                                      11/70=06,PDQ=07,Q=10
                                ;*                              BIT 10=REAL TIME CLOCK
                                ;*                              BIT  9=FLOATING POINT PROCESSOR
                                ;*                              BIT  8=MEMORY MANAGEMENT
001266     000                  $MAMS1   BYTE   AMAMS1          ;;HIGH ADDRESS,M S  BYTE
001267     000                  $MTYP1   BYTE   AMTYP1          ;;MEM  TYPE,BLK#1
                                ;*                              MEM TYPE BYTE   --  (HIGH BYTE)
                                ;*                                      900 NSEC CORE=001
                                ;*                                      300 NSEC BIPOLAR=002
                                ;*                                      500 NSEC MOS=003
001270  000000                  $MADR1   WORD   AMADR1          ;;HIGH ADDRESS,BLK#1
                                ;*                                MEM LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
001272     000                  $MAMS2   BYTE   AMAMS2          ;;HIGH ADDRESS,M S  BYTE
001273     000                  $MTYP2   BYTE   AMTYP2          ;;MEM TYPE,BLK#2
001274  000000                  $MADR2   WORD   AMADR2          ;;MEM LAST ADDRESS,BLK#2
001276     000                  $MAMS3   BYTE   AMAMS3          ;;HIGH ADDRESS,M.S BYTE
001277     000                  $MTYP3   BYTE   AMTYP3          ;;MEM.TYPE,BLK#3
001300  000000                  $MADR3   WORD   AMADR3          ;;MEM.LAST ADDRESS,BLK#3
001302     000                  $MAMS4   BYTE   AMAMS4          ;;HIGH ADDRESS,M S BYTE
001303     000                  $MTYP4   BYTE   AMTYP4          ;;MEM TYPE,BLK#4
001304  000000                  $MADR4   WORD   AMADR4          ;;MEM LAST ADDRESS,BLK#4
001306  000000                  $VECT1   WORD   AVECT1          ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001310  000000                  $VECT2   WORD   AVECT2          ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001312  000000                  $BASE    WORD   ABASE           ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001314  000000                  $DEVM    WORD   ADEVM           ;;DEVICE MAP
001316  000000                  $CDW1    WORD   ACDW1           ;;CONTROLLER DESCRIPTION WORD#1
001320  000000                  $CDW2    WORD   ACDW2           ;;CONTROLLER DESCRIPTION WORD#2
001322  000000                  $DDW0    WORD   ADDW0           ;;DEVICE DESCRIPTOR WORD#0
001324  000000                  $DDW1    WORD   ACDW1           ;;DEVICE DESCRIPTOR WORD#1
```

```
282  001326  000000          $DDW2    WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
283  001330  000000          $DDW3    WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
284  001332  000000          $DDW4    WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
285  001334  000000          $DDW5    WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
286  001336  000000          $DDW6    WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
287  001340  000000          $DDW7    WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
288  001342  000000          $DDW8    WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
289  001344  000000          $DDW9    WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
290  001346  000000          $DDW10   WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
291  001350  000000          $DDW11   WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
292  001352  000000          $DDW12   WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
293  001354  000000          $DDW13   WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
294  001356  000000          $DDW14   WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
295  001360  000000          $DDW15   WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
296
297
298  [illegible]             SETEND
299
```

```
                                 SBTTL  ERROR POINTER TABLE

                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB  THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT
                                ;*NOTE1          IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC)
                                ;*NOTE2          EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS

                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT


  001362                        $ERRTB

                                         ERROR TABLE

                                ;ITEM 1

  001362  043240                        EM1                     ;TIMEOUT ON REFERENCING WCS REGISTER
  001364  055536                        DH1                     ;PC     REG ADRS
  001366  057320                        DT1                     ;$ERRPC $REGO
  001370  000000                        0

                                ;ITEM 2

  001372  043304                        EM2                     ;'WCS PRESENT' BIT NOT SET IN WHAMI
  001374  055557                        DH2                     ;PC     WHAMI
  001376  057320                        DT1                     ;$ERRPC $REGO
  001400  000000                        0

                                ;ITEM 3

  001402  043347                        EM3                     ;WCS ID CODE (BIT 14) NOT SET
  001404  055575                        DH3                     ;PC     STATUS
  001406  057320                        DT1                     ;$ERRPC $REGO
  001410  000000                        0

                                ;ITEM 4

  001412  043402                        EM4                     ;'PARITY DISABLE' BIT NOT CLEAR
  001414  055575                        DH3                     ;PC     STATUS
  001416  057320                        DT1                     ;$ERRPC $REGO
  001420  000000                        0

                                ;ITEM 5

  001422  043441                        EM5                     ;'WRITE WRONG PARITY' BIT NOT CLEAR
  001424  055575                        DH3                     ;PC     STATUS
  001426  057320                        DT1                     ;$ERRPC $REGO
  001430  000000                        0

                                ;ITEM 6

  001432  043504                        EM6                     ;'PARITY DISABLE' BIT NOT SET
  001434  055575                        DH3                     ;PC     STATUS
```

```
001436  057320                  DT1             ;$ERRPC $REG0
001440  000000                  0
                        ;ITEM 7
001442  043541                  EM7             ; PARITY ERROR' NOT CLEAR
001444  055575                  DH3             ;PC     STATUS
001446  057320                  DT1             ;$ERRPC $REG0
001450  000000                  0
                        ;ITEM 10
001452  043572                  EM10            ;'WR TE WRONG PARITY  BIT NOT SET
001454  055575                  DH3             ;PC     STATUS
001456  057320                  DT1             ;$ERRPC $REG0
001460  000000                  0
                        ;ITEM 11
001462  043633                  EM11            ;STATUS ERROR ON WRITE TO WCS LOCATION
001464  055614                  DH11            ;PC     EXPCT   RECVD   LOC     PATRN
001466  057326                  DT11            ;$ERRPC $REG0   $REG1   $REG2   $REG3
001470  000000                  0
                        ;ITEM 12
001472  043701                  EM12            ;DATA ERROR ON READ FROM WCS LOCATION
001474  055663                  DH12            ;PC     LOC     EXPCT   RECVD
001476  057342                  DT12            ;$ERRPC $REG0   $REG1   $REG2
001500  000000                  0
                        ;ITEM 13
001502  043746                  EM13            ;STATUS ERROR ON READ FROM WCS LOCATION
001504  055614                  DH11            ;PC     EXPCT   RECVD   LOC     PATRN
001506  057326                  DT11            ;$ERRPC $REG0   $REG1   $REG2   $REG3
001510  000000                  0
                        ;ITEM 14
001512  044015                  EM14            ;TRAP AT LOCATION
001514  055722                  DH14            ;PC     TRPLOC
001516  057320                  DT1             ;$ERRPC $REG0
001520  000000                  0
                        ;ITEM 15
001522  044036                  EM15            ;INCORRECT PARITY BIT GENERATED FOR PATTERN
001524  055741                  DH15            ;PC     PATRN   EXPCTD PAR
001526  057354                  DT15            ;$ERRPC $REG0   $REG1
001530  000000                  0
                        ;ITEM 16
001532  044111                  EM16            ;INCORRECT PARITY BIT GENERATED -BIT7- (WITH WWP) FOR PA
                                                                                                    TTERN
```

```
001534  056000          DH17        ,PC     STATUS  PATRN
001536  057354          DT15        ,$ERRPC $REG0   $REG1
001540  000000          0

                  ,ITEM 17

001542  044204          EM17        ,UNEXPECTED PARITY TRAP ON READING BAD PARITY THOUGH 'PA
                                                                                  RDIS' WAS SET
001544  056000          DH17        ,PC     STATUS  PATERN
001546  057354          DT15        ,$ERRPC $REG0   $REG1
001550  000000          0

                  ,ITEM 20

001552  044311          EM20        ,'PARITY ERROR' DID NOT SET ON PARITY ERROR TRAP
001554  055575          DH3         ,PC     STATUS
001556  057320          DT1         ,$ERRPC $REG0
001560  000000          0

                  ;ITEM 21

001562  044371          EM21        ,INCORRECT PARITY BIT STORED
001564  056027          DH21        ,PC     LOC     PATRN   STATUS
001566  057342          DT12        ,$ERRPC $REG0   $REG1   $REG2
001570  000000          0

                  ITEM 22

001572  044425          EM22        ,NO PARITY ERROR TRAP ON READING WRONG PARITY
001574  056027          DH21        ,PC     LOC     PATRN   STATUS
001576  057342          DT12         $ERRPC $REG0   $REG1   $REG2
001600  000000          0

                  , TEM 23

001602  044502          EM23        ,'PARITY ERROR' BIT NOT SET ON READING BAD PARITY
001604  055575          DH3          PC     STATUS
001606  057320          DT1         ,$ERRPC $REFG0
001610  000000          0

                  ITEM 24

001612  044563          EM24        ,SETTING 'PARDIS' DID NOT CLEAR 'PARERR'
001614  055575          DH3         ,PC     STATUS
001616  057320          DT1          $ERRPC $REG0
001620  000000          0

                  ITEM 25

001622  044633          EM25        ,BAD PARITY NOT DETECTED BY CHECKER
001624  056027          DH21        ,PC     LOC     PATRN   STATUS
001626  057342          DT12        ,$ERRPC $REG0   $REG1   $REG2
001630  000000          0

                  ITEM 26
```

```
001632  044676                  EM26            ,PARITY ERROR ON READING WCS
001634  056075                  DH26            ,PC     LOC     EXPCT   STATUS
001636  057342                  DT12            ,$ERRPC $REG0   $REG1   $REG2
001640  000000                  0

                        ,ITEM 27

001642  044732                  EM27            ,TRAP AT LOCATION, ON DOING READ
001644  055722                  DH14            ,PC     TRPLOC
001646  057320                  DT1             ,$ERRPC $REG0
001650  000000                  0

                        ,ITEM   30

001652  044772          EM30    ,CORRECT XFC CODE WAS NOT SAVED ON "OTHER USEP" DISPATCH OF XFC
001654  056134          DH30    ,PC     EXPCTD XFC      RECVL
001656  057354          DT15    ,$ERRPC $REG0   $REG1
001660  000000          0

                        ,ITEM   31

001662  045074          EM31    ,WATCH-DOG TIMED OUT ON "OTHER USER" DISPATCH OF XFC
001664  056200          DH31    ,PC     XFC CODE
001666  057320          DT1     ,$ERRPC $REG0
001670  000000          C

                        ,ITEM   32

001672  045163          EM32    ,CORRECT XFC CODE WAS NOT SAVED ON "USER" DISPATCH OF XFC
001674  056134          DH30    ,PC     EXPCTD XFC      RECVD
001676  057354          DT15    ,$ERRPC $REG0   $REG1
001700  000000          0

                        ,ITEM   33

001702  045257          EM33    ,WATCH-DOG TIMED OUT ON "USER" DISPATCH OF XFC
001704  056200          DH31    ,PC     XFC CODE
001706  057320          DT1      $ERRPC $REG0
001710  000000          0

                        ,ITEM   34

001712  045340          EM34    ,FLAG NOT =1 UPON ENTERING WCS VIA "ODD PC" DISPATCH
001714  056221          DH34    ;PC  R3-FLAG
001716  057320          DT1     .$ERRPC  $REG0
001720  000000          0

                        ,ITEM   35

001722  045425          EM35    ,WATCH-DOG TIMED OUT ON "ODD PC" DISPATCH T  WCS
001724  056066          DH23    ,PC
001726  057364          DT23    ,$ERRPC
001730  000000          0

                         ITEM   36
```

```
001732  045510          EM36    ;FLAG NOT =1 UPON ENTERING WCS VIA "MICROBREAK" DISPATCH
001734  056221          DH34    ;PC  R3-FLAG
001736  057320          DT1     ;$ERRPC  $REG0
001740  000000          0

                        ;ITEM   37

001742  045602          EM37    ;WATCH-DOG TIMED OUT ON "MICRO-BREAK" DISPATCH TO WCS
001744  056066          DH23    ;PC
001746  057364          DT23    ;$ERRPC
001750  000000          0

                        ;ITEM   40

001752  045672          EM40    ;CORRECT DATA NOT STORED ON BLOCK MOVE OF GR'S TO WCS
001754  056241          DH40    ;PC     WCS LOC  EXPCT  RECVD   GR#
001756  057326          DT40    ;$ERRPC $REG0   $REG1   $REG2   $REG3
001760  000000          0

                        ;ITEM   41

001762  045757          EM41    ;WATCH-DOG TIMED OUT ON STORING GR'S IN WCS
001764  056200          DH31    ;PC     XFC CODE
001766  057320          DT1     ;$ERRPC $REG0
001770  000000          0

                        ;ITEM   42

001772  046032          EM42     CORRECT DATA NOT STORED ON LOAD OF GR'S FROM WCS
001774  056310          DH42    ;PC     GR#     WCS-LOC EXPCT   RECVD
001776  057326          DT40    ;$ERRPC $REG0   $REG1   $REG2   $REG3
002000  000000          0

                        ;ITEM   43

002002  046113          EM43    ;WATCH-DOG TIMED OUT ON LOADING OF GR'S FROM WCS
002004  056200          DH31    ;PC     XFC CODE
002006  057320          DT1     ;$ERRPC $REG0
002010  000000          0

                        ;ITEM   44

002012  046173          EM44    ;CORRECT RESERVED INST  CODE NOT SAVED ON "RESVD INSTR" DISPATCH TO WCS
002014  056357          DH44    ;PC     EXPCT   RECVD
002016  057354          DT15    ;$ERRPC $REG0   $REG1
002020  000000          0

                        ;ITEM   45

002022  046305          EM45    ;WATCH-DOG TIMED OUT ON "RESVD INST" DISPATCH TO WCS
002024  056066          DH23    ;PC
002026  057364          DT23    ;$ERRPC
002030  000000          0

                         ITEM   46
```

```
002032  046374          EM46    ;CORRECT DATA WAS NOT STORED ON BLOCK MOVE OF FP REGISTERS TO WCS
002034  056406          DH46    ;PC     WCS LOC   EXPCT    RECVD        FP REG#
002036  057326          DT40    ;$ERRPC $REG0   $REG1   $REG2   $REG3
002040  000000          0

                        ;ITEM   47

002042  046476          EM47    ;WTACH-DOG TIMED OUT ON BLCCK MOVE OF FP REGISTERS TO WCS
002044  056066          DH23    ;PC
002046  057364          DT23    ;$ERRPC
002050  000000          0

                        ;ITEM   50

002052  046570          EM50    ;CORRECT DATA WAS NOT STORED ON BLOCK MOVE TO WFP REGISTERS FROM WCS
002054  056455          DH50    ;PC     WFP NO  EXPCT RECVD     WCS LOC
002056  057326          DT40    ;$ERRPC $REG0   $REG1   $REG2   $REG3
002060  000000          0

                        ;ITEM   51

002062  046674          EM51    ;WATCH DOG TIMED OUT ON BLOCK MOVE FROM WCS TO CSP
002064  056066          DH23    ;PC
002066  057364          DT23    ;$ERRPC
002070  000000          0

                        ;ITEM   52

002072  046756          EM52    ;CORRECT DATA WAS NOT STORED ON BLOCK MOVE OF CSP REGISTERS TO WCS
002074  056524          DH52    ;PC     WCS LOC EXPCT   RECVD   CSP NO
002076  057326          DT40    ;$ERRPC $REG0   $REG1   $REG2   $REG3
002100  000000          0

                        ;ITEM   53

002102  047060          EM53    ;WATCH-DOG TIMEC OUT ON BLOCK MOVE OF CSP REGISTERS TO WCS
002104  056066          DH23    ;PC
002106  057364          DT23    ;$ERRPC
002110  000000          0

                        ;ITEM   54

002112  047152          EM54    ;CORRECT DATA WAS NOT STORED ON BLOCK MOVE FROM WCS TO CSP
002114  056573          DH54    ;PC     CSP NO  EXCPT   RECVD   WCS LOC
002116  057326          DT40     $ERRPC $REG0   $REG1   $REG2   $REG3
002120  000000          0

                        ;ITEM   55

002122  047244          EM55    ;WATCH-DOG TIMED OUT ON BLOCK MOVE OF CSP REGISTERS TO WCS
002124  056066          DH23    ;PC
002126  057364          DT23    ;$ERRPC
002130  000000          0

                        ;ITEM   56
```

```
002132  047336          EM56    ;CORRECT DATA WAS NOT STORED ON BLOCK MOVE OF USER SP REG STERS TO WCS
002134  056642          DH56    ;PC     WCS LOC EXPCT   RECVD   USP-MED-RD-CODE
002136  057326          DT40    ;$ERRPC $REGO   $REG1   $REG2   $REG3
002140  000000          0

                        ;ITEM   57

002142  047441          EM57    ;WATCH DOG TIMED OUT ON BLCCK MOVE OF USP REGISTERS TO WCS
002144  056066          DH23    ;PC
002146  057364          DT23    ;$ERRPC
002150  000000          0

                        ;ITEM   60

002152  047534          EM60    ;CORRECT DATA WAS NOT LOADED ON BLOCK MOVE FROM WCS TO USER SP
002154  056642          DH56    ;PC     WCS LOC EXPCT   RECVD   USP-MED-RD-CODE
002156  057326          DT40    ;$ERRPC $REGO   $REG1   $REG2   $REG3
002160  000000          0

                        ;ITEM   61

002162  047641          EM61    ;WATCH DOG TIMED OUT ON BLOCK MOVE FROM WCSS TO USER SP
002164  056066          DH23    ;PC
002166  057364          DT23    ;$ERRPC
002170  000000          0

                        ;ITEM   62

002172  047736          EM62    ;ODD-PC TRAP INSTEAD OF ODD-PC DISPATCH TO WCS
002174  056707          DH62    ;PC     ODD-PC-AT
002176  057320          DT1     ;$ERRPC $REGO
002200  000000          0

                        ;ITEM   63

002202  050014          EM63    ;RESERVED INSTR  TRAP INSTEAD OF RESERVED  INST  DISPATCH TO WCS
002204  056066          DH23    ;PC
002206  057364          DT23    ;$ERRPC
002210  000000          0

                        ;ITEM   64

002212  050110          EM64    ;WCS WATCH-DOG TIMER DEFECTIVE-DID NOT TIME OUT
002214  056066          DH23    ;PC
002216  057364          DT23    ;$ERRPC
002220  000000          0

                        ;ITEM   65

002222  050155          EM65    ;WCS-WATCH-DOG TIMER DEFECTIVE TIME NOT IN
                                ;ACCEPTED RANGE
002224  056731          DH65    ;PC     TIME
002226  057320          DT1     ;$ERRPC $REGO
002230  000000          0

                        ;ITEM   66
```

```
002232  050233          EM66    ;XFC OPCODE DID NOT TRAP AS RESERVED INSTR
                                ;WHEN WCS WAS DISABLED
002234  056200          DH31    ;PC     XFC CODE
002236  057320          DT1     ;$ERRPC $REG0
002240  000000          0

                        ;ITEM   67

002242  050332          EM67    ;WCS INIT DID NOT CLEAR BAD PARITY IN WCS LOCATION
002244  056746          DH67    ;PC     STATUS  LOC
002246  057354          DT15     $ERRPC $REG0   $REG1
002250  000000          0

                        ;ITEM   70

002252  050410          EM70    ;MICRO-WORD LOADED WRONGLY IN WCS AT LOC
002254  055663          DH12    ;PC     LOC     EXPCT   RECVD
002256  057342          DT12    ;$ERRPC $REG0   $REG1   $REG2
002260  000000          0

                        ;ITEM   71

002262  050460          EM71    ;WRONG PARITY BIT-PAR0- (BIT1 IN STAT REG) READ FROM WCS LOC
002264  056775          DH71    ;PC     WCSLOC  STAT REG
002266  057354          DT15    ;$ERRPC $REG0   $REG1
002270  000000          0

                        ;ITEM   72

002272  050552          EM72    ;WRONG PARITY BIT-PAR1- (BIT2 IN STAT REG) READ FROM WCS LOC
002274  056775          DH71    ;PC     WCSLOC  STAT REG
002276  057354          DT15     $ERRPC $REG0   $REG1
002300  000000          0

                        ;ITEM   73

002302  050644          EM73    ;WRONG PARITY BIT-PAR2- (BIT3 IN STAT REG) READ FROM WCS LOC
002304  056775          DH71    ;PC     WCSLOC  STAT REG
002306  057354          DT15    ;$ERRPC $REG0   $REG1
002310  000000          0

                        ;ITEM   74

002312  050736          EM74    ;FLAG NOT =2 UPON ENTERING WCS VIA "FLAG<7>-SWC" DISPATCH
002314  056221          DH34    ;PC  R3-FLAG
002316  057320          DT1      $ERRPC  $REG0
002320  000000          0

                        ;ITEM   75

002322  051030          EM75    ;WATCH-DOG TIMED OUT ON "FLAG<7>-SWC" DISPATCH TO WCS
002324  056066          DH23    ;PC
002326  057364          DT23    ;$ERRPC
002330  000000          0
```

```
                                ;ITEM   76

002332  051120                  EM76    ;INCORRECT DATA STORED DURING 'LOAD WRITE 2' TMS FUNCTION
002334  057024                  DH76    ;  PC     GPR   EXP'D-DATA  RCV'D-DATA  WCS-ADDR
002336  057326                  DT76    ;$ERRPC  $REG0    $REG1       $REG2       $REG3
002340  000000                  0

                                ;ITEM   77

002342  051211                  EM77    ;WATCH-DOG TIMEOUT DURING 'LOAD WRITE 2' TMS FUNCTION
002344  056066                  DH23    ;  PC
002346  057364                  DT23    ;$ERRPC
002350  000000                  0

                                ;ITEM   100

002352  051276                  EM100   ;INCORRECT DATA STORED DURING 'LOAD READ 2' TMS FUNCTION
002354  057073                  DH100   ;  PC     GPR   EXP'D-DATA  RCV'D-DATA
002356  057342                  DT100   ;$ERRPC  $REG0    $REG1       $REG2
002360  000000                  0

                                ;ITEM   101

002362  051366                  EM101   ;WATCH-DOG TIMEOUT DURING 'LOAD READ 2' TMS FUNCTION
002364  056066                  DH23    ;  PC
002366  057364                  DT23    ;$ERRPC
002370  000000                  0

                                ;ITEM   102

002372  051452                  EM102   ;INCORRECT DATA STORED DURING 'SET STORE / WRITE 2' TMS FUNCTION
002374  057024                  DH76    ;  PC     GPR   EXP'D-DATA  RCV'D-DATA  WCS-ADDR
002376  057326                  DT76    ;$ERRPC  $REG0    $REG1       $REG2       $REG3
002400  000000                  0

                                ;ITEM   103

002402  051552                  EM103   ;WATCH-DOG TIMEOUT DURING 'SET STORE / WRITE 2' TMS FUNCTION
002404  056066                  DH23    ;  PC
002406  057364                  DT23    ;$ERRPC
002410  000000                  0

                                ;ITEM   104

002412  051646                  EM104   ;INCORRECT DATA STORED DURING 'SET LOAD / INC READ 2' TMS FUNCTION
002414  057073                  DH100   ;  PC     GPR   EXP'D-DATA  RCV'D-DATA
002416  057342                  DT100   ;$ERRPC  $REG0    $REG1       $REG2
002420  000000                  0

                                ;ITEM   105

002422  051750                  EM105   ;WATCH-DOG TIMEOUT DURING 'SET LOAD / INC READ 2' TMS FUNCTION
002424  056066                  DH23    ;  PC
002426  057364                  DT23    ;$ERRPC
002430  000000                  0
```

```
                                ;ITEM   106

002432  052046                  EM106   ;INCORRECT DATA STORED DURING 'WRITE INDIRECT' TMS FUNCTION
002434  057132                  DH106   ;  PC      ADDR.1  LS@   ADDR 2  EXP'D-DATA  RCV'D-DATA
002436  057370                  DT106   ;$ERRPC   $REG0  $REG1  $REG2      $REG3      $REG4
002440  000000                  0

                                ;ITEM   107

002442  052141                  EM107   ;WATCH-DOG TIMEOUT DURING 'WRITE-INDIRECT  TMS FUNCTION
002444  056066                  DH23    ;  PC
002446  057364                  DT23    ;$ERRPC
002450  000000                  0

                                ;ITEM   110

002452  052230                  EM110   ;INCORRECT DATA STORED DURING 'READ-INDIRECT' TMS FUNCTION
002454  057132                  DH106   ;  PC      ADDR 1  LS@   ADDR 2  EXP'D-DATA  RCV D-DATA
002456  057370                  DT106   ;$ERRPC   $REG0  $REG1  $REG2      $REG3      $REG4
002460  000000                  0

                                ;ITEM   111

002462  052322                  EM111   ;WATCH-DOG TIMEOUT DURING 'READ-INDIRECT' TMS FUNCTION
002464  056066                  DH23    ;  PC
002466  057364                  DT23    ;$ERRPC
002470  000000                  0

                                ;ITEM   112

002472  052410                  EM112   ;INCORRECT DATA STORED DURING 'STORE WFP<0 1>' TMS FUNCTION
002474  057250                  DH112     PC      MED    WCSLOC  E-DATA  R-DATA
002476  057326                  DT112   ;$ERRPC   $REG0   $REG1  $REG2   $REG3
002500  000000                  0

                                ;ITEM   113

002502  052503                  EM113   ;WATCH-DOG TIMEOUT DURING 'STORE WFP 0 1>' TMS FUNCTION
002504  056066                  DH23    ;  PC
002506  057364                  DT23    ;$ERRPC
002510  000000                  0

                                 ITEM   114

002512  052572                  EM114    INCORRECT DATA STORED DURING 'STORE WFP 2 3   TMS FUNCTION
002514  057250                  DH112   ;  PC      MED    WCSLOC  E-DATA  R-DATA
002516  057326                  DT112   ;$ERRPC   $REG0   $REG1  $REG2   $REG3
002520  000000                  0

                                ;ITEM   115

002522  052665                  EM115   ;WATCH-DOG TIMEOUT DURING 'STORE WFP 2 3>' TMS FUNCTION
002524  056066                  DH23    ;  PC
002526  057364                  DT23     $ERRPC
002530  000000                  0
```

```
                                ;ITEM   116

002532  052754                  EM116   ;INCORRECT DATA STORED DURING 'STORE WFP<4 5>' TMS FUNCTION
002534  057250                  DH112   ;  PC      MED     WCSLOC  E-DATA  R-DATA
002536  057326                  DT112   ;$ERRPC   $REG0   $REG1   $REG2   $REG3
002540  000000                  0

                                ;ITEM   117

002542  053047                  EM117   ;WATCH-DOG TIMEOUT DURING 'STORE WFP<4 5>' TMS FUNCTION
002544  056066                  DH23    ;  PC
002546  057364                  DT23    ;$ERRPC
002550  000000                  0

                                ;ITEM   120

002552  053136                  EM120   ;INCORRECT DATA STORED DURING 'LOAD WFP<0 1>' TMS FUNCTION
002554  057211                  DH120   ;  PC      MED     E-DATA  R-DATA
002556  057342                  DT120   ;$ERRPC   $REG0   $REG1   $REG2
002560  000000                  0

                                ;ITEM   121

002562  053220                  EM121   ;WATCH-DOG TIMEOUT DURING 'LOAD WFP<0 1>' TMS FUNCTION
002564  056066                  DH23    ;  PC
002566  057364                  DT23    ;$ERRPC
002570  000000                  0

                                ;ITEM   122

002572  053316                  EM122   ;INCORRECT DATA STORED DURING 'LOAD WFP 2 3>' TMS FUNCTION
002574  057211                  DH120   ;  PC      MED     E-DATA  R-DATA
002576  057342                  DT120   ;$ERRPC   $REG0   $REG1   $REG2
002600  000000                  0

                                ;ITEM   123

002602  053410                  EM123   ;WATCH-DOG TIMEOUT DURING 'LOAD WFP 2 3 ' TMS FUNCTION
002604  056066                  DH23    ;  PC
002606  057364                  DT23    ;$ERRPC
002610  000000                  0

                                ;ITEM   124

002612  053476                  EM124   ;INCORRECT DATA STORED DURING 'LOAD WFP 4 5 ' TMS FUNCTION
002614  057211                  DH120   ;  PC      MED     E-DATA  R-DATA
002616  057342                  DT120   ;$ERRPC   $REG0   $REG1   $REG2
002620  000000                  0

                                ;ITEM   125

002622  053570                  EM125   ;WATCH-DOG TIMEOUT DURING 'LOAD WFP 4 5 ' TMS FUNCTION
002624  056066                  DH23    ;  PC
002626  057364                  DT23    ;$ERRPC
002630  000000                  0
```

```
                                  ,ITEM   126

002632  053656                    EM126   ,INCORRECT DATA STORED DURING 'STORE ASPAD 00 37 ' TMS FUNCTION
002634  057250                    DH126   ,  PC     MED    WCSLOC  E-DATA  R-DATA
002636  057326                    DT11    ,$ERRPC   $REG0   $REG1  $REG2   $REG3
002640  000000                    0

                                  ,ITEM   127

002642  053755                    EM127   ,WATCH-DOG TIMEOUT DURING 'STORE ASPAD 00 37 ' TMS FUNCTION
002644  056066                    DH23    ,  PC
002646  057364                    DT23    ,$ERRPC
002650  000000                    0

                                  ,ITEM   130

002652  054050                    EM130   ,INCORRECT DATA STORED DURING 'STORE BSPAD 00 37 ' TMS FUNCTION
002654  057250                    DH130   ,  PC     MED    WCSLOC  E-DATA  R-DATA
002656  057326                    DT11    ,$ERRPC   $REG0   $REG1  $REG2   $REG3
002660  000000                    0

                                  ,ITEM   131

002662  054147                    EM131    WATCH-DOG TIMEOUT DURING 'STORE BSPAD 00 37 ' TMS FUNCTION
002664  056066                    DH23    ,  PC
002666  057364                    DT23    ,$ERRPC
002670  000000                    0

                                  ,ITEM   132

002672  054242                    EM132   ,INCORRECT DATA STORED DURING 'STORE CSPAD 17 00 ' TMS FUNCTION
002674  057250                    DH132   ,  PC     MED    WCSLOC  E-DATA  R-DATA
002676  057326                    DT11     $ERRPC   $REG0   $REG1  $REG2   $REG3
002700  000000                    0

                                  ,ITEM   133

002702  054341                    EM133   ,WATCH-DOG TIMEOUT DURING 'STORE CSPAD 17 00 ' TMS FUNCTION
002704  056066                    DH23    ,  PC
002706  057364                    DT23    ,$ERRPC
002710  000000                    0

                                  ,ITEM   134

002712  054434                    EM134    INCORRECT DATA LOADED DURING 'LOAD ASPAD 00 37 ' TMS FUNCTION
002714  057250                    DH126   ,  PC     MED    WCSLOC  E-DATA  R-DATA
002716  057326                    DT11    ,$ERRPC   $REG0   $REG1  $REG2   $REG3
002720  000000                    0

                                  ,ITEM   135

002722  054532                    EM135    WATCH-DOG TIMEOUT DURING 'LOAD ASPAD 00 37 ' TMS FUNCTION
002724  056066                    DH23       PC
002726  057364                    DT23     $ERRPC
002730  000000                    0
```

```
                                ;ITEM   136

002732  054624                  EM136   ;INCORRECT DATA LOADED DURING 'LOAD BSPAD 00 37 ' TMS FUNCTION
002734  057250                  DH130   ;  PC      MED     WCSLOC  E-DATA  R-DATA
002736  057326                  DT11    ;SERRPC   $REG0   $REG1  $REG2   $REG3
002740  000000                  0

                                ;ITEM   137

002742  054722                  EM137   ;WATCH-DOG TIMEOUT DURING  LOAD BSPAD 00 37 ' TMS FUNCTION
002744  056066                  DH23    ;  PC
002746  057364                  DT23     SERRPC
002750  000000                  0

                                ;ITEM   140

002752  055014                  EM140    INCORRECT DATA LOADED DURING 'LOAD CSPAD 17 00   TMS FUNCTION
002754  057250                  DH132   ;  PC      MED     WCSLOC  E-DATA  R-DATA
002756  057326                  DT11    ;SERRPC   $REG0   $REG1  $REG2   $REG3
002760  000000                  0

                                 ITEM   141

002762  055112                  EM141    WATCH-DOG TIMEOUT DURING  LOAD CSPAD 17 00   TMS FUNCTION
002764  056066                  DH23    ;  PC
002766  057364                  DT23     SERRPC
002770  000000                  0

                                 ITEM   142

002772  055204                  EM142   ;INCORRECT DATA LOADED DURING 'LOAD TEMP-S' TMS FUNCTION
002774  057250                  DH132   ;  PC      MED     WCSLOC  E-DATA  R-DATA
002776  057326                  DT11    ;SERRPC   $REG0   $REG1  $REG2   $REG3
003000  000000                  0

                                 ITEM   143

003002  055274                  EM143   ;WATCH-DOG TIMEOUT DURING 'LOAD TEMP-S' TMS FUNCTION
003004  056066                  DH23    ;  PC
003006  057364                  DT23    ;SERRPC
003010  000000                  0

                                 ITEM   144

003012  055360                  EM144    INCORRECT DATA STORED DURING 'STORE TEMP-S' TMS FUNCTION
003014  057250                  DH132    PC      MED     WCSLOC  E-DATA  R-DATA
003016  057326                  DT11     SERRPC   $REG0   $REG1  $REG2   $REG3
003020  000000                  0

                                 ITEM   145

003022  055451                  EM145   ;WATCH-DOG TIMEOUT DURING 'STORE TEMP-S' TMS FUNCTION
003024  056066                  DH23    ;  PC
003026  057364                  DT23     SERRPC
003030  000000                  0
```

```
                                        EVEN
                                        .DEFINITIONS

        100000                          PARERR=BIT15
        000200                          PARGEN=BIT7
        000100                          WRTEN=BIT6
        000040                          WWP=BIT5
        000020                          PARDIS=BIT4
        000010                          PAR2=BIT3
        000004                          PAR1=BIT2
        000002                          PAR0=BIT1
        000001                          WCSPRS=BIT0
        040000                          ID=BIT14

        076600                          MED=76600                       ;MAINTAINANCE EX/DEP
        000022                          RDWHAMI=22
        000222                          WRWHAMI=222
        000305                          WRLWHAMI=305

        177766                          CPUERR=177766
        177770                          MBKREG=177770
        000344                          WRFLAG=344
        000144                          RDFLAG=144
        000071                          SWB01=71
        000210                          RESINS=210
        001000                          MAINT=BIT9
        006001                          OTHDIS=6001
        006005                          F7SVC=6005
        006011                          OTH11=6011
        006012                          OTH12=6012
        006013                          OTH13=6013
        006014                          OTH14=6014
        006015                          OTH15=6015
        006003                          URESIN=6003
        006002                          JDISP=6002
        006004                          ODDPC=6004
        006000                          UBRK=6000
        076700                          XFCUDIS=076700
        125252                          UWDEND=125252

003032  177744                  MEMERR  177744
003034  177540                  WCSST   177540
003036  177542                  WCSAR   177542
003040  177544                  WCSDR   177544

003042  000000                  ATMP0    WORD   0
003044  000000                  ATMP1    WORD   0
003046  000000                  TMP0     WORD   0
003050  000000                  TMP1     WORD   0
003052  000000                  COUNT    WORD   0
003054  000000                  COUNTO   WORD   0
003056  000000                  NXTST    WORD   0
003060     000                  LOCHIP   BYTE   0
003061     000                  HICHIP   BYTE   0
003062     000                  LOCNT    BYTE   0
```

```
003063     000                  HICNT    BYTE   0
003064     000                  EPCNTO   BYTE   0
003065     000                  ERCNT1   BYTE   0

003066  042264                  PMSG2    WORD   MSG2
003070  042271                           WORD   MSG3
003072  042276                           WORD   MSG4
003074  042303                           WORD   MSG5
003076  042322                           WORD   MSG6
003100  042345                           WORD   MSG7
003102  042362                           WORD   MSG8
003104  042403                           WORD   MSG80
003106  042410                           WORD   MSG81
003110  042415                           WORD   MSG82
003112  042423                           WORD   MSG83
003114  042431                           WORD   MSG84
003116  042437                           WORD   MSG85
003120  042445                           WORD   MSG86
003122  042453                           WORD   MSG9


                                 ;THIS TABLE CONTAINS THE ENTRY POINTS FOR ALL THE EIGHT GROUPS
                                 ;OF XFC-OP-CODES  NOTE THAT IN THE SEVENTH GROUP, THE FIRST
                                 ;OP-CODE (076600) IS A VALID "MED" OP-CODE  ALL THE REST
                                 ;OP-CODES SHOULD TRAP AS A RESERVED INSTRUCTION WHEN
                                 ;WCS IS NOT ENABLED

003124  006001                   WCSENT   6001          ;ENTRY POINT FOR 0760XX
003126  006011                            6011          ;FOR 0761XX
003130  006012                            6012          ;FOR 0762XX
003132  006013                            6013          ;FOR 0763XX
003134  006014                            6014           FOR 0764XX
003136  006015                            6015          ;FOR 0765XX
003140  000000                             0            ;FOR 0766XX,  ALL THESE OPCODES TRAP AS
                                                        ;RESERVED INSTRUCTIONS
003142  006002                            6002           FOR 0767XX


                                 ;THIS TABLE CONTAINS THE READ MED CODES FOR WFP
                                 ;ACCUMULATORS  GROUPED AS  0 1 , 2 3, 4 5

003144                           FP05XX

003144     070     030     050   FP01XX   BYTE   70 30,50 10
003147     010
003150     071     031     051            BYTE   71 31,51,11
003153     011

003154     072     032     052   FP23XX   BYTE   72,32,52,12
003157     012
003160     073     033     053            BYTE   73,33,53,13
003163     013

003164     074     034     054   FP45XX   BYTE   74,34,54,14
003167     014
003170     075     035     055            BYTE   75,35,55,15
```

```
003173     015

                                  ;THIS TABLE CONTAINS THE WRITE-MED-CODES FOR THE WARM
                                  ;FLOATING POINT (WFP) REGISTERS  SIX REGISTERS EACH
                                  ;IN BOTTOM HALF OF ASPLO,ASPHI,BSPLO,BSPHI
003174     275                    FAC05W:  BYTE   275     ;FAC0 5
003175     235                             BYTE   235     ;FAC1 5
003176     255                             BYTE   255     ;FAC2 5
003177     215                             BYTE   215     ;FAC3 5
003200     274                             BYTE   274     ;FAC0 4
003201     234                             BYTE   234     ;FAC1 4
003202     254                             BYTE   254     ;FAC2 4
003203     214                             BYTE   214     ;FAC3 4
003204     273                             BYTE   273     ;FAC0 3
003205     233                             BYTE   233     ;FAC1 3
003206     253                             BYTE   253     ;FAC2 3
003207     213                             BYTE   213     ;FAC3 3
003210     272                             BYTE   272     ;FAC0 2
003211     232                             BYTE   232     ;FAC1 2
003212     252                             BYTE   252     ;FAC2 2
003213     212                             BYTE   212     ;FAC3 2
003214     271                             BYTE   271     ;FAC0 1
003215     231                             BYTE   231     ;FAC1 1
003216     251                             BYTE   251     ;FAC2 1
003217     211                             BYTE   211     ;FAC3 1
003220     270                             BYTE   270     ;FAC0 0
003221     230                             BYTE   230     ;FAC1 0
003222     250                             BYTE   250     ;FAC2 0
003223     210                             BYTE   210     ;FAC3 0

                                  ;THIS TABLE CONTAINS THE DATA PATTERNS THAT ARE
                                  ;WRITTEN IN THE WFP REGISTERS IN BASE MACHINE

003224     005                    PFAC05   BYTE   05
003225     015                             BYTE   15
003226     025                             BYTE   25
003227     035                             BYTE   35
003230     004                             BYTE   04
003231     014                             BYTE   14
003232     024                             BYTE   24
003233     034                             BYTE   34
003234     003                             BYTE   03
003235     013                             BYTE   13
003236     023                             BYTE   23
003237     033                             BYTE   33
003240     002                             BYTE   02
003241     012                             BYTE   12
003242     022                             BYTE   22
003243     032                             BYTE   32
003244     001                             BYTE   01
003245     011                             BYTE   11
003246     021                             BYTE   21
003247     031                             BYTE   31
003250     000                             BYTE   00
```

```
003251     010                          BYTE   10
003252     020                          BYTE   20
003253     030                          BYTE   30

                                       ,THIS TABLE CONTAINS THE WRITE-MED-CODES FOR THE C-SCRATCH
                                       ,PAD REGISTERS (CSP)  NOTE THAT CSP 12 , CSP 13 , CSP 14 ,
                                       ,CSP 15  ARE NOT INCLUDED

003254     300                 CSPOOW  BYTE   300     ,CSP 0
003255     301                         BYTE   301     ,CSP 1
003256     302                         BYTE   302     ;CSP 2
003257     303                         BYTE   303     ,CSP 3
003260     304                         BYTE   304     ,CSP 4
003261     305                         BYTE   305     ,CSP 5
003262     306                         BYTE   306     ,CSP 6
003263     307                         BYTE   307     ,CSP 7
003264     310                         BYTE   310     ,CSP 8
003265     311                         BYTE   311     ,CSP 9
003266     312                         BYTE   312     ,CSP 10
003267     313                         BYTE   313     ;CSP 11

003270  000220                 WCSAOW  WORD   220
003272  000260                         WORD   260
003274  000261                         WORD   261


                                       EVEN


                                       BADTMO
                                       ,THIS IS CPU ERROR TRAP HANDLER AND SERVICES UNEXPECTED TIME-OUT
                                       ,TRAPS TO 4   THE ADDRESS (PC) AT WHICH THE TIME-OUT OCCURED IS
                                        TYPED OUT   THE TEST IN WHICH THE TIME-OUT OCCURED IS ABORTED
                                       ,(MESSAGE TYPED) AND A RETURN IS MADE TO THE BEGINING OF THE
                                       ,NEXT TEST (THRU 'NXTST')


003276  011637  037034         BADTMO. MOV    (SP),TRAPC
003302  104401  042552                 TYPE   ,MSG13
003306  013746  177766                 MOV    @#CPUERR,-(SP)  ,GET CPU ERROR REGISTER
003312  104402                         TYPOC                  ,AND TYPE IT OUT
003314  104401  043233                 TYPE   ,MSG31
003320  013746  037034                 MOV    TRAPC,-(SP)
003324  162716  000002                 SUB    #2,(SP)
003330  104402                         TYPOC
003332  104401  042652                 TYPE   ,MSG17
003336  013716  003056                 MOV    NXTST,(SP)      ,ON RETURN GO TH THE NEXT TEST
                                                              ,ENABLE ERROR LOG
003342  000002                         RTI
```

```
                                                ;BADPAR
                                                ;THIS IS A PARITY TRAP HANDLER AND SERVICES UNEXPECTED
                                                ;PARITY ERROR TRAPS TO 114.  THE TRAP COULD BE BECAUSE OF
                                                ;A CACHE PARITY ERROR, MAIN MEMORY PARITY ERROR OR WCS
                                                ;PARITY ERROR. IF THE TRAP WAS DUE TO A CACHE PARITY ERROR
                                                ;THEN A SIMPLE RETURN IS DONE (NO REPORT)   IF THE TRAP
                                                ;WAS DUE TO WCS OR MAIN MEMORY PARITY ERROR IT IS SO
                                                ;REPORTED AND A RETURN IS MADE TO THE BEGINNING OF THE
                                                ;NEXT TEST (THRU 'NXTST').  A MESSAGE, 'TEST ABORTED',
                                                ;IS ALSO PRINTED OUT.  THE ADDRESS (PC) AT WHICH THE TRAP OCCURRED
                                                ;IS ALSO REPORTED

003344  011637  037034          BADPAR  MOV     (SP),TRAPC          ;SAVE OLD PC FROM THE STACK
003350  032777  000340  177454          BIT     #BIT5+BIT6+BIT7,@MEMERR  ;PARITY ERROR FROM CACHE?
003356  001031                          BNE     2$                  ;YES
003360  032777  100000  177444          BIT     #BIT15,@MEMERR      ;PARITY ERROR FROM MEMORY?
003366  001007                          BNE     3$                  ;YES
003370  032777  100000  177436          BIT     #PARERR,@WCSST      ;PARITY ERROR FROM WCS?
003376  001421                          BEQ     2$                  ;NO
003400  104401  043134                  TYPE    ,MSG29              ;UNEXPECTED WCS PARITY ERROR
003404  000402                          BR      4$

003406  104401  043172          3$      TYPE    ,MSG30              ;UNEXPECTED MEMORY PARITY ERROR
003412  104401  043233          4$      TYPE    ,MSG31              ;PC=
003416  013746  037034                  MOV     TRAPC,-(SP)
003422  162716  000002                  SUB     #2,(SP)
003426  104402                          TYPOC
003430  104401  042652                  TYPE    ,MSG17              ;TEST ABORTED
003434  013716  003056                  MOV     NXTST,(SP)          ;RETURN TO BEGINNING OF NEXT TEST
                                                                    ;ENABLE ERROR LOG
003440  000002                          RTI                         ;RETURN

003442  013716  037034          2$      MOV     TRAPC,(SP)          PROCEED WITH NORMAL RETURN
003446  000002                          RTI
```

```
                                        SBTTL  PROGRAM STARTS HERE

                                               ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
003450  012706  001100          START          MOV     #$CMTAG,R6       ;;FIRST LOCATION TO BE CLEARED
003454  005026                                 CLR     (R6)+            ;;CLEAR MEMORY LOCATION
003456  022706  001140                         CMP     #SWR,R6          ;;DONE?
003462  001374                                 BNE     .-6              ;;LOOP BACK IF NO
003464  012706  001100                         MOV     #STACK,SP        ;;SETUP THE STACK POINTER
                                               ;; NITIALIZE A FEW VECTORS
003470  012737  040004  000020                 MOV     #$SCOPE,@#IOTVEC  ;;IOT VECTOR FOR SCOPE ROUTINE
003476  012737  000340  000022                 MOV     #340,@#IOTVEC+2 ;;LEVEL 7
003504  012737  040262  000030                 MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
003512  012737  000340  000032                 MOV     #340,@#EMTVEC+2 ;;LEVEL 7
003520  012737  042014  000034                 MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
003526  012737  000340  000036                 MOV     #340,@#TRAPVEC+2 ;;LEVEL 7
003534  012737  042066  000024                 MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
003542  012737  000340  000026                 MOV     #340,@#PWRVEC+2 ;;LEVEL 7
003550  013737  036462  036454                 MOV     $ENDCT,$EOPCT    ;;SETUP END-OF-PROGRAM COUNTER
003556  005037  001224                         CLR     $ESCAPE          ;;CLEAR THE ESCAPE ON ERROR ADDRESS
003562  112737  000001  001115                 MOVB    #1,$ERMAX        ;;ALLOW ONE ERROR PER TEST
003570  005037  001222                         CLR     $TIMES           ;;INITIALIZE NUMBER OF ITERATIONS
003574  012737  003574  001106                 MOV     #.,$LPADR        ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
003602  012737  003602  001110                 MOV     #.,$LPERR        ;;SETUP THE ERROR LOOP ADDRESS
                                          ;;SIZE FOR A HARDWARE SWITCH REGISTER  IF NOT FOUND OR IT IS
                                          ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER
003610  013746  000004                         MOV     @#ERRVEC,-(SP)   ;;SAVE ERROR VECTOR
003614  012737  003650  000004                 MOV     #64$,@#ERRVEC    ;;SET UP ERROR VECTOR
003622  012737  177570  001140                 MOV     #DSWR,SWR        ;;SETUP FOR A HARDWARE SWICH REGISTER
003630  012737  177570  001142                 MOV     #DDISP,DISPLAY   ;;AND A HARDWARE DISPLAY REGISTER
003636  022777  177777  175274                 CMP     #-1,@SWR         ;;TRY TO REFERENCE HARDWARE SWR
003644  001012                                 BNE     66$              ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
003646  000403                                 BR      65$              ;;BRANCH IF NO TIMEOUT
003650  012716  003656          64$:           MOV     #65$,(SP)        ;;SET UP FOR TRAP RETURN
003654  000002                                 RTI
003656  012737  000176  001140  65$            MOV     #SWREG,SWR       ;;POINT TO SOFTWARE SWR
003664  012737  000174  001142                 MOV     #DISPREG,DISPLAY
003672  012637  000004          66$            MOV     (SP)+,@#ERRVEC   ;;RESTORE ERROR VECTOR

003676  005037  001244                         CLR     $PASS            ;;CLEAR PASS COUNT
003702  122737  000001  001256                 CMPB    #APTENV,$ENV     ;;TEST USER RUNNING UNDER APT
003710  001003                                 BNE     67$              ;;NO, USE NON-APT SWITCH
003712  012737  001260  001140                 MOV     #$SWREG,SWR      ;;YES, USE APT SWITCH REGISTER
003720                          67$:

                                               ;;PROGRAM HEADER
003720  104401  003726                         TYPE    ,69$             ;;TYPE ASCIZ STRING
003724  000430                                 BR      68$              ;;GET OVER THE ASCIZ
                                          ;69$:  ASCIZ  <15><12> MAINDEC-11-DQKUA-A0  PDP-11 60 WCS DIAGNOSTIC"
004006                          68$:

                                               ;;POWER FAIL RESTART ENTERS HERE
                                                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
004006  012706  001100          RESTART:  MOV  #$CMTAG,R6               ;;FIRST LOCATION TO BE CLEARED
004012  005026                                 CLR     (R6)+            ;;CLEAR MEMORY LOCATION
004014  022706  001140                         CMP     #SWR,R6          ;;DONE?
```

```
004020  001374                          BNE     -6              ;;LOOP BACK IF NO
004022  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
004026  005037  001224                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
004032  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
004040  012737  004040  001106          MOV     # ,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
004046  012737  004046  001110          MOV     # ,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS

                                        ;---NEW PASS ENTERS HERE---
004054  012706  001100          NEWPAS  MOV     #STACK,SP       ;SETUP THE STACK POINTER
004060  012737  003276  000004          MOV     #BADTMO,@#4
004066  012737  003344  000114          MOV     #BADPAR,@#114
004074  076600                          MED
004076  000022                          RDWHAM!
004100  052700  000001                  BIS     #BIT0,R0        ;ENABLE ERROR LOG IF NOT
004104  076600                          MED                     ;ERROR LOG CONTINUES MODE
004106  000222                          WRWHAM!
```

```
                                        ;;*****************************************************************
                                        ;*TEST 1          CHECK THAT WCS REGISTERS CAN BE ADDRESSED
                                                ;THIS TEST CHECKS THAT THE THREE REGISTERS OF WCS CAN BE
                                                ;ADDRESSED CORRECTLY WITHOUT TIMING OUT   THE REGISTERS ARE
                                                ;WCS STATUS REGISTER    (777740)
                                                ;WCS ADDRESS REGISTER   (777542)
                                                ;WCS DATA REGISTER      (777544)
                                                ;ON THE 11/60, THESE ARE INTERNAL (PROCESSOR) ADDRESSES
                                        ;;*****************************************************************
004110  000004                          TST1    SCOPE
004112  012737  004224  003056                  MOV     #TST2,NXTST     ;STARTING ADDRESS OF NEXT TEST

004120  012700  003034                          MOV     #WCSST,R0       ;INITIALIZE ADRES TO BE REFERENCED
004124  012701  177775                          MOV     #-3,R1          ;INITIALIZE COUNT
004130  012737  004136  001110                  MOV     #1$,$LPERR      ;LOOP ON ERROR TO THIS POINT
004136  005002                          1$      CLR     R2
004140  012737  004202  000004          4$      MOV     #2$,@#4         ;SET UP TIME-OUT VECTOR
004146  005770  000000                          TST     @(R0)           ;REFERENCE THE WCS REGISTER
004152  005720                          3$      TST     (R0)+           ;POINT TO THE NEXT WCS ADRES
004154  005201                                  INC     R1
004156  001370                                  BNE     4$              ;DONE?
004160  012737  003276  000004                  MOV     #BADTMO,@#4     ;REESTABLISH TIME OUT VECTOR
004166  005702                                  TST     R2              ;ANY REGISTER TIMED OUT?
004170  001415                                  BEQ     TST2            ;;GO TO THE NEXT TEST
004172  104401  043112                          TYPE    ;MSG28          ;PROGRAM ABORTED
004176  000137  036426                          JMP     $EOP            ;GO TO END OF PASS

004202  022616                          2$      CMP     (SP)+,(SP)      ;RESTORE THE STACK
004204  012737  003276  000004                  MOV     #BADTMO,@#4     ;RE-ESTABLISH NORMAL TIME-OUT
                                                                        ;VECTOR
004212  005202                                  INC     R2              ;FLAG THIS TIMEOUT
004214  011037  001162                          MOV     R0,$PEGO        ;SAVE THE REGISTER-ADRES
                                                                        ;WHICH TIMED OUT
004220  104001                                  ERROR   1               ;TIMEOUT OCCURRED ON REFERENCING
                                                                        ;A WCS REGISTER  ADRES OF
                                                                        ;THAT REGISTER IS GIVEN IN
                                                                        ;THE PRINTOUT
004222  000753                                  BR      1$              ;GO BACK & CHECK THE REST


                                        ;;*****************************************************************
                                        ;*TEST 2          CHECK WCS STATUS REGISTER, ID BIT, WCS PRESENT BIT
                                                ;THIS TEST CHECKS THAT WCS PRESENT BIT IS SET IN LOG WHAMI
                                                ;REGISTER    THEN IT CLEARS THE STATUS REGISTER AND CHECKS IF
                                                ;THE 'WRITE ENABLE  SIGNAL WAS GENERATED   THEN IT CHECKS
                                                ;IF THE 'PARDIS' (PARITY DISABLE) AND THE 'WWP'
                                                ;(WRITE WRONG PARITY) BITS WERE CLEARED   THIS INVOLVES
                                                ;SELECTION OF THE WCS HOT BOX, GENERATING THE 'WRITE
                                                ;ENABLE' SIGNAL AND WRITING A '0' INTO THE
                                                ;'PARDIS' AND 'WWP' F/FS
                                                ;WRITE INTO STATUS REGISTER INVOLVES
                                                ;GENERATION OF 'STATUS(1)L'
                                                ;HBMUXSEL0, HBMUXSEL1
                                                ;WRITTEN, WRITE PULSE
                                                ;READ OF STATUS REGISTER INVOLVES THE SELECTION OF THE
```

```
                                        ;CORRECT 'BUS DIN' MUX (PORT A)
                                ;;*****************************************************************
004224  000004                  TST2    SCOPE
004226  012737  004342  003056          MOV     #TST3,NXTST     ;STARTING ADDRESS OF NEXT TEST
004234  076600                          MED                     ;READ LOGF WHAMI
004236  000022                          RDWHAMI
004240  032700  000040                  BIT     #BIT5,R0        ;WCS PRESENT BIT SET?
004244  001003                          BNE     1$              ;YES
004246  010037  001162                  MOV     R0,$REG0        ;SAVE LOG WHAMI
004252  104002                          ERROR   2               ;WCS PRESENT BIT WAS NOT SET
                                                                ;IN WHAMI REGISTER

004254  052700  000200          1$      BIS     #BIT7,R0        ;ENABLE WCS
004260  076600                          MED
004262  000222                          WRWHAMI

004264  013700  003034          2$      MOV     WCSST,R0
004270  005010                          CLR     (R0)
004272  032710  040000                  BIT     #ID,(R0)        ;ID CODE SET?
004276  001003                          BNE     3$              ;YES
004300  011037  001162                  MOV     (R0),$REG0
004304  104003                          ERROR   3               ;WCS ID CODE (BIT 14) NOT SET
                                                                ;IN THE STATUS REGISTER

004306  005077  176522          3$      CLR     @WCSST
004312  032710  000020                  BIT     #PARDIS,(R0)    ;CHECK IF 'PARITY DISABLE' BIT IS
004316  001403                          BEQ     4$              ;CLEARED
                                                                ;'PARITY DISABLE' BIT DID NOT
004320  011037  001162                  MOV     (R0),$REG0      ;GET CLEARED ON CLEARING THE
004324  104004                          ERROR   4               ;STATUS REGISTER

004326  032710  000040          4$      BIT     #WWP,(R0)       ;CHECK IF 'WRITE WRONG PARITY' BIT
004332  001403                          BEQ     TST3            ;IS CLEARED
004334  011037  001162                  MOV     (R0),$REG0      ;SAVE STATUS REGISTER
004340  104005                          ERROR   5               ;'WRITE WRONG PARITY' BIT DID
                                                                ;NOT GET CLEARED ON CLEARING
                                                                ;THE STATUS REGISTER

                                ;;*****************************************************************
                                *TEST 3         CHECK STATUS REGISTER, SET 'WWP' & 'PARDIS' BITS
                                        ;THIS TEST DOES A WRITE OF THE STATUS REGISTER AND
                                        ;CHECKS IF THE 'WRITE WRONG PARITY' AND 'PARITY DISABLE'
                                        ;BITS CAN BE SET AND CLEARED   SETTING OF 'PARDIS' BIT
                                        ;CLEARS THE 'PARITY ERROR' (PARERR) BIT. IT IS CHECKED
                                ;;*****************************************************************
004342  000004                  TST3    SCOPE
004344  012737  004532  003056          MOV     #TST4,NXTST     ;STARTING ADDRESS OF NEXT TEST

004352  013700  003034                  MOV     WCSST,R0        ;POINTER TO STATUS REGISTER
004356  005010                          CLR     (R0)            ;CLEAR STATUS REGISTER
004360  012737  004366  001110          MOV     #10$,$LPERR     ;LOOP ON ERROR TO THIS POINT
004366  012710  000020          10$     MOV     #PARDIS,(R0)    ;SET 'PARDIS' BIT IN STATUS REGISTER

004372  032710  000020          1$      BIT     #PARDIS,(R0)    ;'PARDIS' BIT SET?
004376  001003                          BNE     2$              ;OK, IF YES
```

```
004400  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004404  104006                        ERROR   6               ;'PARITY DISABLE' BIT COULD
                                                              ;NOT BE SET ON DOING A
                                                              ;WRITE TO THE STATUS REGISTER

004406  032710  000040          2$    BIT     #WWP,(R0)       ;CHECK 'WWP' BIT SHOULD BE CLEAR
004412  001403                        BEQ     3$              ;OK
004414  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004420  104005                        ERROR   5               ;'WWP' GOT WRITTEN WHEN TRYING
                                                              ;TO WRITE  PARDIS' BIT IN STATUS
                                                              ;REGISTER
004422  032710  100000          3$    BIT     #PARERR,(R0)    ;CHECK IF 'PARITY ERROR' B T IS CLEAR
004426  001403                        BEQ     4$              ;OK, IF YES
004430  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004434  104007                        ERROR   7               ;'PARITY ERROR' BIT SHOULD
                                                              ;BE CLEARED WHEN 'PARITY
                                                              ;'DISABLE' WAS SET   'PARERR'
                                                              ;WAS NOT CLEARED

004436  042710  000020          4$    BIC     #PARDIS,(R0)    ;CLEAR 'PARDIS' BIT
004442  032710  000020                BIT     #PARDIS,(R0)    ;CHECK IF IT IS CLEARED
004446  001403                        BEQ     5$              ;OK
004450  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004454  104004                        ERROR   4               ;'PARDIS' BIT COULD NOT BE
                                                              ;CLEARED

004456  012710  000040          5$    MOV     #WWP,(R0)       ;SET 'WWP' BIT IN STATUS REGISTER
004462  032710  000040                BIT     #WWP,(R0)       ;DID IT SET?
004466  001003                        BNE     6$              ;OK
004470  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004474  104010                        ERROR   10              ;'WWP' BIT COULD NOT BE SET
                                                              ;IN STATUS REGISTER

004476  032710  000020          6$    BIT     #PARDIS,(R0)    ;CHECK IF 'PARDIS' IS CLEAR
004502  001403                        BEQ     7$              ;OK
004504  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004510  104004                        ERROR   4               ;'PARDIS' NOT CLEAR   IT
                                                              ;GOT WRITTEN WHEN TRYING TO WRITE
                                                              ;'WWP' BIT

004512  042710  000040          7$    BIC     #WWP,(R0)       ;CLEAR 'WWP' BIT
004516  032710  000040                BIT     #WWP,(R0)       ;IS IT CLEARED?
004522  001403                        BEQ     TST4            ;,OK
004524  011037  001162                MOV     (R0),$REGO      ;SAVE STATUS REGISTER
004530  104005                        ERROR   5               ;'WWP' BIT COULD NOT BE
                                                              ;CLEARED


                                ;*****************************************************
                                #TEST 4         CHECK 'WRITE' AND 'READ' OF LOCATION 0 IN WCS, EVEN PATTERN
                                        ;PATTERN '0' IS WRITTEN INTO LOCATION 0 OF WCS DATA ARRAY
                                        ;IT IS CHECKED IF 'WRITEN' IS SET, 'PARGEN' IS CLEAR, 'WWP'  IS
                                         CLEAR, 'PARDIS' IS STILL SET AND 'PARERR' IS CLEAR
                                         THEN A READ FROM LOCATION 0 IS DONE   IT IS CHECKED IF
                                         'PARGEN' IS CLEAR, 'WWP' IS CLEAR  'PARDIS' IS SET, AND 'PO'
                                         THE PARITY BIT FOR LOCATION 0 IS CLEAR   NOTE, IN NORMAL MODE
```

```
                                                ,EVEN PARITY IS BEING GENERATED AND CHECKED
                                                ,THIS IS THE FIRST TIME IN THE PROGRAM, A 'WRITE' AND 'READ'
                                                ,IS DONE TO AND FROM THE WCS DATA ARRAY   IN CASE OF A FATAL
                                                ,ERROR UNEXPECTED ACTION MAY TAKE PLACE
                                        ,,*****************************************************************
004532  000004                          TST4    SCOPE
004534  012737  005076  003056                  MOV     #TST5,NXTST     ;STARTING ADDRESS OF NEXT TEST

004542  005037  003042                          CLR     ATMP0           ,COUNT FOR TIMEOUT TRAPS
004546  005037  003044                          CLR     ATMP1           ,COUNT FOR ILLEGAL INSTRUCTION TRAPS
                                                                        ,IF ANY OF THESE TWO COUNTS GO TO
                                                                        ,2 THEN THE PROGRAM IS ABORTED
004552  012737  005006  000114                  MOV     #3$,@#114       ,SET UP PARITY ERROR TRAP VECTOR
004560  012737  005014  000004                  MOV     #4$,@#4         ,SET UP TIME-OUT TRAP VECTOR
004566  012737  005026  000010                  MOV     #5$,@#10        ,SET UP ILLEGAL AND RESERVED
                                                                        ,INSTRUCTION TRAP VECTOR
004574  012777  000020  176232                  MOV     #PARDIS,@WCSST  ,SET 'PARITY DISABLE' BIT
004602  005077  176230                          CLR     @WCSAR          ,ADDRESS LOCATION 0 OF WCS
004606  005077  176226                          CLR     @WCSDR          ,WRITE 0 INTO LOCATION 0 OF WCS
004612  004737  036550                          JSR     PC,VECTRS       ,RE-ESTABLISH TIMEOUT, PARITY
                                                                        ,ILLEGAL INSTRUCTION TRAPS
004616  012737  040020  037252                  MOV     #40020,CESTAT   ,EXPCTD STATUS REG
004624  012737  000014  037256                  MOV     #PAR1+PAR2,CMASK        ,MASK BITS FOR STATUS
004632  012737  004656  037260                  MOV     #1$,CRETRN      ,RETURN ADDRESS
004640  004737  037152                          JSR     PC,CHKSTAT      ,CHECK STATUS REGISTER CONTENTS
004644  005037  001166                          CLR     $REG2           ,SAVE LOCATION INTO WHICH WRITTEN
004650  005037  001170                          CLR     $REG3           ,SAVE PATTERN
004654  104011                                  ERROR   11              ,STATUS REGISTER ERROR ON WRITING
                                                                        ,LOCATION 0 OF WCS WITH A 0
                                                                        ,PATTERNS   BITS WERE NOT AS EXPECTED

004656  012737  005006  000114  1$              MOV     #3$,@#114       ,PARITY TRAP VECTOR
004664  012737  005014  000004                  MOV     #4$,@#4         ,TIMEOUT TRAP VECTOR
004672  012737  005026  000010                  MOV     #5$,@#10        ,ILLEGAL INSTRUCTION TRAP
004700  005077  176132                          CLR     @WCSAR          ,ADDRESS LOCATION 0 OF WCS
004704  012737  176130  001166                  MOV     @WCSDR,$REG2    ,READ LOCATION 0
004712  004737  036550                          JSR     PC,VECTRS       ,RE-ESTABLISH PARITY  TIMEOUT & ILLEGAL
                                                                        ,TRAP VECTORS
004716  005737  001166                          TST     $REG2           ,IS IT 0?
004722  001405                                  BEQ     2$              ;OK, IF IT IS 0
004724  005037  001164                          CLR     $REG1           ,SAVE EXPECTED PATTERN (DATA)
004730  005037  001162                          CLR     $REG0           ,SAVE LOCATION THAT WAS READ
004734  104012                                  ERROR   12              ,LOCATION 0 OF WCS WAS READ
                                                                        ,IT SHOULD CONTAIN 0 THAT WAS
                                                                        ,WRITTEN BEFORE  IT DID NOT

004736  012777  000000  176072  2$              MOV     #0,@WCSAR
004744  012737  040020  037252                  MOV     #40020,CESTAT   ,EXPECTED STATUS REGISTER
004752  012737  000014  037256                  MOV     #PAR1+PAR2,CMASK,MASK BITS FOR STATUS
004760  012737  005004  037260                  MOV     #10$,CRETRN     ,RETURN ADDRESS FOR 'CHKSTAT'
004766  004737  037152                          JSR     PC,CHKSTAT      ,CHECK STATUS REGISTER CONTENTS
004772  005037  001166                          CLR     $REG2           ,SAVE LOCATION READ
004776  005037  001170                          CLR     $REG3           ,SAVE PATTERN READ
005002  104013                                  ERROR   13              ,STATUS REGISTER ERROR ON READING
                                                                        ,LOCATION 0 OF WCS (0 WAS WRITTEN
                                                                         INTO IT BEFORE)   BITS WERE NOT AS
```

```
                                                                                ;EXPECTED

005004  000432                  10$     BR      8$

                                                                                ;ENTER HERE IF A PARITY ERROR
                                                                                ;TRAP OR TIMEOUT OR ILLEGAL
                                                                                ;INSTRUCTION TRAP TAKES PLACE
                                                                                ;ON DOING A WRITE OR READ TO WCS

005006  104406  042520          3$      TYPMSG  ;MSG12          ;UNEXPECTED PARITY ERROR TRAP OCCURRED
005012  000411                          BR      6$
005014  104406  042552          4$      TYPMSG  ;MSG13          ;UNEXPECTED TIMEOUT TRAP
005020  005237  003042                  INC     ATMP0
005024  000404                          BR      6$
005026  104406  042617          5$      TYPMSG  ;MSG14          ;ILLEGAL INSTRUCTION TRAP
005032  005237  003044                  INC     ATMP1

005036  162776  000002  000000  6$      SUB     #2,@(SP)
005044  017637  000000  001162          MOV     @(SP),$REG0
005052  022626                          CMP     (SP)+,(SP)+
005054  023727  001162  004656          CMP     $REG0,#1$       ;TRAP ON DOING READ OR WRITE?
005062  103002                          BHIS    7$              ;ON READ
                                                                ;AN UNEXPECTED TRAP (TIMEOUT,
                                                                ;PARITY ERROR OR ILLEGAL INSTRUCTION)
                                                                ;TOOK PLACE ON DOING
                                                                ;WRITE TO WCS LOCATION
005064  104014                          ERPCR   14              ;0   PC AT WHICH THE TRAP TOOK
                                                                ;PLACE IS GIVEN IN THE ERROR
                                                                 MESSAGE (TRPLOC)

005066  000401                          BR      8$

005070  104027                  7$      ERROR   27               AN UNEXPECTED TRAP (TIMEOUT,
                                                                ;PARITY ERROR OR ILLEGAL INSTRUCTION)
                                                                 TOOK   PLACE ON DOING A READ FROM
                                                                ;WCS LOCATION 0  PC AT WHICH THE TRAP
                                                                 OCCURED IS GIVEN IN THE ERROR MESSAGE

005072  004737  036550          8$      JSR     PC,VECTR1       ;REESTABLISH VECTORS AT
                                                                 4, 114 AND 10


                                ***********************************************************
                                #TEST 5         CHECK 'WRITE' AND 'READ' OF LOCATION 0 IN WCS, ODD PATTERN
                                        THIS TEST DOES A WRITE OF AN ODD, ALTERNATE 0'S AND 1'S PATTERN
                                        ;INTO LOCATION 0 AND CHECKS IF THE APPROPRIATE BITS ARE SET
                                        ;IN THE STATUS REGISTER  THEN IT READS LOCATION 0 AND CHECKS
                                        ;IF THE CORRECT DATA WAS READ, AGAIN THE STATUS REGISTER
                                        ;IS CHECKED
                                ***********************************************************
005076  000004                  TST5    SCOPE
005100  012737  005476  003056          MOV     #TST6,NXTST     ;STARTING ADDRESS OF NEXT TEST
005106  012737  005354  000114          MOV     #3$,@#114        SET UP PARITY ERROR TRAP VECTOR
005114  012737  005362  000004          MOV     #4$,@#4         ;SET UP TIMEOUT TRAP VECTOR
005122  012737  005374  000010          MOV     #5$,@#10        ;SET UP ILLEGAL & RESERVED INSTRUCTION TRAP
005130  012737  000020  175676          MOV     #PARDIS,@WCSST   SET 'PARITY DISABLE' BIT
```

```
005136  005077  175674                  CLR     @WCSAR          ;ADDRESS LOCATION 0 OF WCS
005142  012777  052524  175670          MOV     #52524,@WCSDR   ;WRITE PATTERN INTO LOCATION 0 OF WCS
005150  004737  036550                  JSR     PC,VECTRS       ;REESTABLISH VECTORS AT 4,114,10
005154  012737  040022  037252          MOV     #40022,CESTAT   ;EXPECTED STATUS REGISTER
005162  012737  000014  037256          MOV     #PAR1+PAR2,CMASK;MASK BITS FOR STATUS
005170  012737  005216  037260          MOV     #1$,CRETRN      ;RETURN ADRES FOR 'CHKSTAT'
005176  004737  037152                  JSR     PC,CHKSTAT      ;CHECK STATUS REGISTER CONTENTS
005202  005037  001166                  CLR     $REG2           ;SAVE LOCATION INTO WHICH WR TTEN
005206  012737  052524  001170          MOV     #52524,$REG3    ;SAVE EXPECTED PATTERN
005214  104011                          ERROR   11              ;STATUS REGISTER ERROR ON WRITING
                                                                ;LOCATION 0 OF WCS WITH A
                                                                ;'52524' PATTERN  BITS
                                                                ;WERE NOT AS EXPECTED IN STATUS

005216  012737  005354  000114  1$      MOV     #3$,@#114       ;PARITY TRAP
005224  012737  005362  000004          MOV     #4$,@#4         ;TIMEOUT TRAP
005232  012737  005374  000010          MOV     #5$,@#10        ;ILLEGAL INSTRUCTION TRAP
005240  005077  175572                  CLR     @WCSAR          ;ADDRESS LOCATION 0 OF WCS
005244  017737  175570  001166          MOV     @WCSDR,$REG2    ;READ LOCATION 0
005252  004737  036550                  JSR     PC,VECTRS       ;RE-ESTABLISH VECTORS AT 4,10,114
005256  022737  052524  001166          CMP     #52524,$REG2    ;READ CORRECTLY?
005264  001406                          BEQ     2$              ;OK
005266  005037  001162                  CLR     $REG0           ;SAVE LOCATION READ
005272  012737  052524  001164          MOV     #52524,$REG1    ;SAVE EXPECTED DATA PATTERN
005300  104012                          ERROR   12              ;LOCATION 0 GAVE BAD DATA ON
                                                                ;READING IT   IT WAS WRITTEN
                                                                ;BEFORE WITH A '52524' PATTERN

005302  012777  000000  175526  2$      MOV     #0,@WCSAR
005310  012737  040022  037252          MOV     #40022,CESTAT   ;EXPECTED STATUS REGISTER
005316  012737  000014  037256          MOV     #PAR1+PAR2,CMASK;MASK BITS FOR STATUS
005324  012737  005352  037260          MOV     #10$,CRETRN     ;RETURN ADRES FOR 'CHKSTAT'
005332  004737  037152                  JSR     PC,CHKSTAT      ;CHECK CONTENTS OF STATUS REGISTER
005336  005037  001166                  CLR     $REG2           ;SAVE LOCATION READ
005342  012737  052524  001170          MOV     #52524,$REG3    ;SAVE PATTERN READ
005350  104013                          ERROR   13              ;STATUS REGISTER ERROR ON READING
                                                                ;LOCATION 0 OF WCS  (52524
                                                                ;WAS WRITTEN INTO IN BEFORE)  BITS
                                                                ;WERE NOT AS EXPECTED

005352  000432                  10$     BR      8$

005354  104406  042520          3$      TYPMSG  ,MSG12          ;UNEXPECTED PARITY ERROR TRAP
005360  000411                          BR      6$
005362  104406  042552          4$      TYPMSG  ,MSG13          ;UNEXPECTED TIMEOUT TRAP
005366  005237  003042                  INC     ATMP0
005372  000404                          BR      6$
005374  104406  042617          5$      TYPMSG  ,MSG14
005400  005237  003044                  INC     ATMP1

005404  162776  000002  000000  6$      SUB     #2,@(SP)        ;GET THE LOCATION AT WHICH TRAP  OCCURRED
005412  017637  000000  001162          MOV     @(SP),$REG0     ;SAVE IT
005420  022626                          CMP     (SP)+,(SP)+     ;POP THE STACK

005422  023727  001162  005216          CMP     $REG0,#1$       ;TRAP FROM READ OR WRITE?
005430  103002                          BHIS    7$              ;FROM READ
```

```
005432  104014                          ERROR   14              ,AN UNEXPECTED TRAP OCCURRED ON
                                                                ,DOING A WRITE
                                                                ,OF WCS LOCATION 0   PC AT WHICH
                                                                ,TRAP OCCURRED IS GIVEN IN
                                                                ,ERROR MESSAGE (TRPLOC)
005434  000401                          BR      8$
                                                                
005436  104027                  7$      ERROR   27              ,AN UNEXPECTED TRAP OCCURED ON
                                                                ,DOING A READ OF WCS LOCATION 0  PC
                                                                ,AT WHICH TRAP OCCURED IS GIVEN IN
                                                                ,ERROR MESSAGE (TRPLOC)
005440  023727  003042  000002  8$      CMP     ATMP0,#2                ,ABORT THE PROGRAM?
005446  001407                          BEQ     9$              ,YES
005450  023727  003044  000002          CMP     ATMP1,#2
005456  001403                          BEQ     9$
005460  004737  036550                  JSR     PC,VECTRS       ,REESTABLISH VECTORS AT 4, 114
                                                                ,AND 10
005464  000404                          BR      TST6            ,,EXIT
005466  104401  043112          9$      TYPE    ,MSG28          ,ABORT THE PROGRAM
005472  000137  036426                  JMP     $EOP            ,GO TO END OF PASS
                                                                
                                  ,*****************************************************************
                                  *TEST 6         CHECK WRITE PULSES WP0, WP1, WP2 USING WRITE/READ (LOC  0,2000,4000
                                          ,THIS TEST CHECKS OUT THAT THE THREE WRITE PULSES - WP0
                                          ,WP1 AND WP2 GET GENERATED CORRECTLY   LOCATIONS 0, 2000, 4000
                                          ,OF THE WCS ARE WRITTEN WITH THREE UNIQUE PATTERNS AND
                                          ,ARE READ BACK AND THE CONTENTS CHECKED FOR CORRECT
                                          ,DATA   THE STATUS REGISTER IS CHECKED EACH TIME AFTER THE
                                           WRITE TO SEE IF THE BITS (P0, P1, P2, PARGEN ETC) ARE
                                          ,CORRECT   THE SEQUENCE OF CHECKING IS AS FOLLOWS
                                                                
                                          ,WRITE LOC 0=0, LOC2000=177777, LOC4000=52524
                                          ,READ STATUS=330 (P0=0, P1=0, P2=1, PARDIS=PARGEN=WRTEN=1, REST=0)
                                           READ LOC0=0     ,LOC2000=177777,        LOC4000=52524
                                                                
                                          ,WRITE LOC0=177777,     LOC2000=52524,  LOC4000=0
                                          ,READ STATUS=324 (P0=P2=0, P1=1, PARDIS=PARGEN=WRTEN=1, REST=0)
                                           READ LOC0=177777,      LOC2000=52524,  LOC4000=0
                                                                
                                          ,WRITE LOC0=52524,      LOC2000=0,      LOC4000=177777
                                          ,READ STATUS=322 (P0=1, P1=P2=0, PARDIS=PARGEN=WRTEN=1, REST=0)
                                          ,READ LOC0=52524,       LOC2000=0,      LOC4000=177777
                                  ,*****************************************************************
005476  000004                  TST6    SCOPE
005500  012737  006052  003056          MOV     #TST7,NXTST     ,STARTING ADDRESS OF NEXT TEST
005506  012700  006036                  MOV     #PAT0,R0        ,INITIALIZE THE PATTERNS
005512  012720  000000                  MOV     #0,(R0)+        ,TO BE USED  NOTE, YOU
005516  012720  177777                  MOV     #177777,(R0)+   ,CAN CHANGE THE THREE PATTERNS
005522  012720  052524                  MOV     #52524,(R0)+    ,BEING WRITTEN BY CHANGING THESE
005526  012777  000020  175300          MOV     #PARDIS,@WCSST  ,DISABLE PARITY ERROR TRAP
005534  012703  006044                  MOV     #STWRD0,R3      ,INITIALIZE POINTER TO STATUS WORD
005540  012737  005556  001110          MOV     #10$,$LPERR
005546  013704  003036                  MOV     WCSAR,R4        ,R4 CONTAINS ADDRESS OF WCSAR
005552  013705  003040                  MOV     WCSDR,R5        ,R5 CONTAINS ADDRESS OF WCSDR
005556  012700  006036          10$     MOV     #PAT0,R0        ,INITIALIZE POINTER TO PATTERN
005562  012714  000000                  MOV     #0,(R4)          ADDRESS LOC 0 OF WCS
```

```
                                                                        ,NOTE, # 0  MODE IS USED AS THAT
                                                                        ,ANY OTHER LOCATION CAN BE TOGGLED IN
005566  012015                          MOV     (R0)+,(R5)              ,WRITE THE 1ST PATTERN
005570  012714  002000                  MOV     #2000,(R4)              ;ADDRESS LOC 2000 OF WCS
005574  012015                          MOV     (R0)+,(R5)              ,WRITE THE SECOND PATTERN
005576  012714  004000                  MOV     #4000,(R4)              ,ADDRESS LOC 4000 OF WCS
005602  011015                          MOV     (R0),(R5)               ;WRITE THE THIRD PATTERN
005604  011337  037252                  MOV     (R3),CESTAT             ,EXPECTED STATUS REGISTER
005610  005037  037256                  CLR     CMASK                   ;MASK BITS FOR STATUS
005614  012737  005642  037260          MOV     #1$,CRETRN              ;RETURN ADRES FOR 'CHKSTAT'
005622  004737  037152                  JSR     PC,CHKSTAT              ;CHECK STATUS REGISTER
005626  012737  004000  001166          MOV     #4000,$REG2             ;SAVE LOCATION INTO WHICH WRITTEN
005634  011037  001170                  MOV     (R0),$REG3              ,SAVE EXPECTED PATTERN
005640  104011                          ERROR   11                      ,STATUS REGISTER ERROR ON WRITING
                                                                        ,LOCATION 4000 OF WCS WITH THE PATTERN
                                                                        ,GIVEN IN ERROR MESSAGE  BITS WERE
                                                                        ,NOT AS EXPECTED
005642  012737  005650  001110  1$      MOV     #2$,$LPERR              ,LOOP HERE ON ERROR
005650  012700  006036          2$      MOV     #PAT0,R0
005654  012714  000000                  MOV     #0,(R4)                 ,ADDRESS LOCATION 0 OF WCS
005660  011537  001166                  MOV     (R5),$REG2              ,READ THE CONTENTS OF 0
005664  023710  001166                  CMP     $REG2,(R0)              ,DATA OK?
005670  001406                          BEQ     3$                      ,YES
005672  011037  001164                  MOV     (R0),$REG1              ,SAVE EXPECTED DATA PATTERN
005676  012737  000000  001162          MOV     #0,$REG0                ,SAVE LOCATION READ
005704  104012                          ERROR   12                      ,LOCATION 0 OF WCS WAS READ
                                                                        ,PATTERN READ BACK WAS INCORRECT
                                                                        ,EXPECTED AND PATTERN RECORD
                                                                        ,ARE GIVEN IN ERROR MESSAGE
005706  005720                  3$      TST     (R0)+                   ,POINT TO NEXT PATTERN
005710  012737  005716  001110          MOV     #4$,$LPERR              ;LOOP HERE ON ERROR (SW9)
                                                                        ,READ LOCATION 2000 OF WCS
005716  012714  002000          4$      MOV     #2000,(R4)              ,ADDRESS LOC 2000
005722  011537  001166                  MOV     (R5),$REG2              ,READ THE CONTENTS
005726  023710  001166                  CMP     $REG2,(R0)              ,DATA OK?
005732  001406                          BEQ     5$                      ,YES
005734  011037  001164                  MOV     (R0),$REG1              ,SAVE EXPECTED DATA PATTERN
005740  012737  002000  001162          MOV     #2000,$REG0             ,SAVE LOCATION READ
005746  104012                          ERROR   12                      ,LOCATION 2000 OF WCS WAS READ
                                                                        ,PATTERN READ BACK WAS INCORRECT
                                                                        ,EXPECTED AND RECORD PATTERNS
                                                                        ;ARE GIVEN IN ERROR MESSAGE
005750  005720                  5$      TST     (R0)+                   ,POINT TO NEXT PATTERN
005752  012737  005760  001110          MOV     #6$,$LPERR              ,LOOP HERE ON ERROR
005760  012714  004000          6$      MOV     #4000,(R4)              ,ADDRESS LOC4000
005764  011537  001166                  MOV     (R5),$REG2              ,READ THE CONTENTS
005770  023710  001166                  CMP     $REG2,(R0)              ,DATA OK?
005774  001406                          BEQ     7$                      ,YES
005776  011037  001164                  MOV     (R0),$REG1              ,SAVE EXPECTED DATA PATTERN
006002  012737  004000  001162          MOV     #4000,$REG0             ,SAVE LOCATION READ
006010  104012                          ERROR   12                      ,LOCATION 2 OF WCS WAS READ
                                                                        ,PATTERN READ BACK WAS INCORRECT
                                                                        ,EXPECTED AND RECORD  PATTERNS ARE
                                                                        ,GIVEN IN ERROR MESSAGE
006012  011001                  7$      MOV     (R0),R1                 ,R0 POINTS TO THE THIRD ENTRY IN
006014  010002                          MOV     R0,R2                    THE PATTERN TABLE-'PAT2'  CALCULATE
```

```
006016  014012                          MOV     -(R0),(R2)      ,THE CONTENTS OF THE THREE ENTRIES
006020  014042                          MOV     -(R0),-(R2)     ,(PAT0)--->(PAT1),(PAT1)--->(PAT2),
006022  010110                          MOV     R1,(R0)         ;(PAT2)--->(PAT0)
006024  005723                          TST     (R3)+           ,INCREMENT POINTER TO THE NEXT
                                                                ,ENTRY IN STATUS REGISTER
                                                                ,TABLE
006026  022710  000000                  CMP     #0,(R0)         ,DONE ALL THREE TIMES?  NOTE
006032  001251                          BNE     10$             ;#C MODE IS USED TO ALLOW THE
                                                                ;USER TO CHANGE THE PATTERN IN
                                                                ;THE PATTERN TABLE


006034  000406                          BR      TST7            ,,

006036  000000                  PAT0     WORD   0               ,PATTERN TABLE
006040  177777                           WORD   177777          ,THESE PATTERNS ARE USED 3 TIMES
006042  052524                           WORD   52524           ,SHIFTED CYCLICALLY EACH TIME

006044  040230                  STWRD0   WORD   40230           ,STATUS REGISTER TABLE
006046  040222                           WORD   40222           ,EXPECTED STATUS REGISTER CONTENTS
006050  040224                           WORD   40224           ,FOR THE THREE CASES


                                ,,*****************************************************************
                                 *TEST 7        CHECK PARITY GENERATOR FOR HI BYTE DATA
                                         THIS TEST CHECKS OUT THE PARITY GENERATOR CHIP CORRESPONDING
                                        ,TO THE HI-BYTE   IN THIS TEST HI BYTE REFERS TO DATA BITS (15,14,13,12,11,10,1,
                                                                                                                    0)
                                        ,LO BYTE REFERS TO DATA BITS (9,8,7,6,5,4,3,2)
                                        ,A PATTERN IS WRITTEN INTO THE ADDRESS REGISTER AND THE PARITY BIT
                                        ,GENERATED FOR THAT PATTERN (PARGEN) IS READ FROM
                                        ,THE STATUS REGISTER AND CHECKED IF IT IS CORRECT
                                        ,SEQUENCE OF TESTING
                                        ,DATA PATTERN USED FOR LOW BYTE IS KEPT CONSTANT AT
                                        ,377 (EVEN PATTERN) AND A COUNT PATTERN 0-377 IS
                                        ,USED FOR THE HI-BYTE   THE PARITY BIT IS CHECKED
                                        ,FOR CORRECTNESS   IF A WRONG PARITY WAS GENERATED AN ERROR
                                        ,MESSAGE IS REPORTED   IF THERE ARE MORE THAN
                                        ,FIVE ERRORS THE SUB-TEST IS ABORTED  THE FAULT
                                        ,COULD BE IN THE PARITY GENERATOR CHIPS, GATING
                                        ,CHIP OR THE ASSOCIATED DATA PATH

                                        ,THE ENTIRE SUB-TEST IS REPEATED WITH A CONSTANT ODD PATTERN OF
                                        ,376 IN THE LOBYTE AND COUNT PATTERN 0-377 FOR THE
                                        ,HI-BYTE
                                ,,*****************************************************************
006052  000004                  TST7    SCOPE
006054  012737  006256  003056          MOV     #TST10,NXTST    ,STARTING ADDRESS OF NEXT TEST
006062  005037  003046                  CLR     TMP0            ,IF TMP0=0, USE EVEN PATTERN ALL 1'S FOR LOBYTE
                                                                ,IF TMP0=2, USE ODD PATTERN 376 FOR LOBYTE
                                                                ,FOR BOTH CASES VARY HI-BYTE FROM 0 TO 377
006066  012777  000020  174740          MOV     #PARDIS,@WCSST  ,SET PARITY ERROR DISABLE BIT
006074  013704  003046          20$     MOV     TMP0,R4
006100  016400  006252                  MOV     PARPAT(R4),R0   ,INITIALIZE THE PATTERN
                                                                ,LO BYTE=ALL 1'S, HI BYTE=0 TO 377
006104  012737  006120  001110          MOV     #1$ $LPERR       LOOP TO THIS POINT ON ERROR
```

```
006112  012737  177400  003054          MOV     #-400,COUNTO        ;INITIALIZE COUNT FOR NUMBER OF PATTERNS
006120  112737  177773  003064  1$      MOVB    #-5,ERCNTO          ;DO NOT TYPE MORE THAN 5 ERRORS
006126  010004                  2$      MOV     R0,R4               ;COPY THE PATTERN

006130  004737  036734                  JSR     PC,XFRPGN           ;MAP INPUT PATTERN TO CHIP COMPATIBLE PATTERN
006134  010477  174676                  MOV     R4,@WCSAR           ,LOAD THE PATTERN INTO ADDRESS REGISTER
006140  017705  174670                  MOV     @WCSST,R5           ;READ STATUS REGISTER AND 'PARGEN'
                                                                    ,BIT-THE PARITY BIT
006144  042705  177577                  BIC     #177777-PARGEN,R5   .MASK ALL BUT PARITY BIT


006150  004737  036676                  JSR     PC,GENPAR           ,GENERATE PARITY BIT (EVEN) FOR
                                                                    ,THE PATTERN IN R4, RETURN WITH BIT IN R2
006154  020502                          CMP     R5,R2               ,CORRECT PARITY BIT GENERATED?
006156  001006                          BNE     4$                  ,NO. REPORT ERROR
006160  062700  000400          3$      ADD     #400,R0             ,CREATE NEXT PATTERN, INCREMENT HI-BYTE
006164  005237  003054                  INC     COUNTO              ;GO BACK AND CHECK NEXT PATTERN
006170  001356                          BNE     2$
006172  000417                          BR      13$
                                                                    ,CORRECT PARITY BIT WAS NOT
                                                                    ,GENERATED FOR PATTERN HELD IN R4
006174  105737  003064          4$      TSTB    ERCNTO              ,REPORT 5 ERRORS MAXIMUM, OF THIS KIND
006200  001414                          BEQ     13$                 ,ABORT THE SUB-TEST
006202  105237  003064                  INCB    ERCNTO
006206  010203                          MOV     R2,R3               ;GET EXPECTED PARITY BIT AND
006210  000241                          CLC                         .ROTATE IT TO BIT 0 POSITION
006212  106103                          ROLB    R3
006214  106103                          ROLB    R3
006216  010437  001162                  MOV     R4,$REG0            ,SAVE PATTERN FOR WHICH PARITY WAS GENERATED
006222  010337  001164                  MOV     R3,$REG1            ,SAVE EXPECTED PARITY BIT FOR THAT PATTERN
006226  104015                          ERROR   15                  ,INCORRECT PARITY BIT WAS GENERATED
                                                                    ,FOR THE PATTERN GIVEN IN ERROR
                                                                    ,MESSAGE  NORMALLY, EVEN PARITY
                                                                    ,IS GENERATED


006230  000753                  5$      BR      3$


006232  005737  003046          13$     TST     TMPO                ,DONE CHECKING OF HI-BYTE PARITY
                                                                    ,GENERATOR USING ODD PATTERN IN
                                                                    ,LO BYTE?
006236  001007                          BNE     TST10               ,,YES, EXIT
006240  062737  000002  003046          ADD     #2,TMPO
006246  000137  006074                  JMP     20$                 ,NO, CHECK HI-BYTE PARITY GENERATOR
                                                                    ,USING ODD PATTERN (376) FOR
                                                                    ,LO BYTE
006252  000377                  FARPAT  .WORD   377                 ,LO-BYTE WILL BE THESE EVEN AND ODD
006254  000376                          WORD    376                 ,PATTERNS WHILE HI-BYTE IS BEING
                                                                    ,CHECKED WITH ALL PATTERNS 0-377


                                ,*****************************************************************
                                *TEST 10        CHECK PARITY GENERATOR FOR LO BYTE DATA
```

```
                                                ;THIS TEST CHECKS OUT THE PARITY GENERATOR CHIP CORRESPONDING
                                                ,TO THE LO-BYTE (AND ASSOCIATED CIRCUIT)  IN THIS TEST LO BYTE
                                                ,REFERS TO DATA BITS (9,8,7,6,5,4,3,2)
                                                ,HI BYTE REFERS TO DATA BITS (15,14,13,12,11,10,1,0)
                                                ,A PATTERN IS WRITTEN INTO THE ADDRESS REGISTER AND THE
                                                ,PARITY BIT GENERATED FOR THAT PATTERN (PARGEN) IS READ
                                                ,FROM THE STATUS REGISTER AND CHECKED IF IT IS CORRECT
                                                ,SEQUENCE OF TESTING:
                                                ,DATA PATH USED FOR HI-BYTE IS KEPT CONSTANT AT 377
                                                ,(EVEN PATTERN) AND A COUNT PATTERN 0-377 IS USED
                                                ,FOR THE LO-BYTE   THE PARITY BIT IS CHECKED FOR
                                                ,CORRECTNESS.  IF A WRONG PARITY WAS GENERATED AN
                                                ,AN EROR MESSAGE IS REPORTED   THE FAULT COULD BE
                                                ,IN THE PARITY GENERATOR CHIPS, GATING CHIP OR THE ASSOC ATED
                                                ,DATA PATH

                                                ,NOT MORE THAN 5 ERROR MESSAGES OF THE SAME KIND
                                                ,(ABOUT INCORRECT PARITY) ARE REPORTED  IF MORE THAN
                                                ,FIVE ERRORS OCCUR THE SUB-TEST IS ABORTED

                                                ,THE ENTIRE SUB-TEST IS REPEATED WITH A CONSTANT
                                                ,ODD PATTERN OF 376 IN THE HIGH BYTE AND A
                                                ,COUNT PATTERN 0-377 FOR THE LO-BYTE
                                        ,*****************************************************************
006256  000004                          TST10   SCOPE
006260  012737  006444  003056                  MOV     #TST11,NXTST    ,STARTING ADDRESS OF NEXT TEST
006266  005037  003046                          CLR     TMPO            ,IF TMPO=0, USE EVEN PATTERN (377) FOR
                                                                        ,HI BYTE.
                                                                        ,IF TMPO=2, USE ODD PATTERN (376)
                                                                        ,FOR HI BYTE
                                                                        ;FOR BOTH CASES LO-BYTE PATTERN
                                                                        ;CHANGES FROM 0 TO 377
006272  012777  000020  174534                  MOV     #PARDIS,@WCSST  ,SET PARITY ERROR DISABLE BIT
006300  013704  003046          20$             MOV     TMPO,R4
006304  016400  006252                          MOV     PARPAT(R4),R0   ,INITIALIZE THE PATTERN
006310  000300                                  SWAB    R0
006312  012737  006320  001110                  MOV     #1$,$LPERR      ,LOOP TO THIS POINT ON ERROR
006320  112737  177773  003064  1$              MOVB    #-5,ERCNTO      ,DO NOT TYPE MORE THAN 5 ERRORS
006326  010004                  2$:             MOV     R0,R4


006330  004737  036734                          JSR     PC,XFRPGN       ;MAP INPUT PATTERN TO CHIP COMPATIBLE PATTERN
006334  010477  174476                          MOV     R4,@WCSAR       ,LOAD PATTERN INTO ADDRESS REGISTER
006340  017705  174470                          MOV     @WCSST,R5       ,READ STATUS REG STER AND
                                                                        ,'PARGEN'-PARITY BIT
006344  042705  177777                          BIC     #177777-PARGEN,R5  ,MASK OUT ALL BUT PARITY BIT


006350  004737  036676                          JSR     PC,GENPAR       ,GENERATE PARITY BIT (EVEN) FOR
                                                                        ,THE PATTERN IN R4, RETURN WITH BIT IN R2
006354  020502                                  CMP     R5,R2           ,CORRECT PARITY BIT GENERATED?
006356  001003                                  BNE     4$              ,NO, REPORT ERROR
006360  105200                  3$              INCB    R0              ,CREATE NEXT PATTERN, INCREMENT
                                                                        ,LO-BYTE
006362  001361                                  BNE     2$              ,GO BACK IF NOT DONE
```

```
006364  000417                          BR      13$
                                                        ;CORRECT PARITY BIT WAS NOT GENERATED
                                                        ;FOR PATTERN HELD IN R4
006366  105737  003064          4$      TSTB    ERCNTO  ;REPORT 5 ERRORS MAXIMUM, OF THIS KIND
006372  001414                          BEQ     13$     ;ABORT SUB-TEST
006374  105237  003064                  INCB    ERCNTO
006400  010203                          MOV     R2,R3   ;GET EXPECTED PARITY BIT AND
006402  000241                          CLC             ;ROTATE IT TO BIT 0 POSIT ON
006404  106103                          ROLB    R3      ;***
006406  106103                          ROLB    R3
006410  010437  001162                  MOV     R4,$REG0        ;SAVE PATTERN FOR WHICH PARITY
                                                        ;WAS GENERATED
006414  010337  001164                  MOV     R3,$REG1        ;SAVE EXPECTED PARITY BIT FOR
                                                        ;THAT PATTERN
006420  104015                          ERROR   15      ;INCORRECT PARITY BIT WAS
                                                        ;GENERATED (AND READ) FOR
                                                        ;THE PATTERN GIVEN IN ERROR
                                                        ;MESSAGE  NORMALLY, EVEN
                                                        ;PARITY IS GENERATED
006422  000756                  5$      BR      3$
006424  005737  003046          10$     TST     TMP0    ;DONE CHECKING OF LO-BYTE
                                                        ;PARITY GENERATOR USING ODD
                                                        ;PATTERN IN HI-BYTE?
006430  001005                          BNE     TST11   ;;YES, EXIT
006432  062737  000002  003046          ADD     #2,TMP0
006440  000137  006300                  JMP     20$     ;****IF NOT, CHECK LO-BYTE PARITY
                                                        ;GENERATOR USING ODD PATTERN
                                                        ;(376) FOR HI-BYTE
                                ;;*****************************************************************
                                ;*TEST 11        CHECK THAT WRONG PARITY CAN BE GENERATED, WHEN WWP IS SET
                                        ;THIS TEST CHECKS THAT WHEN WWP (WRITE WRONG PARITY) BIT IS SET
                                        ;IN THE STATUS REGISTER, WRONG PARITY (ODD PARITY) IS GENERATED
                                        ;NORMALLY, EVEN PARITY IS GENERATED   'PARDIS' (DISABLE PARITY
                                        ;ERROR TRAP) BIT IS ALSO SET, SO THAT A PARITY ERROR TRAP
                                        ;MAY NOT OCCUR WHEN WRONG PARITY IS WRITTEN   IF STILL,
                                        ;PARITY ERROR TRAP (FROM WCS) OCCURS (IE PARERR BIT IS
                                        ;SET IN STATUS REGISTER), THEN THERE IS A FAULT IN THE
                                        ;TRAP INHIBITING LOGIC (PARDIS, PARERR, JAM F/F'S ETC)
                                        ;FOUR DIFFERENT PATTERNS AND THEIR COMPLEMENTS ARE USED FOR
                                        ;GENERATING WRONG PARITY AND CHECKING THE CHECKER
                                        ;HI BYTE  LO BYTE       PATTERN
                                        ;ODD      EVEN          125525
                                        ;EVEN     EVEN          145252
                                        ;EVEN     ODD           052524
                                        ;ODD      ODD           032253
                                        ;THE PATTERN IS LOADED INTO WCS ADDRESS REGISTER AND THE
                                        ;PARITY BIT GENERATED FOR THAT PATTERN IS READ FROM
                                        ;THE STATUS REGISTER
```

```
                                        ;;*****************************************************************
006444  000004                          TST11   SCOPE
006446  012737  006632  003056                  MOV     #TST12,NXTST    ;STARTING ADDRESS OF NEXT TEST
006454  012777  000060  174352                  MOV     #PARDIS+WWP,@WCSST ;DISABLE PARITY ERROR TRAPS
                                                                        ;AND WRITE WRONG PARITY
006462  005001                                  CLR     R1              ;INITIALIZE PARITY MASK FOR
                                                                        ;'PARGEN'
006464  012704  000200                          MOV     #PARGEN,R4
006470  012700  006622                          MOV     #WRPAT,R0       ;INITIALIZE POINTER TO THE F RST PATTERN
006474  012703  177774                          MOV     #-4,R3          ;SET COUNT FOR 4 PATTERNS
006500  012737  006516  001110                  MOV     #1$,$LPERR      ;LOOP TO THIS POINT ON ERROR

006506  012737  006604  000114                  MOV     #3$,@#114       ;ESTABLISH PARITY TRAP VECTOR

006514  005002                          5$      CLR     R2
006516  011077  174314                  1$      MOV     (R0),@WCSAR     ;WRITE THE PATTERN IN ADDRESS REGISTER
006522  017705  174306                          MOV     @WCSST,R5       ;READ STATUS REGISTER &  PARGEN' BIT
006526  042705  177577                          BIC     #177777-PARGEN,R5 ;MASK OUT EVERYTHING BUT 'PARGEN' BIT
006532  020105                                  CMP     R1,R5           ;CORRECT PARITY BIT GENERATED?
006534  001406                                  BEQ     2$              ;YES
006536  011037  001164                          MOV     (R0),$REG1      ;GET PATTERN THAT GAVE ERROR
006542  017737  174266  001162                  MOV     @WCSST,$REG0    ;SAVE STATUS
006550  104016                                  ERROR   16              ;INCORRECT PARITY BIT WAS GENERATED
                                                                        ;FOR THE PATTERN GIVEN IN THE
                                                                        ;ERROR MESSAGE  NOTE, THAT WWP
                                                                        ;(WRITE WRONG PARITY) BIT WAS SET
                                                                        ;IN THE STATUS REGISTER  THUS
                                                                        ;INSTEAD OF GENERATING EVEN
                                                                        ;PARITY AS USUAL, ODD PARITY
                                                                        ;SHOULD HAVE BEEN GENERATED
006552  005702                          2$      TST     R2              ;USED THE COMPLIMENTORY PATTERN?
006554  001003                                  BNE     4$              ;YES
006556  005202                                  INC     R2
006560  005110                                  COM     (R0)            ;IF NOT, USE IT
006562  000755                                  BR      1$              ;GO AND CHECK

006564  074401                          4$      XOR     R4,R1           ;PARITY BIT MASK FOR THE
                                                                        ;NEXT PATTERN
006566  005720                                  TST     (R0)+           ;INCREMENT POINTER TO THE NEXT
                                                                        ;PATTERN
006570  005203                                  INC     R3
006572  001350                                  BNE     5$              ;IF NOT, GO BACK AND CHECK
006574  012737  003344  000114                  MOV     #BADPAR,@#114
006602  000413                                  BR      TST12           ;EXIT

006604                                  3$                              ;ENTER HERE IF AN UNEXPECTED PARITY
                                                                        ;ERROR TRAP TO 114 OCCURRED
                                                                        ;***
006604  017737  174224  001162                  MOV     @WCSST,$REG0    ;SAVE WCS STATUS REGISTER
006612  011037  001164                          MOV     (R0),$REG1      ;SAVE PATTERN THAT WAS WRITTEN
006616  104017                                  ERROR   17              ;UNEXPECTED PARITY ERROR TRAP
                                                                        ;TOOK PLACE
                                                                        ;NOTE, WCS PARITY ERROR TRAPS
                                                                        ;HAVE BEEN DISABLED BY SETTING
                                                                        ;'PARDIS' BIT IN STATUS REGISTER
                                                                        ;IF THIS ERROR OCCURS AND 'PAPERR'
```

```
                                                        ,BIT IS SET IN STATUS REGISTER,
                                                        ,THEN THERE IS A FAULT IN THE
                                                        ,PARITY-TRAP-DISABLING LOGIC
                                                        ,(PARDIS, PARERR, JPM F/FS)

006620  000754                          BR      2$      ,CONTINUE

                                                        ,THIS TABLE CONTAINS THE PATTERNS
                                                        ,USED FOR WRITING WRONG PARITY
                                                        ,AND CHECKING THE PARITY GENERATION
006622  125525                  WRPAT   WORD    125525  ,HI BYTE ODD, LO BYTE EVEN, PARITY =0
006624  145252                          WORD    145252  ,HI BYTE EVEN, LO BYTE EVEN, PARITY=1
006626  052524                          WORD    052524  ,HI BYTE EVEN, LO BYTE ODD, PARITY=0
006630  032253                          WORD    032253  ,HI BYTE ODD, LO BYTE ODD, PARITY=1

                                                        ,GENERATION OF PARITY BIT MASK (R1)
                                                        ,RELIES ON THE FACT THAT THE 4
                                                        ,PATTERNS GIVE PAR TY BITS 0,1,0,1
                                                        ,RESPECTIVELY


                                ,*****************************************************************
                                *TEST 12        CHECK TRAP ON PARITY ERROR, TRAP INHIBITING, AND PAR TY ERROR CLEARING L
                                                                                                                        OGIC
                                        ,THIS TEST CHECK OUT THE TRAP-ON-PARITY-ERROR LOGIC
                                        ,THE PARITY-ERROR-TRAP-INHIBITING LOGIC, AND PARITY-ERROR
                                        ,CLEARING LOGIC
                                        ,PARITY ERROR TRAPS ARE INHIBITED (SETTING 'PARDIS') AND
                                        ,A PATTERN IS WRITTEN INTO LOCATION 0  WWP IS SET SO WRONG (ODD)
                                        ,PARITY IS GENERATED AND STORED   LOCATION 0 IS READ, IF A
                                        ,TRAP OCCURS, THE FAULT (IN THE TRAP-INHIBITING LOGIC-PARDIS) IS
                                        REPORTED
                                        , PARDIS  IS CLEARED AND LOCATION 0 IS READ AGAIN, FORCING
                                        ,A PARITY ERROR TRAP THIS TIME   IF A TRAP DID NOT
                                        ,OCCUR THE FAULT IS REPORTED
                                        ,IF THE TRAP OCCURRED 'PARERR' BIT (15) IS CHECKED TO SEE
                                        ,IF IT WAS SET.  IT IS ALSO CHECKED WHETHER THE CORRECT PARITY
                                        BIT WAS STORED.  THEN, 'PARDIS' BIT IS SET AND IT IS CHECKED
                                        ,IF 'PARERR' BIT GOT CLEARED
                                        ,IF A PARITY ERROR TRAP DID NOT OCCUR ON READING WRONG
                                        ,PARITY 'PARERR' IS CHECKED TO SEE IF THE PARITY ERROR
                                        ,WAS AT LEAST DETECTED  IF 'PARERR' IS NOT SET, THEN
                                        ,'PO' PARITY BIT STORED FOR LOCATION 0 IS CHECKED TO SEE
                                        ,IF IT WAS STORED CORRECTLY  IF IT WAS NOT THEN IT IS
                                        CHECKED IF THE PARITY GENERATOR CAN GENERATE CORRECT
                                        ,PARITY BIT FOR THAT PATTERN
                                        ,THE ABOVE PROCEDURE SHOULD PROVIDE OPTIMIUM FAULT RESOLUTION
                                        ,THE ENTIRE TEST IS REPEATED WITH A SECOND PATTERN
                                ,*****************************************************************
006632  000004                 TST12    SCOPE
006634  012737  007552  003056          MOV     #TST13,NXTST    ,STARTING ADDRESS OF NEXT TEST

006642  012700  007542                  MOV     #TPATRN,R0      ,INITIALIZE PATTERN
006646  012701  007546                  MOV     #TSTAT,R1       ,INITIALIZE STATUS REGISTER CONTENTS
006652  012702  000200                  MOV     #PARGEN,R2      ,INITALIZE PARITY GENERATED AND
006656  012703  000002                  MOV     #PARO,R3                ,PARITY STORED BITS
```

```
006662  012777  000060  174144  1$      MOV     #PARDIS+WWP,@WCSST ,WRITE WRONG PARITY, DISABLE TRAPS
006670  012737  007426  000114          MOV     #14$,@#114         ,UNEXPECTED TRAP SERVICE
006676  012737  006662  001110          MOV     #1$,$LPERR         ,LOOP-BACK POINT

006704  012777  000000  174124  2$      MOV     #0,@WCSAR          ,WRITE PATTERN INTO LOCATION 0
006712  011077  174122                  MOV     (R0),@WCSDR        ,OF WCS

006716  011137  037252                  MOV     (R1),CESTAT        ,CHECK IF THE CONTENTS OF STATUS REGISTER
006722  012737  000014  037256          MOV     #PAR1+PAR2,CMASK,ARE OK
006730  012737  006756  037260          MOV     #3$,CRETRN         ,RETURN ADDRESS FOR SUBROUTINE
006736  004737  037152                  JSR     PC,CHKSTAT
006742  012737  000000  001166          MOV     #0,$REG2           ,IF ERROR, SAVE LOCATION ADDRESS
006750  011037  001170                  MOV     (R0),$REG3         ,SAVE PATTERN WRITTEN IN THAT LOC
006754  104011                          ERROR   11                 ,A PATTERN WAS WRITTEN INTO LOCATION
                                                                   ,0 OF WCS, THEN STATUS REGISTER
                                                                   ,WAS CHECKED TO SEE IF CORRECT BITS
                                                                   ,WERE SET, THEY WERE NOT  ERROR MESSAGE
                                                                   ,GIVES THE INFO

006756  012777  000000  174052  3$      MOV     #0,@WCSAR          ,ADDRESS LOC 0 AND READ IT
006764  005777  174050                  TST     @WCSDR             ,SINCE 'PARDIS' IS SET A TRAP
006770  000240                          NOP                        ,SHOULD NOT OCCUR   FAULT,  F IT DOES

006772  012737  007002  001110          MOV     #4$,$LPERR         ,LOOP ON ERROR POINT
007000  000403                          BR      5$

007002  052777  000020  174024  4$      BIS     #PARDIS @WCSST     ,IF LOOPING OR ERROR, CLEAR UP 'PARERR'
                                                                   ,BY SETTING 'PARDIS'

007010  012737  007044  000114  5$      MOV     #6$,@#114          ,PARITY ERROR TRAP VECTOR
007016  042777  000020  174010          BIC     #PARDIS,@WCSST     ,CLEAR 'PARDIS  SO THAT PARITY TRAP CAN
                                                                    BE FORCED
007024  012777  000000  174004          MOV     #0 @WCSAR          ,READ LOC 0 (BAD PARITY IS THERE) AND
007032  005777  174002                  TST     @WCSDR             ,FORCE PARITY ERROR TRAP
007036  000240                          NOP                        ,PARITY ERROR TRAP SHOULD OCCUR
007040  000240                          NOP                        ,BECAUSE LOC WITH BAD PARITY WAS READ

007042  000450                          BR      9$                 ,ERROR, IF PARITY TRAP DID NOT OCCUR

                                                                   ,LOCATION WITH BAD PARITY WAS READ
                                                                   ,AND TRAP OCCURRED   ENTER THIS
                                                                   ,CODE UPON TRAP
                                                                   ,FOR CERTAIN FAULTS IN TRAP LOGIC, THE
                                                                   ,MACHINE CAN HANG
007044  022626                  6$      CMP     (SP)+,(SP)+        ,POP THE STACK
007046  012737  007460  000114          MOV     #TRP3,@#114        ,UNEXPECTED TRAP SERVICE
007054  005777  173754                  TST     @WCSST             ,DID 'PARERR' SET
007060  100404                          BMI     7$                 ,YES
007062  017737  173746  001162          MOV     @WCSST,$REG0               ,NO, SAVE STATUS REGISTER
007070  104020                          ERROR   20                 ,'PARERR' BIT(15) DID NOT SET IN
                                                                   ,STATUS REGISTER ON FORCING A
                                                                   ,PARITY ERROR TRAP
007072  012777  000000  173726  7$      MOV     #0,@WCSAR          ,READ THE PARITY BIT STORED FOR
007100  017705  173730                  MOV     @WCSST,R5          ,PATTERN IN LOC 0
007104  042705  177775                  BIC     #177775,R5
```

```
007110  020503                          CMP     R5,R3           ;IS IT CORRECT?(NOTE, WWP 'S SET)
007112  001410                          BEQ     8$              ;YES
007114  012737  000000  001162          MOV     #0,$REG0        ;SAVE LOC THAT WAS READ
007122  011037  001164                  MOV     (R0),$REG1      ;SAVE PATTERN WRITTEN THERE
007126  017705  173702                  MOV     @WCSST,R5       ;SAVE STATUS REGISTER
007132  104021                          ERROR   21              ;INCORRECT PARITY BIT IS STORED FOR
                                                                ;THE PATTERN IN LOC 0 OF WCS
                                                                ;NOTE, 'WRONG PARITY' WAS WRITTEN
                                                                ;(ODD PARITY)

007134  052777  000020  173672  8$      BIS     #PARDIS,@WCSST  ;CLEAR 'PARERR' BY SETTING 'PARDIS
007142  032777  100000  173664          BIT     #PARERR,@WCSST  ;CHECK, WAS IT?
007150  001475                          BEQ     12$             ;YES
007152  017737  173656  001162          MOV     @WCSST,$REG0    ;SAVE STATUS
007160  104024                          ERROR   24              ;'PARERR' F/F WAS NOT
                                                                ;CLEARED WHEN 'PARDIS' BIT WAS
                                                                ;SET
007162  000470                          BR      12$

                                                                ;IF A PARITY ERROR TRAP DID NOT
                                                                ;OCCUR WHEN LOCATION WITH BAD
                                                                ;PARITY WAS READ (FAULT), ENTER
                                                                ;THIS CODE   REPORT THE ERROR

007164  012737  007474  000114  9$      MOV     #TRP2,@#114     ;UNEXPECTED TRAP SERVICE
007172  012737  000000  001162          MOV     #0,$REG0        ;SAVE LOCATION WHERE BAD PARITY WAS
007200  011037  001164                  MOV     (R0),$REG1      ;WRITTEN.  SAVE PATTERN WRITTEN
007204  017737  173624  001166          MOV     @WCSST,$REG2    ;SAVE STATUS
007212  104022                          ERROR   22              ;PARITY ERROR TRAP DID NOT OCCUR
                                                                ;WHEN WCS LOCATION HAVING BAD
                                                                ;PARITY WAS READ

007214  005777  173614                  TST     @WCSST          ;CHECK, IF 'PARERR' BIT WAS SET
007220  100407                          BMI     10$             ;YES
007222  017737  173606  001162          MOV     @WCSST,$REG0
007230  104023                          ERROR   23              ;'PARERR' BIT WAS NOT SET
                                                                ;(BAD PARITY NOT DETECTED) WHEN
                                                                ;LOCATION WITH BAD PARITY WAS
                                                                ;READ  NOTE, TRAP ALSO DID NOT
                                                                ;OCCUR
007232  012737  007240  001110          MOV     #10$,$LPERR     ;LOOP ON ERROR POINT
007240  012777  000000  173570  10$     MOV     #0,@WCSAR       ;CHECK IF CORRECT PARITY BIT FOR
                                                                ;PATTERN IN LOC 0, WAS STORED
007246  017705  173562                  MOV     @WCSST,R5       ;(NOTE, WRONG PARITY (ODD) WAS WRITTEN)
007252  042705  177775                  BIC     #177775,R5
007256  020503                          CMP     R5,R3           ;PARITY BIT OK?
007260  001431                          BEQ     12$             ;YES
007262  012737  000000  001162          MOV     #0,$REG0        ;SAVE LOCATION THAT WAS WRITTEN
007270  011037  001164                  MOV     (R0),$REG1      ;SAVE PATTERN THAT WAS WRITTEN
007274  017705  173534                  MOV     @WCSST,R5       ;SAVE STATUS
007300  104021                          ERROR   21              ;INCORRECT PARITY BIT WAS STORED
                                                                ;FOR PATTERN IN LOC 0   NOTE
                                                                ;WRONG PARITY WAS WRITTEN THERE
                                                                ;EXPECTED PARITY ERROR TRAP PROBABLY
                                                                ;DID NOT TAKE PLACE BECAUSE
                                                                 THE PARITY BIT WAS NOT STORED
```

```
                                                                        ;CORRECTLY

007302  012737  007310  001110          MOV     #11$,$LPERR             ;LOOP ON ERROR POINT
007310  011077  173522          11$     MOV     (R0),@WCSAR             ;CHECK IF CORRECT PARITY BIT CAN BE
007314  017705  173514                  MOV     @WCSST,R5               ;GENERATED FOR THE PATTERN IN LOC 0
007320  042705  177677                  BIC     #177677,R5
007324  020502                          CMP     R5,R2                   ;PARITY BIT OK?
007326  001406                          BEQ     12$                     ;YES
007330  011037  001164                  MOV     (R0),$REG1              ;SAVE PATTERN
007334  017737  173474  001162          MOV     @WCSST,$REG0            ;SAVE STATUS
007342  104016                          ERROR   16                      ;CORRECT PARITY BIT IS NOT
                                                                        ;GENERATED FOR THE
                                                                        ;PATTERN GIVEN IN ERROR MESSAGE
                                                                        ;NOTE, WRONG PARITY IS BEING
                                                                        ;GENERATED (ODD)
007344  052777  000020  173462  12$     BIS     #PARDIS,@WCSST          ;CLEAR 'PARERR' IF SET

007352  032777  000040  173454          BIT     #WWP,@WCSST             ;CHECK IF 'WWP' BIT IS STILL SET
007360  001004                          BNE     13$                     ;OK, IF IT IS
007362  017737  173446  001162          MOV     @WCSST,$REG0
007370  104010                          ERROR   10                      ;'WWP' BIT WAS SET AT THE
                                                                        ;BEGINNING OF THIS TEST   IT
                                                                        ;WAS FOUND TO BE CLEAR AT
                                                                        ;THIS POINT, SHOULD NOT BE

007372  012737  003244  000114  13$     MOV     #BADPAR,@#114           ;UNEXPECTED PARITY ERROR SERV CES

007400  005720                          TST     (R0)+                   ;INCREMENT POINTEPS TO NEXT PATTERN
007402  005721                          TST     (R1)+                   ;NEXT STATUS
007404  012705  000200                  MOV     #PARGEN,R5
007410  074502                          XOR     R5,R2                    USE THIS MASK FOR 'PARGEN' AND
007412  012705  000002                  MOV     #PARO,R5
007416  074503                          XOR     R5,R3                    'PO' FOR THE NEXT PATTERN
007420  001034                          BNE     EXIT2
007422  000137  006662                  JMP     1$                       REPEAT TEST FOR NEXT PATTERN

                                                                        ;PARITY ERROR TRAP OCCURRED
                                                                        ;ON READING WCS LOCATION WITH
                                                                        ;BAD PARITY EVEN THOUGH
007426                          14$                                     ;'PARDIS' WAS SET
007426  011637  037034                  MOV     (SP),TRAPC              ;SAVE PC WHERE TRAP OCCURRED
007432  022626                          CMP     (SP)+,(SP)+             ;POP THE STACK
007434  004737  037000                  JSR     PC,TRPMSG               ;GO TYPE OUT THE PC AT WHICH
                                                                        ;TRAP OCCURRED
007440  017737  173370  001162          MOV     @WCSST,$REG0            ;SAVE STATUS
007446  011037  001164                  MOV     (R0),$REG1              ;SAVE TEST PATTERN (WITH BAD PARITY)
007452  104017                          ERROR   17                       PARITY ERROR TRAP OCCURRED ON
                                                                        ;READING LOCATION WITH BAD
                                                                        ;PARITY EVEN THOUGH 'PARDIS'
                                                                        ;WAS SET  PROBABLE FAULT IN
                                                                        ;TRAP INHIBITING LOGIC (PARDIS
                                                                        ;JAM F/F'S)
007454  000137  007010                  JMP     5$
                                                                         THIS CODE IS ENTERED IF AN
                                                                        ;UNEXPECTED SECOND TRAP
                                                                        ;OCCURRED AFTER THE FIRST ONE
```

```
                                                                                  ,WAS FORCED BY READING BAD PARITY)
007460  011637  037034          TRP3    MOV     (SP),TRAPC      ,SAVE PC WHERE TRAP OCCURRED
007464  022626                          CMP     (SP)+,(SP)+     ,POP STACK
007466  004737  037000                  JSR     PC,TRPMSG       ,GO TYPE OUT PC WHERE TRAP
                                                                ,OCCURRED
007472  000405                          BR      EXIT1

007474                          TRP2                            ,THIS TRAP OCCURRED WHILE CHECKING
                                                                ,WAS BEING DONE ON THE FAULT
                                                                ,CONDITION -- NO TRAP ON READING
                                                                ,BAD PARITY
007474  011637  037034                  MOV     (SP),TRAPC      ,SAVE PC WHERE TRAP OCCURRED
007500  022626                          CMP     (SP)+,(SP)+     ;POP STACK
007502  004737  037000                  JSR     PC,TRPMSG       ,GO TYPE OUT PC WHERE TRAP
                                                                ,OCCURRED
007506  104406  042652          EXIT1   TYPMSG  ,MSG17          ;INDICATE THAT THIS TEST IS
                                                                ,ABORTED
007512  012777  000020  173314  EXIT2   MOV     #PARDIS,@WCSST  ,DISABLE TRAPS
007520  012777  000000  173310          MOV     #0,@WCSAR       ,WRITE BACK CORRECT PARITY
007526  005077  173306                  CLR     @WCSDR          ,IN LOCATION 0
007532  012737  003344  000114          MOV     #BADPAR,@#114
007540  000404                          BR      TST13            ,EXIT

007542  000000                  TPATRN   WORD   0
007544  052524                           WORD   52524

007546  040262                  TSTAT   40262
007550  040260                          40260


                                ***********************************************************
                                *TEST 13        CHECK THAT BAD PARITY 'PARO' CAN FORCE A TRAP
                                        ,THIS TEST CHECKS THAT A PARITY ERROR IN THE 16-BIT FIRST SEGMENT
                                        ,(CORRESPONDING TO PARO AND WPO) OF THE 48-BIT MICRO-WORD
                                        ,WILL RESULT IN A TRAP TO 114, IF 'PARDIS' IS CLEAR
                                         BAD PARITY (ODD) IS WRITTEN INTO LOCATION 0  OF THE WCS
                                         THE STATUS REGISTER IS CHECKED TO SEE IF THE CORRECT PARITY
                                        ,BIT (PARO) WAS STORED
                                        ,THEN 'PARDIS' IS CLEARED AND LOCATION 0 IS READ SO AS TO
                                         FORCE A PARITY ERROR TRAP   IF THE PARITY ERROR TRAP DOES
                                        ,NOT TAKE PLACE THE FAULT IS REPORTED   THEN THE PATTERN
                                        ,WHICH WAS READ FROM LOCATION 0 IS CHECKED TO SEE
                                        ,IF IT WAS READ CORRECTLY  IF THE PATTERN WAS NOT
                                         CORRECT THEN THE FAULT IS PROBABLY IN THE DATA STORAGE
                                        ,LOGIC (CORRESPONDING TO WPO)   IF THE PATTERN WAS READ
                                        ,CORRECTLY AND THE PREVIOUS TEST PASSED (INDICATING THAT
                                         A PARITY ERROR TRAP CAN TAKE PLACE) THEN THE FAULT IS
                                         IN PARITY CHECKING AND ROUTING LOGIC (CORRESPONDING TO PARO)
                                        ,THE ENTIRE TEST IS REPEATED FOR THE FOLLOWING PATTERNS

                                         PATTERN   HI BYTE   LO BYTE   PARO   OUTPUT OF 'AND-OR' GATE SHOULD BE

                                         125525     ODD      EVEN     LO(0)    LO(0)
                                         145252     EVEN     EVEN     HI(1)    LO(0)
                                         052524     EVEN     ODD      LO(0)    LO(0)
```

```
                                                ;032253     ODD       ODD       HI(1)     LO(0)
                                        ;;*****************************************************************
007552  000004                          TST13   SCOPE
007554  012737  010076  003056                  MOV     #TST14,NXTST    ;STARTING ADDRESS OF NEXT TEST
007562  012700  006622                          MOV     #WRPAT,R0       ;INITIALIZE THE PATTERN TO BE USED
007566  012701  040260                          MOV     #40260,R1               ;INITIALIZE EXPECTED STATUS
007572  012702  177774                          MOV     #-4,R2

007576  012737  007604  001110  1$              MOV     #2$,$LPERR      ;LOOP ON ERROR POINT

007604  012777  000060  173222  2$              MOV     #PARDIS+WWP,@WCSST  ;DISABLE TRAPS, WRITE WRONG PARITY
007612  012737  010024  000114                  MOV     #6$,@#114       ;UNEXPECTED TRAP SERVICE

007620  012777  000000  173210                  MOV     #0,@WCSAR       ;WRITE PATTERN WITH WRONG PARITY (ODD)
007626  011077  173206                          MOV     (R0),@WCSDR     ;INTO LOCATION 0

007632  010137  037252                          MOV     R1,CESTAT       ;CHECK IF THE BITS IN STATUS
007636  012737  000014  037256                  MOV     #PAR1+PAR2,CMASK,REGISTER ARE SET CORRECTLY
007644  012737  007672  037260                  MOV     #3$,CRETRN
007652  004737  037152                          JSR     PC,CHKSTAT
007656  012737  000000  001166                  MOV     #0,$REG2        ;SAVE LOCATION THAT WAS WRITTEN
007664  011037  001170                          MOV     (R0),$REG3      ;SAVE PATTERN THAT WAS WRITTEN
007670  104011                                  ERROR   11

007672  012737  010044  000114  3$              MOV     #7$,@#114       ;SET TRAP VECTOR FOR PARITY ERROR
007700  042777  000020  173126                  BIC     #PARDIS,@WCSST  ;CLEAR 'PARDIS' SO THAT PARITY ERROR
                                                                        ;TRAP CAN OCCUR
007706  012777  000000  173122                  MOV     #0 @WCSAR       ;FORCE A PARITY ERROR TRAP BY
007714  017705  173120                          MOV     @WCSDR R5       ;READING LOCATION 0 (BAD PARITY)
007720  000240                                  NOP                     ;PARITY ERROR TRAP SHOULD OCCUR BECAUSE
007722  000240                                  NOP                     ;LOCATION 0 CONTAINS BAD PARITY

                                                                         IF A TRAP DID NOT OCCUR, REPORT
                                                                        ;THE FAULT

007724  012737  010024  000114                  MOV     #6$ @#114       ;UNEXPECTED TRAP SERVICE
007732  012737  000000  001162                  MOV     #0,$REG0        ;SAVE LOCATION WHERE READ WAS DONE
007740  011037  001164                          MOV     (R0) $REG1      ;SAVE EXPECTED PATTERN
007744  017737  173064  001166                  MOV     @WCSST $REG2    ;SAVE STATUS
007752  104022                                  ERROR   22               PARITY ERROR TRAP DID NOT
                                                                         OCCUR WHEN LOCATION 0 CONTAINING
                                                                         BAD PARITY WAS READ

007754  012737  000004  001110                  MOV     #4 $LPERR       ;LOOP ON ERROR POINT

007762  020510                          4$      CMP     R5 (R0)         ;DATA READ WAS CORRECT?
007764  001410                                  BEQ     5$               YES
007766  012737  000000  001162                  MOV     #0 $REG0        ;SAVE LOCATION WHERE READ WAS DONE
007774  011037  001164                          MOV     (R0),$REG1      ;SAVE EXPECTED DATA
010000  010537  001166                          MOV     R5,$REG2        ;SAVE DATA RECEIVED
010004  104012                                  ERROR   12              ;DATA ERROR ON DOING A READ
                                                                        ;FROM LOCATION 0   ALSO, PARITY ERROR
                                                                         TRAP DID NOT OCCUR ON READING

010006  005720                          5$      TST     (R0)+            INCREMENT POINTER TO NEXT PATTERN
                                                                         TO BE USED
```

```
010010  012705  000002                  MOV     #PARO,R5
010014  074501                          XOR     R5,R1           ;GENERATE EXPECTED STATUS FOR NEXT
                                                                ;PATTERN
010016  005202                          INC     R2              ;DONE?
010020  001266                          BNE     1$
010022  000425                          BR      9$              ;EXIT
010024  011637  037034          6$      MOV     (SP),TRAPC      ;AN UNEXPECTED TRAP TO 114
010030  022626                          CMP     (SP)+,(SP)+     ;OCCURRED  REPORT PC AT WHICH
010032  004737  037000                  JSR     PC,TRPMSG       ;THE TRAP OCCURRED
010036  104406  042652                  TYPMSG  ,MSG17          ;REPORT THIS TEST ABORTED
010042  000401                          BR      8$
010044  022626                  7$      CMP     (SP)+,(SP)+     ;ENTER HERE, IF A VALID TRAP TO
                                                                ;114 OCCURRED ON READING LOC
                                                                ;0 HAVING BAD PARITY
010046  012777  000020  172760  8$      MOV     #PARDIS,@WCSST  ;INHIBIT FURTHER TRAPS
010054  012777  000000  172754          MOV     #0,@WCSAR       ;WRITE BACK GOOD PARITY INTO
010062  005077  172752                  CLR     @WCSDR          ;LOCATION 0
010066  012737  003344  000114          MOV     #BADPAR,@#114   ;ESTABLISH UNEXPECTED PARITY TRAP
                                                                ;SERVICE (114) FOR THE PROGRAM
010074  000744                          BR      5$
010076                          9$
                                ***********************************************************
                                ;TEST 14        CHECK THAT BAD PARITY 'PAR1' CAN FORCE A TRAP
                                        ;THIS TEST CHECKS THAT A PARITY ERROR IN THE 16-BIT MIDDLE SEGMENT
                                        ;CORRESPONDING TO PAR1 AND WP1) OF THE 48-BIT MICRO-WORD
                                        ;WILL RESULT IN A TRAP TO 114, IF 'PARDIS' IS CLEAR
                                        ;BAD PARITY (ODD) IS WRITTEN INTO LOCATION 2000 OF THE WCS
                                        ;THE STATUS REGISTER IS CHECKED TO SEE IF THE CORRECT PARITY
                                        ;BIT (PAR1) WAS STORED
                                        ;THEN 'PARDIS' IS CLEARED AND LOCATION 2000 IS READ SO AS TO
                                        ;FORCE A PARITY ERROR TRAP   IF THE PARITY ERROR TRAP DOES
                                        ;NOT TAKE PLACE THE FAULT IS REPORTED   THEN THE PATTERN
                                        ;WHICH WAS READ FROM LOCATION 2000 IS CHECKED TO SEE
                                        ;IF IT WAS READ CORRECTLY  IF THE PATTERN WAS NOT
                                        ;CORRECT THEN THE FAULT IS PROBABLY IN THE DATA STORAGE
                                        ;LOGIC (CORRESPONDING TO WP1)   IF THE PATTERN WAS READ
                                        ;CORRECTLY AND THE PREVIOUS TEST PASSED (INDICATING THAT
                                         A PARITY ERROR TRAP CAN TAKE PLACE) THEN THE FAULT IS
                                        ;IN PARITY CHECKING AND ROUTING LOGIC (CORRESPONDING TO PAR1)
                                        ;THE ENTIRE TEST IS REPEATED FOR THE FOLLOWING PATTERNS
                                        ;PATTERN   HI BYTE   LO BYTE   PAR1   OUTPUT OF 'AND-OR' GATE SHOULD BE

                                        ;125525     ODD       EVEN     LO(0)    LO(0)
                                        ;145252     EVEN      EVEN     HI(1)    LO(0)
                                        ;052524     EVEN      ODD      LO(0)    LO(0)
                                        ;032253     ODD       ODD      HI(1)    LO(0)
                                ;;***********************************************************
010076  000004                  TST14   SCOPE
010100  012737  010422  003056          MOV     #TST15,NXTST    ;STARTING ADDRESS OF NEXT TEST
```

```
010106  012700  006622                  MOV     #WRPAT,R0          ;INITIALIZE THE PATTERN TO BE USED
010112  012701  040060                  MOV     #40060,R1                  ;INITIALIZE EXPECTED STATUS
010116  012702  177774                  MOV     #-4,R2
010122  012737  010130  001110  1$      MOV     #2$,$LPERR         ;LOOP ON ERROR POINT
010130  012777  000060  172676  2$      MOV     #PARDIS+WWP,@WCSST  ;DISABLE TRAPS, WRITE WRONG PARITY
010136  012737  010350  000114          MOV     #6$,@#114          ;UNEXPECTED TRAP SERVICE
010144  012777  002000  172664          MOV     #2000,@WCSAR       ;WRITE PATTERN WITH WRONG PARITY (ODD)
010152  011077  172662                  MOV     (R0),@WCSDR        ;INTO LOCATION 2000
010156  010137  037252                  MOV     R1,CESTAT          ;CHECK IF THE BITS IN STATUS
010162  012737  000012  037256          MOV     #PAR0+PAR2,CMASK,REGISTER ARE SET CORRECTLY
010170  012737  010216  037260          MOV     #3$,CRETRN
010176  004737  037152                  JSR     PC,CHKSTAT
010202  012737  002000  001166          MOV     #2000,$REG2        ;SAVE LOCATION THAT WAS WRITTEN
010210  011037  001170                  MOV     (R0),$REG3         ;SAVE PATTERN THAT WAS WRITTEN
010214  104011                          ERROR   11
010216  012737  010370  000114  3$      MOV     #7$,@#114          ;SET TRAP VECTOR FOR PARITY ERROR
010224  042777  000020  172602          BIC     #PARDIS,@WCSST     ;CLEAR 'PARDIS' SO THAT PARITY ERROR
                                                                   ;TRAP CAN OCCUR.
010232  012777  002000  172576          MOV     #2000,@WCSAR       ;FORCE A PARITY ERROR TRAP BY
010240  017705  172574                  MOV     @WCSDR,R5          ;READING LOCATION 2000 (BAD PARITY)
010244  000240                          NOP                        ;PARITY ERROR TRAP SHOULD OCCUR BECAUSE
010246  000240                          NOP                        ;LOCATION 1 CONTAINS BAD PARITY

                                                                   ;IF A TRAP DID NOT OCCUR, REPORT
                                                                   ;THE FAULT

010250  012737  010350  000114          MOV     #6$,@#114          ;UNEXPECTED TRAP SERVICE
010256  012737  002000  001162          MOV     #2000,$REG0        ;SAVE LOCATION WHERE READ WAS DONE
010264  011037  001164                  MOV     (R0),$REG1         ;SAVE EXPECTED PATTERN
010270  017737  172540  001166          MOV     @WCSST,$REG2       ;SAVE STATUS
010276  104022                          ERROR   22                 ;PARITY ERROR TRAP DID NOT
                                                                   ;OCCUR WHEN LOCATION 2000 CONTAINING
                                                                   ;BAD PARITY WAS READ

010300  012737  000004  001110          MOV     #4,$LPERR          ;LOOP ON ERROR POINT

010306  020510                  4$      CMP     R5,(R0)            ;DATA READ WAS CORRECT?
010310  001410                          BEQ     5$                 ;YES
010312  012737  002000  001162          MOV     #2000,$REG0        ;SAVE LOCATION WHERE READ WAS DONE
010320  011037  001164                  MOV     (R0),$REG1         ;SAVE EXPECTED DATA
010324  010537  001166                  MOV     R5,$REG2           ;SAVE DATA RECEIVED
010330  104012                          ERROR   12                 ;DATA ERROR ON DOING A READ
                                                                   ;FROM LOCATION 2000   ALSO, PARITY ERROR
                                                                   ;TRAP DID NOT OCCUR ON READING

010332  005720                  5$      TST     (R0)+              ;INCREMENT POINTER TO NEXT PATTERN
                                                                   ;TO BE USED
010334  012705  000004                  MOV     #PAR1,R5
010340  074501                          XOR     R5,R1              ;GENERATE EXPECTED STATUS FOR NEXT
                                                                   ;PATTERN
010342  005202                          INC     R2                 ;DONE?
```

```
010344  001266                          BNE     1$
010346  000425                          BR      9$              ,EXIT
010350  011637  037034          6$      MOV     (SP),TRAPC      ,AN UNEXPECTED TRAP TO 114
010354  022626                          CMP     (SP)+,(SP)+     ,OCCURRED. REPORT PC AT WHICH
010356  004737  037000                  JSR     PC,TRPMSG       ,THE TRAP OCCURRED
010362  104406  042652                  TYPMSG  ,MSG17          ,REPORT THIS TEST ABORTED
010366  000401                          BR      8$
010370  022626                  7$      CMP     (SP)+,(SP)+     ,ENTER HERE, IF A VALID TRAP TO
                                                                ,114 OCCURRED ON READ NG LOC
                                                                ;1 HAVING BAD PARITY
010372  012777  000020  172434  8$      MOV     #PARDIS,@WCSST  ,INH BIT FURTHER TRAPS
010400  012777  002000  172430          MOV     #2000,@WCSAR    ,WRITE BACK GOOD PARITY INTO
010406  005077  172426                  CLR     @WCSDR          ,LOCATION 2000
010412  012737  003344  000114          MOV     #BADPAR,@#114   ,ESTABLISH UNEXPECTED PARITY TRAP
                                                                ,SERVICE (114) FOR THE PROGRAM
010420  000744                          BR      5$
010422                          9$
                                  ***********************************************************
                                 *TEST 15       CHECK THAT BAD PARITY 'PAR2' CAN FORCE A TRAP
                                        ,THIS TEST CHECKS THAT A PARITY ERROR IN THE 16-BIT THIRD SEGMENT
                                        ,(CORRESPONDING TO PAR2 AND WP2) OF THE 48-BIT MICRO-WORD
                                        ,WILL RESULT IN A TRAP TO 114, IF 'PARDIS' IS CLEAR
                                        ,BAD PARITY (ODD) IS WRITTEN INTO LOCATION 4000 OF THE WCS
                                        ,THE STATUS REGISTER IS CHECKED TO SEE IF THE CORRECT PARITY
                                        ,BIT (PAR2) WAS STORED
                                        ,THEN 'PARDIS' IS CLEARED AND LOCATION 4000 IS READ SO AS TO
                                        ,FORCE A PARITY ERROR TRAP   IF THE PARITY ERROR TRAP DOES
                                        ,NOT TAKE PLACE THE FAULT IS REPORTED.  THEN THE PATTERN
                                        ,WHICH WAS READ FROM LOCATION 4000 IS CHECKED TO SEE
                                        ,IF IT WAS READ CORRECTLY  IF THE PATTERN WAS NOT
                                        ,CORRECT THEN THE FAULT IS PROBABLY IN THE DATA STORAGE
                                        ,LOGIC (CORRESPONDING TO WP2)   IF THE PATTERN WAS READ
                                        ,CORRECTLY AND THE PREVIOUS TEST PASSED (INDICATING THAT
                                        ,A PARITY ERROR TRAP CAN TAKE PLACE) THEN THE FAULT IS
                                        ,IN PARITY CHECKING AND ROUTING LOGIC (CORRESPONDING TO PAR2)
                                        ,THE ENTIRE TEST IS REPEATED FOR THE FOLLOWING PATTERNS
                                        ,PATTERN   HI BYTE   LO BYTE   PAR2   OUTPUT OF 'AND-OR' GATE SHOULD BE

                                        ,125525     ODD       EVEN     LO(0)    LO(0)
                                        ,145252     EVEN      EVEN     HI(1)    LO(0)
                                        ,052524     EVEN      ODD      LO(0)    LO(0)
                                        ,032253     ODD       ODD      HI(1)    LO(0)
                                  ,,***********************************************************
010422  000004                  TST15   SCOPE
010424  012737  010746  003056          MOV     #TST16,NXTST    ,STARTING ADDRESS OF NEXT TEST
010432  012700  006622                  MOV     #WRPAT,R0       ,INITIALIZE THE PATTERN TO BE USED
010436  012701  040060                  MOV     #40060,R1               ,INITIALIZE EXPECTED STATUS
010442  012702  177774                  MOV     #-4 R2
```

```
010446  012737  010454  001110  1$      MOV     #2$,$LPERR          ;LOOP ON ERROR POINT

010454  012777  000060  172352  2$      MOV     #PARDIS+WWP,@WCSST  ;DISABLE TRAPS, WRITE WRONG PARITY
010462  012737  010674  000114          MOV     #6$,@#114           ;UNEXPECTED TRAP SERVICE

010470  012777  004000  172340          MOV     #4000,@WCSAR        ,WRITE PATTERN WITH WRONG PARITY (ODD)
010476  011077  172336                  MOV     (R0),@WCSDR         ;INTO LOCATION 4000

010502  010137  037252                  MOV     R1,CESTAT           ;CHECK IF THE BITS IN STATUS
010506  012737  000006  037256          MOV     #PAR0+PAR1,CMASK;REGISTER ARE SET CORRECTLY
010514  012737  010542  037260          MOV     #3$,CRETRN
010522  004737  037152                  JSR     PC,CHKSTAT
010526  012737  004000  001166          MOV     #4000,$REG2         ;SAVE LOCATION THAT WAS WRITTEN
010534  011037  001170                  MOV     (R0),$REG3          ;SAVE PATTERN THAT WAS WRITTEN
010540  104011                          ERROR   11                  ,STATUS ERROR ON WRITE TO WCS LOCATION

010542  012737  010714  000114  3$      MOV     #7$,@#114           ,SET TRAP VECTOR FOR PARITY ERROR
010550  042777  000020  172256          BIC     #PARDIS,@WCSST      ;CLEAR 'PARDIS' SO THAT PARITY ERROR
                                                                    ,TRAP CAN OCCUR.
010556  012777  004000  172252          MOV     #4000,@WCSAR        ,FORCE A PARITY ERROR TRAP BY
010564  017705  172250                  MOV     @WCSDR,R5           ,READING LOCATION 4000 (BAD PARITY)
010570  000240                          NOP                         ,PARITY ERROR TRAP SHOULD OCCUR BECAUSE
010572  000240                          NOP                         ;LOCATION 4000 CONTAINS BAD PARITY

                                                                    ,IF A TRAP DID NOT OCCUR, REPORT
                                                                    ,THE FAULT

010574  012737  010674  000114          MOV     #6$,@#114           ,UNEXPECTED TRAP SERVICE
010602  012737  004000  001162          MOV     #4000,$REG0         ,SAVE LOCATION WHERE READ WAS DONE
010610  011037  001164                  MOV     (R0),$REG1          ,SAVE EXPECTED PATTERN
010614  017737  172214  001166          MOV     @WCSST,$REG2        ,SAVE STATUS
010622  104022                          ERROR   22                  ,PARITY ERROR TRAP DID NOT
                                                                    ,OCCUR WHEN LOCATION 4000 CONTAINING
                                                                    ,BAD PARITY WAS READ

010624  012737  000004  001110          MOV     #4,$LPERR           ,LOOP ON ERROR POINT

010632  020510                  4$      CMP     R5,(R0)             ,DATA READ WAS CORRECT?
010634  001410                          BEQ     5$                  ,YES
010636  012737  004000  001162          MOV     #4000,$REG0         ,SAVE LOCATION WHERE READ WAS DONE
010644  011037  001164                  MOV     (R0),$REG1          ,SAVE EXPECTED DATA
010650  010537  001166                  MOV     R5,$REG2            ,SAVE DATA RECEIVED
010654  104012                          ERROR   12                  ,DATA ERROR ON DOING A READ
                                                                    ,FROM LOCATION 4000   ALSO, PARITY ERROR
                                                                    ,TRAP DID NOT OCCUR ON READING

010656  005720                  5$      TST     (R0)+               ,INCREMENT POINTER TO NEXT PATTERN
                                                                    ,TO BE USED

010660  012705  000010                  MOV     #PAR2,R5
010664  074501                          XOR     R5,R1               ,GENERATE EXPECTED STATUS FOR NEXT
                                                                    ,PATTERN
010666  005202                          INC     R2                  ,DONE?
010670  001266                          BNE     1$

010672  000425                          BR      9$
```

```
010674  011637  037034          6$      MOV     (SP),TRAPC      ,AN UNEXPECTED TRAP TO 114
010700  022626                          CMP     (SP)+,(SP)+     ,OCCURRED. REPORT PC AT WHICH
010702  004737  037000                  JSR     PC,TRPMSG       ,THE TRAP OCCURRED
010706  104406  042652                  TYPMSG  ,MSG17          ,REPORT THIS TEST ABORTED
010712  000401                          BR      8$

010714  022626                  7$      CMP     (SP)+,(SP)+     ,ENTER HERE, IF A VALID TRAP TO
                                                                ;114 OCCURRED ON READING LOC
                                                                ,2 HAVING BAD PARITY

010716  012777  000020  172110  8$      MOV     #PARDIS,@WCSST  ,INHIBIT FURTHER TRAPS
010724  012777  004000  172104          MOV     #4000,@WCSAR    ,WRITE BACK GOOD PARITY INTO
010732  005077  172102                  CLR     @WCSDR          ,LOCATION 4000
010736  012737  003344  000114          MOV     #BADPAR,@#114   ,ESTABLISH UNEXPECTED PARITY TRAP
                                                                ,SERVICE (114) FOR THE PROGRAM
010744  000744                          BR      5$
010746                          9$


                                ,,*****************************************************************
                                ,*TEST 16       CHECK WCS DATA PATH  DBUF (15 0), BUS DIN (15 0), LOC 0
                                        ,THIS TEST IS PRIMARILY TESTING THE DATA PATH LOGIC OF THE
                                        ,WCS, NAMELY DB<15 0> LINES, DB REGISTER, DOUT<15 0>,
                                        ;BUS DIN<15:0>, AND LOCATION 0 (USED AS TEST WORD)   A
                                        ,FAULT IN THE LOGIC GENERATING THE WRITE PULSE WILL ALSO
                                        ,BE DETECTED
                                        ,
                                        ,FIRST A PATTERN OF 1 IS FLOATED THROUGH LOCATION 0   THEN
                                        ,A 0 (WITH A BACKGROUND OF 1'S) IS FLOATED THROUGH   AFTER
                                        ;WRITING A PATTERN INTO LOCATION 0, A READ IS DONE AND
                                        ,COMPARED
                                ,,*****************************************************************
010746  000004                  TST16   SCOPE
010750  012737  011224  003056          MOV     #TST17,NXTST    ,STARTING ADDRESS OF NEXT TEST
010756  005077  172052                  CLR     @WCSST
010762  005003                          CLR     R3
010764  005004                          CLR     R4              ,IF R4=0 FLOAT A 1, R4=1, FLOAT A 0
010766  012700  000001                  MOV     #1,R0           ,INITIALIZE THE PATTERN
010772  012737  011130  000114          MOV     #7$,@#114       ;PARITY ERROR TRAP VECTOR
011000  012705  000020          1$      MOV     #16 ,R5         ,COUNT
011004  005001                          CLR     R1              ,WCS ADDRESS TO BE USED (0)
011006  012737  011014  001110          MOV     #2$,$LPERR      ;LOOP BACK ADDRESS
011014  112737  177773  003064  2$      MOVB    #-5,ERCNT0      ,REPORT MAXIMUM 5 ERRORS
011022  112737  177773  003065          MOVB    #-5,ERCNT1
011030  010177  172002                  MOV     R1,@WCSAR       ,ADDRESS THE WCS, LOC 0
011034  010077  172000          3$      MOV     R0,@WCSDR       ,WRITE THE DATA PATTERN
011040  017702  171774                  MOV     @WCSDR,R2       ,READ IT BACK
011044  020002                          CMP     R0,R2           ,OK?
011046  001413                          BEQ     5$              ,YES
011050  105237  003064                  INCB    ERCNT0          ,DON'T REPORT MORE THAN 5 ERRORS
011054  001407                          BEQ     4$
011056  005037  001162                  CLR     $REG0           ,SAVE WCS LOCATION
011062  010037  001164                  MOV     R0,$REG1        ,SAVE EXPECTED PATTERN
011066  010237  001166                  MOV     R2,$REG2        ,SAVE PATTERN READ
011072  104012                          ERROR   12              ,DATA ERROR OCURRED ON DOING A READ
                                                                ,FROM WCS LOCATION 0   FAULT COULD
```

```
                                                                  ,BE IN THE 'DB' REGISTER OR LINES <15 0>
                                                                  ,OR BUS DIN<15:0>, PORT B0
011074  005203                  4$      INC     R3
011076  006300                  5$      ASL     R0                ,CREATE NEXT PATTERN TO BE USED
011100  005704                          TST     R4                ;FLOAT A 1 OR 0?
011102  001402                          BEQ     6$
011104  052700  000001                  BIS     #BIT0,R0          ,FLOAT A 1
011110  077527                  6$      SOB     R5,3$             ,DONE ALL 16 PATTERNS?
011112  012702  000001                  MOV     #BIT0,R2
011116  074204                          XOR     R2,R4             ;DONE BOTH-FLOAT A 1 AND 0?
011120  001436                          BEQ     8$                ;YES
011122  012700  177776                  MOV     #177776,R0        ;INITIALIZE THE PATTERN
011126  000742                          BR      3$                ,DO REST OF CHECKING

                                        ,IF A PARITY ERROR OCCURRED ENTER HERE

011130  032777  100000  171676  7$      BIT     #PARERR,@WCSST    ,WCS PARITY ERROR?
011136  001422                          BEQ     9$                ,NO, CHECK WHICH ONE?
011140  022626                          CMP     (SP)+,(SP)+       ,POP THE STACK
011142  105237  003065                  INCB    ERCNT1
011146  001753                          BEQ     5$
011150  017737  171660  001166          MOV     @WCSST,$REG2      ,SAVE STATUS REGISTER
011156  012777  000020  171650          MOV     #PARDIS,@WCSST    ,CLEAR PARITY ERROR
011164  005077  171644                  CLR     @WCSST
011170  005037  001162                  CLR     $REG0             ,SAVE WCS ADDRESS
011174  010037  001164                  MOV     R0,$REG1          ,SAVE EXPECTED PATTERN
011200  104026                          ERROR   26                ,PARITY ERROR OCCURRED ON READING
                                                                  ,LOCATION 0 OF WCS.  FAULT COULD
                                                                  ,BE IN LOCATION 0, WRITE PULSE
                                                                  ,LOGIC OR PARITY GENERATOR/CHECKER
011202  000735                          BR      5$                ,RETURN, DO REST OF CHECKING
011204  012737  003344  000114  9$      MOV     #BADPAR,@#114     ,IF THE PARITY ERROR WAS NOT
011212  000137  003344                  JMP     BADPAR            ,FROM WCS GO TO THE NORMAL
                                                                  ,PARITY ERROR HANDLER
011216                          8$                                ,EXIT
011216  012737  003344  000114          MOV     #BADPAR,@#114     ,NORMAL PARITY ERROR HANDLER


                                ,*****************************************************************
                                *TEST 17        CHECK WCS DATA PATH  BUS DIN (31.16), LOC2000
                                        ,THIS TEST PRIMARILY CHECKS OUT THE DATA PATH SEGMENT <31 16>
                                        ,OF THE WCS, NAMELY INPUTS TO DATA ARRAY CHIPS <31 16>,
                                        ,DOUT <31 16>, 'BUS DIN' MUX (PORT C0) AND LOCATION 2000
                                         (TEST LOCATION)  FAULTS IN THE DBUF PATH AND WRITE PULSE
                                        ,LOGIC WILL ALSO BE DETECTED
                                        ,FIRST, A PATTERN OF 1 IS FLOATED THROUGH LOCATION 2000   THEN
                                        ,A 0 (WITH A BACKGROUND OF 1'S) IS FLOATED THROUGH   AFTER
                                        ,WRITING A PATTERN A READ IS DONE AND COMPARED   IF A
                                        ,PARITY ERROR OCCURS THE FAULT IS PROBABLY IN THE DATA
                                        ,ARRAY OR ASSOCIATED INPUT/OUTPUT LINES
                                        ,IF A DATA ERROR OCCURS, THE FAULT IS PROBABLY IN THE
                                        ,'BUS DIN' MUX <31 16> OR ASSOCIATED LINES
                                        ,NOTE, FAULTS IN DBUF REGISTER, WRITE PULSE LOGIC  PAR TY
                                        ,LOGIC WILL ALSO BE DETECTED HERE   BUT THEY SHOULD HAVE
                                        ,BEEN ALREADY DETECTED IN PREVIOUS TESTS
```

```
                                        ;;*****************************************************************
011224  000004                          TST17.  SCOPE
011226  012737  011514  003056                  MOV     #TST20,NXTST    ;STARTING ADDRESS OF NEXT TEST
011234  005077  171574                          CLR     @WCSST
011240  005003                                  CLR     R3
011242  005004                                  CLR     R4              ;IF R4=0 FLOAT A 1, R4=1 FLOAT A 0
011244  012700  000001                          MOV     #1,R0           ;INITIALIZE THE PATTERN
011250  012737  011412  000114                  MOV     #7$,@#114       ;PARITY ERROR TRAP VECTOR
011256  012705  000020          1$              MOV     #16 ,R5         ;COUNT
011262  012701  002000                          MOV     #2000,R1        ;WCS ADDRESS TO BE USED (2000)
011266  012737  011274  001110                  MOV     #2$,$LPERR      ;LOOP BACK ADDRESS
011274  112737  177773  003064  2$              MOVB    #-5,ERCNT0      ;REPORT 5 ERRORS MAXIMUM
011302  112737  177773  003065                  MOVB    #-5,ERCNT1
011310  010177  171522                          MOV     R1,@WCSAR       ;ADDRESS THE WCS, LOC 2000
011314  010077  171520          3$              MOV     R0,@WCSDR       ;WRITE THE PATTERN
011320  017702  171514                          MOV     @WCSDR,R2       ;READ IT BACK
011324  020002                                  CMP     R0,R2           ;OK?
011326  001414                                  BEQ     5$              ;YES
011330  105237  003064                          INCB    ERCNT0          ;DONT REPORT MORE THAN 5 ERRORS
011334  001410                                  BEQ     4$
011336  012737  002000  001162                  MOV     #2000,$REG0     ;SAVE WCS LOCATION
011344  010037  001164                          MOV     R0,$REG1        ;SAVE EXPECTED PATTERN
011350  010237  001166                          MOV     R2,$REG2        ;SAVE PATTERN READ
011354  104012                                  ERROR   12              ;DATA ERROR OCCURRED ON DOING A
                                                                        ;READ FROM WCS LOCATION 2000   FAULT
                                                                        ;COULD BE IN 'BUS DIN' MUX (31 16
                                                                        ;(PORT C0), LINES (31 16), OR DB REGISTER
011356  005203                          4$      INC     R3              ;KEEP COUNT OF ERRORS
011360  006300                          5$      ASL     R0              ;CREATE NEXT PATTERN TO BE USED
011362  005704                                  TST     R4              ;FLOAT A 1 OR 0?
011364  001402                                  BEQ     6$
011366  052700  000001                          BIS     #BIT0,R0        ;FLOAT A 1
011372  077530                          6$      SOB     R5,3$           ;DONE ALL 16 PATTERNS?
011374  012702  000001                          MOV     #BIT0,R2
011400  074204                                  XOR     R2,R4           ;DONE BOTH-FLOAT A 1 AND 0?
011402  001441                                  BEQ     8$              ;YES
011404  012700  177776                          MOV     #177776,R0      ;INITIALIZE THE PATTERN
011410  000741                                  BR      3$              ;DO REST OF CHECKING

                                                ;IF A PARITY ERROR OCCURRED ENTER HERE

011412  032777  100000  171414  7$              BIT     #PARERR,@WCSST  ;WCS PARITY ERROR?
011420  001425                                  BEQ     9$              ;NO  CHECK WHICH ONE
011422  022626                                  CMP     (SP)+,(SP)+     ;POP THE STACK
011424  105237  003065                          INCB    ERCNT1          ;REPORT MAXIMUM 5 ERRORS
011430  001002                                  BNE     +6
011432  000137  011360                          JMP     5$
011436  017737  171372  001166                  MOV     @WCSST,$REG2    ;SAVE STATUS REGISTER
011444  012777  000020  171362                  MOV     #PARDIS,@WCSST  ;CLEAR PARITY ERROR
011452  005077  171356                          CLR     @WCSST
011456  012737  002000  001162                  MOV     #2000,$REG0     ;SAVE WCS ADDRESS
011464  010037  001164                          MOV     R0,$REG1        ;SAVE EXPECTED PATTERN
011470  104026                                  ERROR   26              ;PARITY ERROR OCCURRED ON READING
                                                                        ;LOCATION 2000 OF WCS   FAULT COULD
                                                                        ;BE IN LOC 2000 OR THE INPUT/OUTPUT
                                                                        ;LINES
```

```
011472  000732                          BR      5$              ;RETURN, DO REST OF CHECKING
011474  012737  003344  000114  9$      MOV     #BADPAR,@#114   ;IF THE PARITY ERROR WAS NOT FROM
011502  000137  003344                  JMP     BADPAR          ;WCS GO TO THE NORMAL
                                                                ;PARITY ERROR HANDLER
011506                          8$                              ;EXIT

011506  012737  003344  000114          MOV     #BADPAR,@#114   ;NORMAL PARITY ERROR HANDLER

                                ;;*****************************************************************
                                ;*TEST 20        CHECK WCS DATA PATH: BUS DIN (47.32), LOC 4000
                                        ;TH'S TEST PRIMARILY CHECKS OUT THE DATA PATH SEGMENT <47 31>
                                        ;OF THE WCS, NAMELY INPUTS TO DATA ARRAY CHIPS <47:32>
                                        ;DOUT <47.32>, 'BUS DIN' MUX (PORT DO) AND LOCATION 4000
                                        ;(TEST LOCATION).  FAULTS IN THE DBUF PATH AND WRITE
                                        ;PULSE LOGIC WILL ALSO BE DETECTED.
                                        ;FIRST, A PATTERN OF 1 IS FLOATED THROUGH LOCATION 4000   THEN
                                        ;A 0 (WITH A BACKGROUND OF 1'S) IS FLOATED THROUGH   AFTER
                                        ;WRITING A PATTERN A READ IS DONE AND COMPARED   IF A
                                        ;PARITY ERROR OCCURS THE FAULT IS PROBABLY IN THE DATA ARRAY
                                        ;(LOCATION 4000) OR ASSOCIATED INPUT OUTPUT LINES
                                        ;IF A DATA ERROR OCCURS, THE FAULT IS PROBABLY IN THE
                                        ;'BUS DIN' MUX <47 32> OR ASSOCIATED LINES   NOTE,
                                        ;FAULTS IN DBUF REGISTER, WRITE PULSE LOGIC, PARITY
                                        ;LOGIC WILL ALSO BE DETECTED HERE. BUT THEY SHOULD HAVE
                                        ;BEEN ALREADY DETECTED IN THE PREVIOUS TESTS
                                ;;*****************************************************************
011514  000004                  TST20   SCOPE
011516  012737  012000  003056          MOV     #TST21,NXTST    ;STARTING ADDRESS OF NEXT TEST
011524  005077  171304                  CLR     @WCSST
011530  005003                          CLR     R3
011532  005004                          CLR     R4              ;IF R4=0 FLOAT A 1, R4=1 FLOAT A 0
011534  012700  000001                  MOV     #1,R0           ;INITIALIZE THE PATTERN
011540  012737  011702  000114          MOV     #7$,@#114       ;PARITY ERROR TRAP VECTOR
011546  012705  000020          1$      MOV     #16 ,R5         ;COUNT
011552  012701  004000                  MOV     #4000,R1        ;WCS ADDRESS TO BE USED (4000)
011556  012737  011564  001110          MOV     #2$,$LPERR      ;LOOP BACK ADDRESS
011564  112737  177773  003064  2$      MOVB    #-5,ERCNT0      ;REPORT 5 ERRORS MAXIMUM
011572  112737  177773  003065          MOVB    #-5,ERCNT1
011600  010177  171232                  MOV     R1,@WCSAR       ;ADDRESS THE WCS, LOCATION 4000
011604  010077  171230          3$      MOV     R0,@WCSDR       ;WRITE THE PATTEPN
011610  017702  171224                  MOV     @WCSDR,R2       ;READ IT BACK
011614  020002                          CMP     R0,R2           ;OK?
011616  001414                          BEQ     5$              ;YES
011620  105237  003064                  INCB    ERCNT0          ;DONT REPORT MORE THAN 5 EPROPS
011624  001410                          BEQ     4$
011626  012737  004000  001162          MOV     #4000,$REG0     ;SAVE WCS LOCATION
011634  010037  001164                  MOV     R0,$REG1        ;SAVE EXPECTED PATTERN
011640  010237  001166                  MOV     R2,$REG2        ;SAVE PATTERN READ
011644  104012                          ERROR   12              ;DATA ERROR OCCURRED ON DOING A
                                                                ;READ FROM WCS LOCATION 4000   FAULT
                                                                ;COULD BE IN 'BUS DIN' MUX <47 32>
                                                                ;(PORT DO), LINES <47.32>, OR DB REGISTER
011646  005203                  4$      INC     R3              ;KEEP COUNT OF ERRORS

011650  006300                  5$      ASL     R0              ;CREATE NEXT PATTERN TO BE USED
011652  005704                          TST     R4              ;FLOAT A 1 OR 0?
```

```
011654  001402                          BEQ     6$
011656  052700  000001                  BIS     #BIT0,R0        ,FLOAT A 1

011662  077530                  6$      SOB     R5,3$           ,DONE ALL 16 PATTERNS?
011664  012702  000001                  MOV     #BIT0,R2
011670  074204                          XOR     R2,R4           ,DONE BOTH-FLOAT A 1 AND 0?
011672  001437                          BEQ     8$              ;YES
011674  012700  177776                  MOV     #177776,R0      ,INITIALIZE THE PATTERN
011700  000741                          BR      3$              ;DO REST OF CHECKING

                                        ,IF A PARITY ERROR OCCURRED ENTER HERE

011702  032777  100000  171124  7$      BIT     #PARERR,@WCSST  ,WCS PARITY ERROR?
011710  001757                          BEQ     5$              ,NO, CHECK WHICH ONE?
011712  105237  003065                  INCB    ERCNT1          ,REPORT MAXIMUM 5 ERRORS
011716  001420                          BEQ     9$
011720  022626                          CMP     (SP)+,(SP)+     ,POP THE STACK
011722  017737  171106  001166          MOV     @WCSST,$REG2    ,SAVE STATUS REGISTER
011730  012777  000020  171076          MOV     #PARDIS,@WCSST  ,CLEAR PARITY ERROR
011736  005077  171072                  CLR     @WCSST
011742  012737  004000  001162          MOV     #4000,$REG0     ,SAVE WCS ADDRESS
011750  010037  001164                  MOV     R0,$REG1        ,SAVE EXPECTED PATTERN
011754  104026                          ERROR   26              ,PARITY ERROR OCCURRED ON READING
                                                                ,LOCATION 40000 OF WCS   FAULT COULD
                                                                ,BE IN LOC 4000 OR THE INPUT/OUTPUT
                                                                ,LINES
011756  000734                          BR      5$              ,RETURN, DO REST OF CHECKING
011760  012737  003344  000114  9$      MOV     #BADPAR @#114   ,IF THE PARITY ERROR WAS NOT FROM
011766  000137  003344                  JMP     BADPAR          ,WCS GO TO THE NORMAL PARITY
                                                                ,ERROR HANDLER

011772                          8$                              ;EXIT
011772  012737  003344  000114          MOV     #BADPAR,@#114   ,NORMAL PARITY ERROR HANDLER

                                ,,*****************************************************************
                                ,*TEST 21       CHECK THE THREE HI-BYTE PARITY CHECKERS
                                        ,THIS TEST CHECKS THE THREE HI-BYTE PARITY CHECKERS, THAT THEY
                                        ,CAN DETECT BAD PARITY WHEN A WCS LOCATION IS READ
                                        ,THE TEST CHECKS THE THREE HI-BYTE PARITY CHECKERS CORRESPONDING
                                        ,TO THE THREE SEGMENTS OF A 48 BIT MICRO-WORD
                                        ,SEGMENT 0 CORRESPONDS TO 'PAR0' AND WP0', THE 16 BIT FIELD
                                        ,CORRESPONDING TO WCS LOCATIONS 0,1,2,3     1777(OCTAL)
                                        ,SEGMENT 1 CORRESPONDS TO 'PAR1' AND 'WP1', THE 16 BIT FIELD
                                        ,CORRESPONDING TO WCS LOCATIONS 2000,2001,2002,     3777(OCTAL)
                                        ,SEGMENT 2 CORRESPONDS TO 'PAR2' AND 'WP2'. THE 16-BIT FIELD
                                        ,CORRESPONDING TO WCS LOCATIONS 4000,4001,4002,     5777(OCTAL)
                                        ,LOCATIONS 0,2000, 4000 ARE USED AS TEST LOCATIONS WHERE PATTERNS ARE STORED
                                        ,AND READ FROM, AND THE PARITY CHECKED   BAD PARITY IS GENERATED AND
                                        ,STORED USING 'WRITE WRONG PARITY   WHEN THE BAD PARITY IS
                                        ,READ, THE PARITY CHECKERS SHOULD DETECT IT AND CAUSE A TRAP
                                        ,A COUNT PATTERN FROM 0 TO 377 IS USED TO TEST THE
                                        ,8-BIT PARITY CHECKERS (HI BYTE)   MEANWHILE, THE LO-BYTE PATTERN
                                        ,IS KEPT CONSTANT AT EVEN (377) AND ODD (376)   IF THE
                                        ,BAD PARITY IS NOT DETECTED FOR A PARTICULAR PATTERN AN ERROR
                                        ;MESSAGE IS REPORTED
                                        ,THE ENTIRE TEST IS REPEATED FOR EACH OF THE THREE
```

```
                                                ,HI BYTE PARITY CHECKERS USING TEST LOCATIONS  0,2000,4000
                                        ;;*****************************************************************
012000  000004                          TST21   SCOPE
012002  012737  012434  003056                  MOV     #TST22,NXTST    ,STARTING ADDRESS OF NEXT TEST

012010  005037  003046                          CLR     TMP0            ,IF TMP0=0, USE EVEN PATTERN (377) FOR LO BYTE
                                                                        ,IF TMP0=2, USE ODD PATTERN (376) FOR LO BYTE
                                                                        ,FOR BOTH CASES, VARY HI-BYTE FROM 0 TO 377

012014  005001                                  CLR     R1              ,INITIALIZE WCS LOCATION, CORRESPONDING
                                                                        ,TO WHICH THE PARITY CHECKER WILL BE
                                                                        ;CHECKED. NOTE, THERE ARE THREE SETS OF
                                                                        ,PARITY CHECKERS.
                                                                        ,FOR SEGMENT 0 (LOCATIONS 0,1,2       )
                                                                        ,FOR SEGMENT 1 (LOCATIONS 2000,2001,    )
                                                                        ,FOR SEGMENT 2 (LOCATIONS 4000,4001,    )

012016  012702  000002                          MOV     #PAR0,R2
012022  010237  003050                          MOV     R2,TMP1
012026  013704  003046                  20$     MOV     TMP0,R4
012032  016400  006252                          MOV     PARPAT(R4),R0   ,INITIALIZE THE PATTERN
                                                                        ,LO BYTE =377 HI BYTE=0 (TO 377)

012036  012737  012052  001110                  MOV     #1$,$LPERR      ,LOOP ON ERROR POINT
012044  012737  177400  003054                  MOV     #-400,COUNT0    ,INITIALIZE COUNT FOR NUMBER OF PATTERNS

012052  112737  177770  003064  1$              MOVB    #-10,ERCNT0     ,DO NOT TYPE MORE THAN 10 ERRORS

                                                 WRITE WRONG PARITY INTO WCS LOCATION AND CHECK IF IT WAS
                                                ,STORED CORRECTLY  (P0, P1, P2)

012060  012777  000060  170746  2$              MOV     #PARDIS+WWP,@WCSST
012066  010177  170744                          MOV     R1,@WCSAR       ,ADDRESS THE WCS
012072  010004                                  MOV     R0,R4
012074  032701  002000                          BIT     #BIT10,R1       ,TESTING PAIRTY CHECKER FOR LOC 1?
012100  001402                                  BEQ     25$             ,NO
012102  004737  037262                          JSR     PC,XFRCHK       ,REMAP THE PATTERN
012106  010477  170726                  25$     MOV     R4,@WCSDR       ,WRITE THE PATTERN
012112  017705  170716                          MOV     @WCSST,R5       ,READ STATUS
012116  013703  003050                          MOV     TMP1,R3          ISOLATE PARITY BIT STORED
012122  005103                                  COM     R3
012124  040305                                  BIC     R3,R5
012126  004737  036666                          JSR     PC,GENWPAR      ,GENERATE PARITY BIT (ODD) FOR
                                                                        ,THE PATTERN IN R4
012132  005702                                  TST     R2              ,AND SAVE IT IN R2
012134  001402                                  BEQ     29$
012136  013702  003050                          MOV     TMP1,R2
012142  020502                          29$     CMP     R5,R2           ,WAS PARITY BIT STORED CORRECTLY?
012144  001415                                  BEQ     21$             ,YES

012146  105737  003064                          TSTB    ERCNT0          ,DON'T REPORT MORE THAN 5 ERRORS
012152  001464                                  BEQ     31$             ,ABORT REST OF SUB-TEST
012154  105237  003064                          INCB    ERCNT0
012160  010137  001162                          MOV     R1,$REG0        ,GET WCS LOCATION
012164  010437  001164                          MOV     R4,$REG1        ,SAVE PATTERN THAT WAS WRITTEN
012170  017737  170640  001166                  MOV     @WCSST,$REG2    ,SAVE STATUS
```

```
012176  104021                          ERROR   21              ,INCORRECT PARITY BIT WAS STORED
                                                                ,FOR THE PATTERN WRITTEN IN WCS
                                                                ,LOCATION  MESSAGE GIVES T
                                                                ,LOCATION AND PATTERN
                                                                ,WRONG PARITY (WWP) I'        N

                                        ,CHECK THE PARITY CHECKER BY READING WCS LOCATION WI
                                        ,BAD PARITY   PARITY ERROR TRAP SHOULD OCCUR, IF   _ PARITY
                                        ,CHECKER DETECTED THE BAD PARITY

012200  012737  012334  000114  21$     MOV     #32$,@#114      ,PARITY TRAP VECTOR
012206  042777  000020  170620          BIC     #PARDIS,@WCSST  ,ALLOW PARITY TRAP TO TAKE PLACE
012214  010177  170616                  MOV     R1,@WCSAR       ,READ BAD PARITY FROM THIS LOC
012220  017705  170614                  MOV     @WCSDR,R5
012224  000240                          NOP                     ,TRAP SHOULD OCCUR

                                                                ,REPORT ERROR IF BAD PARITY WAS NOT
                                                                ,DETECTED
012226  012737  003344  000114          MOV     #BADPAR,@#114   ,UNEXPECTED PARITY ERROR TRAP
012234  105737  003064                  TSTB    ERCNTO          ,REPORT ONLY MAXM NUMBER OF ERRORS
012240  001431                          BEQ     31$             ,ABORT REST OF SUB-TEST
012242  105237  003064                  INCB    ERCNTO
012246  010137  001162                  MOV     R1,$REG0        ,SAVE WCS LOCATION
012252  010437  001164                  MOV     R4 $REG1        ,SAVE PATTERN
012256  017737  170552  001166          MOV     @WCSST,$REG2    ,SAVE STATUS
012264  104025                          ERROR   25              ,PARITY ERROR TRAP DID NOT OCCUR
                                                                ,ON READING BAD PARITY FROM
                                                                ,WCS LOC   FAULT LIKELY IN THE
                                                                ,PARITY CHECKER CHIP FOR THE HI
                                                                ,BYTE   ERROR MESSAGE GIVES THE
                                                                ,SEGMENT (LOCATION) TO WHICH
                                                                ,THIS CHIP BELONGS   THERE ARE THREE
                                                                 SEGMENTS OF THE WCS MICRO-WORD
                                                                ,WP0, WP1 WP2 (PAR0,PAR1,PAR2)

                                         IF THE BAD PARITY WAS NOT DETECTED (BY THE PARITY CHECKER FOR THE
                                         HI BYTE), CHECK IF THE DATA WAS READ CORRECTLY

012266  020504                          CMP     R5,R4           ,WAS THE CORRECT DATA READ?
012270  001422                          BEQ     23$              YES?
012272  105737  003064                  TSTB    ERCNTO
012276  001412                          BEQ     31$             ,ABORT REST OF SUB-TEST
012300  105237  003064                  INCB    ERCNTO
012304  010137  001162                  MOV     R1 $REG0        ,SAVE WCS LOCATION
012310  010437  001164                  MOV     R4 $REG1        ,SAVE EXPECTED DATA
012314  010537  001166                  MOV     R5 $REG2        ,SAVE DATA READ
012320  104012                          ERROR   12              ,DATA READ FROM WCS LOCATION WAS
                                                                ,INCORRECT   ALSO  PARITY ERROR TRAP
                                                                ,DID NOT OCCUR ON READING
                                                                ,BAD PARITY FROM THAT LOC

012322  000405                  22$     BR      23$
                                         IF THERE WERE MORE THAN 10 ERRORS AND THE SUBTEST IS TO BE ABORTED
                                        ,ENTER HERE
012324  012737  177777  003054  31$     MOV     #-1,COUNTO       INDICATE THAT THE REST OF SUBTEST
012332  000401                          BR      22$              IS TO BE ABORTED PROCEED T
```

```
                                                                        ;CLEAN-UP

                                        ;IF THE BAD PARITY WAS DETECTED (AS EXPECTED) AND A TRAP OCCURRED
                                        ;ENTER HERE   REWRITE GOOD PARITY INTO THE LOCATION

012334  022626                  32$     CMP     (SP)+,(SP)+     ;POP THE STACK
012336  012737  003344  000114  23$     MOV     #BADPAR,@#114   ;UNEXPECTED PARITY TRAP SERVICE
012344  012777  000020  170462  30$     MOV     #PARDIS,@WCSST  ;REWRITE CORRECT PARITY, WHERE
012352  010177  170460                  MOV     R1,@WCSAR       ;BAD PARITY WAS WRITTEN
012356  010477  170456                  MOV     R4,@WCSDR

                                        ;SETUP TO CHECK PARITY-CHECKER USING NEXT PATTERN (IN HI BYTE)
012362  062700  000400          3$      ADD     #400,R0         ;CREATE NEXT PATTERN, INCREMENT HI-BYTE
012366  005237  003054                  INC     COUNTO          ;IF NOT DONE, GO CHECK NEXT PATTERN
012372  001232                          BNE     2$

012374  012705  000002          27$     MOV     #2,R5
012400  074537  003046                  XOR     R5,TMP0         ;DONE CHECKING OF HI-BYTE PARITY
                                                                ;CHECKER USING ODD PATTERN IN
                                                                ;LO-BYTE?
012404  001402                          BEQ     28$
012406  000137  012026                  JMP     20$             ;IF NOT, CHECK IT USING (376) FOR LO BYTES

                                         AT THIS POINT, THE HI-BYTE PARITY CHECKER FOR A PARTICULAR
                                        ;SEGMENT (AS INDICATED IN R1) HAS BEEN CHECKED   SET UP
                                        ;TO CHECK THE NEXT SEGMENT OR EXIT IF ALL 3 ARE
                                        ;CHECKED   THERE ARE THREE PARITY CHECKERS CORRESPONDING TO
                                        ;THE THREE SEGMENTS OF THE 48-BIT MICRO-WORD
                                         SEGMENT 0 CORRESPONDS TO PAR0 AND WP0
                                         SEGMENT 1 CORRESPONDS TO PAR1 AND WP1
                                        ;SEGMENT 2 CORRESPONDS TO PAR2 AND WP2

012412  006337  003050          28$     ASL     TMP1            CREATE THE NEXT 'PARITY BIT STORED'
012416  062701  002000                  ADD     #2000,P1        ;CREATE WCS LOCATION FOR NEXT SEGMENT
012422  020127  006000                  CMP     R1,#6000                ;DONE CHECKING 3 SEGMENTS?
012426  001402                          BEQ     TST22           ;YES  EXIT
012430  000137  012026                  JMP     20$

                                 ***********************************************************
                                 #TEST 22       CHECK THE THREE LO-BYTE PARITY CHECKERS
                                        ;THIS TEST CHECKS THE THREE LO BYTE PARITY CHECKERS, THAT THEY
                                         CAN DETECT BAD PARITY WHEN A WCS LOCATION IS READ
                                        ;THE TEST CHECKS THE THREE LO-BYTE PARITY CHECKERS CORRESPONDING
                                         TO THE THREE SEGMENTS OF A 48-BIT MICRO-WORD
                                        ;SEGMENT 0 CORRESPONDS TO 'P0' AND 'WP0' THE 16-BIT FIELD
                                        ;CORRESPONDING TO WCS LOCATIONS 0,1,2,3,     1777(OCTAL)
                                        ;SEGMENT 1 CORRESPONDS TO 'P1' AND 'WP1', THE 16 BIT FIELD
                                        ;CORRESPONDING TO WCS LOCATIONS 2000,2001,2002,     3777(OCTAL)
                                        ;SEGMENT 2 CORRESPONDS TO 'P2' AND 'WP2', THE 16 BIT FIELD
                                        ;CORRESPONDING TO WCS LOCATIONS 4000,4001,     5777(OCTAL)
                                        ;LOCATIONS 0,2000,4000 ARE USED AS TEST LOCATIONS WHERE PATTERNS ARE STORED
                                        ;AND READ FROM, AND THE PARITY CHECKED   BAD PARITY IS GENERATED AND
                                        ;STORED USING 'WRITE WRONG PARITY'  WHEN THE BAD PARITY IS
```

```
                                                ;READ THE PARITY CHECKER SHOULD DETECT IT AND CAUSE A TRAP
                                                ;A COUNT PATTERN FROM 0 TO 377 IS USED TO TEST THE
                                                ;8-BIT PARITY CHECKER (LO BYTE)   MEANWHILE, THE HI-BYTE PATTERN
                                                ;IS KEPT CONSTANT AT EVEN (377) AND ODD (376)   IF THE
                                                ;BAD PARITY IS NOT DETECTED FOR A PARTICULAR PATTERN AN ERROR
                                                ;MESSAGE IS REPORTED
                                                ;THE ENTIRE TEST IS REPEATED FOR EACH OFTHE THREE
                                                ;LO BYTE PARITY CHECKERS USING TEST LOCATIONS 0,2000,4000
                                        ;;*****************************************************************
012434  000004                          TST22   SCOPE
012436  012737  013056  003056                  MOV     #TST23,NXTST    ;STARTING ADDRESS OF NEXT TEST

012444  005037  003046                          CLR     TMP0            ;IF TMP0=0, USE EVEN PATTERN (377) FOR HI BYTE
                                                                        ;IF TMP0=2, USE ODD PATTERN (376) FOR HI BYTE
                                                                        ;FOR BOTH CASES, VARY LO-BYTE FROM 0 TO 377

012450  005001                                  CLR     P1              ;INITIALIZE WCS LOCATION, CORRESPONDING
                                                                        ;TO WHICH THE PARITY CHECKS WILL BE
                                                                        ;CHECKED  NOTE, THERE ARE THREE SETS OF
                                                                        ;PARITY CHECKERS
                                                                        ;FOR SEGMENT 0 (LOCATIONS 0,1,2,    )
                                                                        ;FOR SEGMENT 1 (LOCATIONS 2000,2001,    )
                                                                        ;FOR SEGMENT 2 (LOCATIONS 4000,4001,    )

012452  012702  000002                          MOV     #PAPO,R2
012456  010237  003050                          MOV     R2,TMP1
012462  013704  003046                  20$     MOV     TMP0,R4
012466  016400  006252                          MOV     PARPAT(R4),R0   ;INITIALIZE THE PATTERN
012472  000300                                  SWAB    R0              ;HI BYTE =377 LO BYTE =0 (TO 377)

012474  012737  012502  001110                  MOV     #1$,$LPERR      ;LOOP ON ERROR POINT

012502  112737  177770  003064  1$              MOVB    #-10,ERCNTO     ;DO NOT TYPE MORE THAN 10 ERRORS

                                                WRITE WRONG PARITY INTO WCS LOCATION AND CHECK IF IT WAS
                                                ;STORED CORRECTLY  (P0, P1, P2)

012510  012777  000060  170316  2$              MOV     #PARDIS+WWP,@WCSST
012516  010177  170314                          MOV     R1,@WCSAR       ;ADDRESS THE WCS
012522  010004                                  MOV     R0,R4
012524  032701  002000                          BIT     #BIT10,R1       ;TESTING PARITY CHIP FOR LOC 1?
012530  001402                                  BEQ     25$             ;NO
012532  004737  037262                          JSR     PC,XFPCHK       ;REMAP THE PATTERN
012536  010477  170276                  25$     MOV     R4,@WCSDR       ;WRITE THE PATTERN
012542  017705  170266                          MOV     @WCSST,R5       ;READ STATUS
012546  013703  003050                          MOV     TMP1,R3         ;ISOLATE PARITY BIT STORED
012552  005103                                  COM     R3
012554  040305                                  BIC     R3,R5
012556  004737  036666                          JSR     PC,GENWPAR      ;GENERATE PARITY B T (EVEN) FOR
                                                                         THE PATTERN IN R4
012562  005702                                  TST     R2              ;AND SAVE IT IN R2
012564  001402                                  BEQ     29$
012566  013702  003050                          MOV     TMP1,R2
012572  020502                          29$     CMP     R5,R2           ;WAS PARITY BIT STORED CORRECTLY?
012574  001415                                  BEQ     21$              YES
```

```
012576  105737  003064                  TSTB    ERCNTO          ,DON'T REPORT MORE THAN 5 ERRORS
012602  001462                          BEQ     31$             ,ABORT REST OF SUB-TEST
012604  105237  003064                  INCB    ERCNTO
012610  010137  001162                  MOV     R1,$REG0        ;GET WCS LOCATION
012614  010437  001164                  MOV     R4,$REG1        ,SAVE PATTERN THAT WAS WRITTEN
012620  017737  170210  001166          MOV     @WCSST,$REG2    ,SAVE STATUS
012626  104021                          ERROR   21              ;INCORRECT PARITY BIT WAS STORED
                                                                ,FOR THE PATTERN WRITTEN IN WCS
                                                                ,LOCATION  MESSAGE GIVES THE
                                                                ,LOCATION AND PATTERN
                                                                ,WRONG PARITY (WWP) WAS WRITTEN

                                        ,CHECK THE PARITY CHECKER BY READING WCS LOCATION WITH
                                        ,BAD PARITY   PARITY ERROR TRAP SHOULD OCCUR, IF THE PARITY
                                        ,CHECKER DETECTED THE BAD PARITY

012630  012737  012756  000114  21$:    MOV     #32$,@#114      ,PARITY TRAP VECTOR
012636  042777  000020  170170          BIC     #PARDIS,@WCSST  ,ALLOW PARITY TRAP TO TAKE PLACE
012644  010177  170166                  MOV     R1,@WCSAR       ,READ BAD PARITY FROM THIS LOC
012650  017705  170164                  MOV     @WCSDR,R5
012654  000240                          NOP                     ,TRAP SHOULD OCCUR

                                                                ;REPORT ERROR IF BAD PARITY WAS NOT
                                                                ,DETECTED
012656  012737  003344  000114          MOV     #BADPAR,@#114   ,UNEXPECTED PAITY ERROR TRAP
012664  105737  003064                  TSTB    ERCNTO          ,REPORT ONLY MAXM NUMBER OF ERROR
012670  001427                          BEQ     31$             ,ABORT REST OF SUB-TEST
012672  105237  003064                  INCB    ERCNTO
012676  010137  001162                  MOV     R1,$REG0        ,SAVE WCS LOCATION
012702  010437  001164                  MOV     R4,$REG1        ,SAVE PATTERN
012706  017737  170122  001166          MOV     @WCSST,$REG2    ,SAVE STATUS
012714  104025                          ERROR   25              ,PARITY ERROR TRAP DID NOT OCCUR
                                                                ,ON READING BAD PARITY FROM
                                                                ,WCS LOC   FAULT LIKELY IN THE
                                                                ,PARITY DETECTER CHIP FOR THE HI
                                                                ,BYTE.  ERROR MESSAGE GIVES THE
                                                                ,SEGMENT (LOCATION) TO WHICH
                                                                ,THIS CHIP BELONGS   THERE ARETHREE
                                                                ,SEGMENTS OF THE WCS MICRO-WORD
                                                                ,WP0,WP1,WP2 (PAR0,PAR1,PAR2)

                                        ,IF THE BAD PARITY WAS NOT DETECTED (BY THE PARITY CHECKS FOR THE
                                        ,HI BYTE), CHECK IF THE DATA WAS READ CORRECTLY

012716  020504                          CMP     R5,R4           ,WAS THE CORRECT DATA READ?
012720  001417                          BEQ     23$             ,YES?
012722  105737  003064                  TSTB    ERCNTO           REPORT ONLY MAXM NO  OF ERRORS
012726  001410                          BEQ     31$             ,ABORT REST OF SUBTEST

012730  010137  001162                  MOV     R1,$REG0        ,SAVE WCS LOCATION
012734  010437  001164                  MOV     R4,$REG1        ,SAVE EXPCTD DATA
012740  010537  001166                  MOV     R5,$REG2        ,SAVE DATA RECVD
012744  104012                          ERROR   12              ,DATA READ FROM WCS LOCATION WAS
                                                                ,INCORRECT   ALSO, PARIT  ERROR TRAP
                                                                 DID NOT OCCUR ON READING
```

```
                                                                        ,BAD PARITY FROM THAT LOC

012746  000404                  ..      BR      23$
                                        ,IF THERE WERE MORE THAN 10 ERRORS AND THE SUBTEST IS TO BE
                                        ,ABORTED ENTER HERE
012750  112700  177777          31$     MOVB    #-1,R0          ,INDICATE THAT THE REST OF SUBTEST
012754  000401                          BR      23$             ,IS TO BE ABORTED & PROCEED TO CLEANUP

                                        ,IF THE BAD PARITY WAS DETECTED (AS EXPECTED) AND A TRAP OCCURRED
                                        ,ENTER HERE   REWRITE GOOD PARITY INTO THE LOCATIN

012756  022626                  32$     CMP     (SP)+,(SP)+     ,POP THE STACK
012760  012737  003344  000114  23$     MOV     #BADPAR,@#114   ,UNEXPECTED PARITY TRAP SERVICE
012766  012777  000020  170040  30$     MOV     #PARDIS,@WCSST  ,REWRITE CORRECT PAITY, WHERE
012774  010177  170036                  MOV     R1,@WCSAR       ,BAD PARITY WAS WRITTEN
013000  010477  170034                  MOV     R4,@WCSDR

                                        ,SETUP TO CHECK PARITY-CHECKER USING NEXT PATTERN (IN LO BYTE)
013004  105200                  3$      INCB    R0              ,IF NOT DONE, GO CHECK NEXT PATTERN
013006  001240                          BNE     2$              ,DONE ALL PATTERNS IN LO BYTE?

013010  000400                          BR      27$
013012  012705  000002          27$     MOV     #2,R5
013016  074537  003046                  XOR     R5 TMP0         ,DONE CHECKING OF HI-BYTE PARITY
                                                                ,CHECKER USING ODD PATTERN IN
                                                                ,LO-BYTE?
013022  001402                          BEQ     28$
013024  000137  012462                  JMP     20$             ,IF NOT, CHECK IT USING (376) FOR LO BYTES

                                        ,AT THIS POINT, THE LO-BYTE PARITY CHECKER FOR A PARTICULAR
                                        ,SEGMENT (AS INDICATED IN R1) HAS BEEN CHECKED   SET UP
                                        ,TO CHECK THE NEXT SEGMENT OR EXIT IF ALL 3 ARE
                                        ,CHECKED   THERE ARE THREE PARITY CHECKERS CORRESPONDING TO
                                         THE THREE SEGMENTS OF THE 48-BIT MICRO-WORD
                                        ,SEGMENT 0 CORRESPONDS TO PAR0 AND WP0
                                        ,SEGMENT 1 CORRESPONDS TO PAR1 AND WP1
                                        ,SEGMENT 2 CORRESPONDS TO PAR2 AND WP2

013030  006337  003050          28$     ASL     TMP1            ,CREATE THE NEXT 'PARITY BIT STORED
013034  013702  003050                  MOV     TMP1,R2
013040  062701  002000                  ADD     #2000,R1        ,CREATE WCS LOCATION FOR NEXT SEGMENT
013044  020127  006000                  CMP     R1,#6000                ,DONE CHECKING 3 SEGMENTS?
013050  001402                          BEQ     TST23           ,,YES, EXIT
013052  000137  012462                  JMP     20$             ,IF NOT GO BACK


                                 ***************************************************************
                                *TEST 23        CHECK ADDRESSING FOR DATA ARRAY <11 0>, ADDRESS<9 0>
                                        ,THIS TEST CHECKS OUT THE ADDRESSING SCHEME FOR THE
                                        ,DATA ARRAY <11 00>   THIS GROUP OF 12 CHIPS IS
                                        ,ADDRESSED BY THE SAME SET OF ADDRESS SELECTORS   THIS TEST
                                        ,CHECKS THE COMMON ADDRESS LINES <11 0>  THE TEST
                                        ,CONTAINS A FAULT ANALYZER WHICH ATTEMPTS TO FIGURE OUT
                                        ,THE ADDRESS LINES WHICH ARE FAULTY   THERE ARE 10 ADDRESS
                                         LINES (00-09)
                                         AN INCREMENTING COUNT PATTERN IS WRITTEN INTO ALL THE
```

```
                                                ;LOCATIONS (1024) OF SEGMENT 0 (WPO) OF THE WCS
                                                ;(ADDRESSES 0,1,2,3,  .1777.(OCTAL)  THIS IS EQUIVALENT TO WRITING
                                                ;THE ADDRESS AS DATA FOR THE VERTICAL ARRAY   THEN A
                                                ;READ IS DONE.
                                                ;LOGICAL 'AND' AND 'OR' FUNCTION ARE PERFORMED ON ALL
                                                ;THE PATTERNS READ
                                                ;A SEPERATE LOGICAL 'AND' AND 'OR' IS PERFORMED FOR
                                                ;ONLY THOSE PATTERNS THAT FAIL
                                                ;THE ABOVE INFORMATION IS USED BY THE FAULT ANALYZER
                                                ;ROUTINE.  MORE INFORMATION CAN BE FOUND AT
                                                ;THE BEGINNING OF THE ROUTINE.
                                                ;IT SHOULD BE REALIZED THAT THE FAULT ANALYZER
                                                ;WORKS ON A "SINGLE SOLID FAULT" ASSUMPTION AND
                                                ;HENCE RESULTS MAY NOT BE PREDICTABLE IN CASE OF MULTIPLE,
                                                ;SOFT ERRORS, OR DATA ERRORS
                                        ;;*****************************************************************
013056  000004                          TST23   SCOPE
013060  012737  013464  003056                  MOV     #TST24,NXTST    ;STARTING ADDRESS OF NEXT TEST

                                                ;WRITE ALL THE WORDS IN SEGMENT 0 OF WCS (CORRESPONDING
                                                ;TO WPO AND PARO   ADDRESS (IN SEGMENT 0) IS WRITTEN AS DATA


013066  004737  036624                          JSR     PC,CLRWCS
013072  005077  167736                          CLR     @WCSST
013076  005000                                  CLR     R0              ;INITIALIZE WCS LOCATION
013100  005001                                  CLR     R1              ;INITIALIZE WCS DATA
013102  010077  167730                  1$      MOV     R0,@WCSAR       ;WRITE DATA INTO THIS WCS
013106  010177  167726                          MOV     R1,@WCSDR       ;LOCATION
013112  005200                                  INC     R0              ;NEXT WCS LOCATION
013114  005201                                  INC     R1              ;NEXT WCS DATA
013116  020127  002000                          CMP     R1,#1024        ;DONE WRITING ENTIRE 1024 WORD
013122  001367                                  BNE     1$              ;SEGMENT?

                                                ;READ BACK ALL THE WORDS (1024) OF SEGMENT 0 OF
                                                ;WCS   CHECK IF THEY WERE READ CORRECTLY
013124  012777  000020  167702                  MOV     #PARDIS,@WCSST
013132  005000                                  CLR     R0              ;INITIALIZE WCS LOCATION
013134  005001                                  CLR     R1              ;INITIALIZE WCS DATA
013136  005004                                  CLR     R4              ;R4 WILL CONTAIN A RUNNING
                                                                        ;'OR' OF ALL THE WORDS READ
013140  012705  177777                          MOV     #-1,R5          ;R5 WILL CONTAIN A RUNNING
                                                                        ;'AND' OF ALL THE WORDS READ
013144  005037  003046                          CLR     TMP0            ;'TMP0' WILL CONTAIN 'OR' OF THE
                                                                        ;DATA PATTERNS THAT FAILED
013150  010537  003050                          MOV     R5,TMP1         ;'TMP1' WILL CONTAIN 'AND' OF
                                                                        ;THE DATA PATTERNS THAT FAILED
013154  005003                                  CLR     R3              ;KEEP COUNT OF NUMBER OF DATA ERRORS
013156  112737  177773  003065                  MOVB    #-5,ERCNT1
013164  112737  177773  003064                  MOVB    #-5,ERCNT0      ;DON'T REPORT MORE THAN 5 ERRORS
013172  012737  013206  001110                  MOV     #2$,$LPERR      ;LOOP ON ERROR
013200  012737  013344  000114                  MOV     #8$,@#114       ;SET PARITY TRAP VECTOR
013206  010077  167624                  2$      MOV     R0,@WCSAR       ;READ FROM THIS WCS LOCATION
013212  017702  167622                          MOV     @WCSDR,R2       ;AND SAVE IN R2
013216  050204                                  BIS     R2,R4           ;KEEP RUNNING 'OR' OF DATA
013220  005102                                  COM     R2              ;PATTERNS READ, IN R4
```

```
013222  005105                          COM     R5
013224  050205                          BIS     R2,R5           ,KEEP RUNNING 'AND' OF DATA
013226  005105                          COM     R5              ,PATTERNS READ, IN R5
013230  005102                          COM     R2

013232  020102                          CMP     R1,R2           ,DATA PATTERN READ OK?
013234  001006                          BNE     4$              ;NO, DATA MISCOMPARE OCCURED

013236  005200                  3$      INC     R0              ;SET UP TO READ NEXT ADDRESS
013240  005201                          INC     R1              ,NEXT DATA PATTERN
013242  020127  002000                  CMP     R1,#1024        ,DONE READING ALL?
013246  001357                          BNE     2$              ,NO

013250  000466                          BR      6$              ,YES, GO ANALYZE THE FAULT
                                                                ,IF ANY ERROR OCCURED
                                        .DATA MISCOMPARE OCCURED ON READING THE DATA
                                        ,FROM THE WCS LOCATION
                                        ,R0 CONTAINS THE WCS LOCATION READ
                                        ,R1 CONTAINS EXPECTED DATA
                                        ,R2 CONTAINS DATA THAT WAS READ

013252  105237  003064          4$      INCB    ERCNTO          ,DON'T REPORT MORE THAN 5 ERRORS
013256  001407                          BEQ     5$              ,SKIP, IF 5 REPORTED

013260  010037  001162                  MOV     R0,$REG0        ,SAVE WCS LOCATION GIVING DATA ERROR
013264  010137  001164                  MOV     R1,$REG1        ,SAVE EXPECTED DATA
013270  010237  001166                  MOV     R2,$REG2        ,SAVE DATA RECEIVED
013274  104012                          ERROR   12              ,DATA MISCOMPARE OCCURRED ON READING
                                                                ,WCS LOCATION
                                                                ,POSSIBLE ADDRESS ERROR FOR
                                                                ,DATA ARRAY <11 0>  THIS TEST
                                                                ,CONTAINS A FAULT ANALYZER
                                                                 WHICH WILL ATTEMPT TO
                                                                ,ANALYZE THE ABOVE ERROR

013276  010146                  5$      MOV     R1,-(SP)
013300  042716  176000                  BIC     #176000,(SP)    ,MAKE SURE THE DATA MISCOMPARE
013304  010246                          MOV     R2,-(SP)        ,WAS IN BITS <0-11>  IF OUTSIDE,
013306  042716  176000                  BIC     #176000,(SP)    ,(BITS <15-12>), DON'T DO
013312  022626                          CMP     (SP)+,(SP)+     ,FAULT ANALYSIS (AND,OR)
013314  001750                          BEQ     3$              ,SKIP FAULT ANALYSIS
013316  005203                          INC     R3              ,KEEP COUNT OF ERRORS IN DATA BITS <0-11>
013320  050237  003046                  BIS     R2,TMP0         ,'OR' THE FAILING DATA PATTERN INTO
                                                                ,'TMP0'
013324  005102                          COM     R2              ,'AND' THE FAILING PATTERN WITH
013326  005137  003050                  COM     TMP1            ;'TMP1'
013332  050237  003050                  BIS     R2,TMP1
013336  005137  003050                  COM     TMP1

013342  000735                          BR      3$              ,RETURN TO DO FURTHER CHECKING

                                        ,IF A PARITY ERROR OCCURED ON READING A WCS LOCATION,
                                        ,ENTER HERE
013344  012737  003344  000114  5$      MOV     #BADPAR,@#114   ,NORMAL PARITY ERROR HANDLED

013352  032777  100000  167454          BIT     #PARERR,@WCSST  ,WAS IT A WCS PARITY ERROR?
```

```
013360  001420                          BEQ     10$
013362  022626                          CMP     (SP)+,(SP)+     ,RESTORE THE STACK POINTER
013364  017737  167444  001166          MOV     @WCSST,$REG2
013372  012777  000020  167434          MOV     #PARDIS,@WCSST  ,CLEAR OUT THE PARITY ERROR
013400  105237  003065                  INCB    ERCNT1          ,DON'T REPORT MORE THAN 5 ERRORS
013404  001405                          BEQ     9$
013406  010037  001162                  MOV     R0,$REG0        ;SAVE ADDRESS GIVING PARITY ERROR
013412  010137  001164                  MOV     R1,$REG1        ,SAVE EXPECTED DATA
013416  104026                          ERROR   26              ,PARITY ERROR OCCURED ON READING
                                                                ,A WCS LOCATION   NOTE THAT
                                                                ,PARITY ERROR CAN BE FROM ANY
                                                                ,ONE OF THE THREE 16-BIT WORDS
                                                                ,OF THE DATA D(47 0)

013420  000706                  9$      BR      3$              ,DO THE REST OF CHECKING

013422  000137  003344          10$     JMP     BADPAR          ,IF THE PARITY ERROR WAS NOT FROM
                                                                .WCS,GO TO THE COMMON PARITY
                                                                ,ERROR HANDLER

                                                        ,GO TO THE FAULT ANALYZER AND PRINT OUT WHICH ADDRESS
                                                        ,LINES ARE FAULTY

013426  012737  003344  000114  6$      MOV     #BADPAR,@#114   ,NORMAL PARITY ERROR HANDLER
013434  005703                          TST     R3              ,ANY ERROR (D(11-0)) OCCURRED?
013436  001412                          BEQ     TST24           ,,EXIT
013440  013700  003046                  MOV     TMP0,R0         ,GET 'OR'
013444  013701  003050                  MOV     TMP1,R1         ,GET 'AND'
013450  012746  042725                  MOV     #MSG22,-(SP)    ,MESSAGE POINTER
013454  012746  176000                  MOV     #176000,-(SP)   ,BIT MASK
013460  004737  037350                  JSR     PC, ANLYSO      ,GO TO THE FAULT ANALYZER

                                ..*****************************************************************
                                ,*TEST 24       CHECK ADDRESSING FOR DATA ARRAY (23 12),ADDRESS(7 0)
                                                ,THIS TEST CHECKS OUT THE ADDRESSING SCHEME FOR THE DATA
                                                ,ARRAY (23:12)   THIS GROUP OF 12 CHIPS IS ADDRESSED BY
                                                ,THE SAME SET OF ADDRESS SELECTORS. (THERE ARE 10 ADDRESS
                                                ,LINES (00-09))   THIS TEST CHECKS THE COMMON ADDRESS LINES
                                                ,(00-07)   THE FAULT ANALYZER ATTEMPTS TO FIGURE OUT WHICH ONE
                                                ,OF THESE ADDRESS LINES (02-09) WAS FAULTY
                                                ,AN INCREMENTING COUNT PATTERN IS WRITTEN INTO (FIRST 256)
                                                ,LOCATIONS OF THE SEGMENT 1 OF WCS (WP1) (ADDRESSES
                                                ,2000,2001,     )   THIS IS EQUIVALENT TO WRITING
                                                ,THE ADDRESS AS DATA INTO THE FIRST 256 LOCATIONS OF
                                                 THE VERTICAL ARRAY (D(31 16))   THEN A READ IS DONE

                                                ,LOGICAL 'AND' AND 'OR' FUNCTIONS ARE PERFORMED ON ALL
                                                ,THE PATTERNS READ.
                                                ,A SEPERATE LOGICAL 'AND' AND 'OR' IS PERFORMED FOR
                                                ,ONLY THOSE PATTERNS THAT FAIL
                                                ,THE ABOVE INFORMATION IS USED BY THE FAULT ANALYZER
                                                ,ROUTINE (MORE INFO ON IT CAN BE FOUND AT THE
                                                ,BEGINNING OF THE ROUTINE)
                                ,*****************************************************************
013464  000004                        TST24   SCOPE
013466  012737  014074  003056          MOV     #TST25,NXTST    STARTING ADDRESS OF NEXT TEST
```

```
013474  004737  036624                  JSR     PC,CLRWCS       ,CLEAR OUT THE ARRAY

013500  005077  167330                  CLR     @WCSST
013504  012700  002000                  MOV     #2000,R0        ,INITIALIZE WCS LOCATION
013510  005001                          CLR     R1              ;INITIALIZE WCS DATA

013512  010077  167320          1$      MOV     R0,@WCSAR       ;WRITE DATA INTO THIS WCS
013516  010177  167316                  MOV     R1,@WCSDR       ,LOCATION
013522  005200                          INC     R0              ;NEXT WCS LOCATION
013524  005201                          INC     R1
013526  020127  000400                  CMP     R1,#256         ;DONE WRITING?
013532  001367                          BNE     1$

                                        ,READ BACK ALL THE 256 WORDS THAT WERE WRITTEN AND
                                        ,CHECK IF THEY ARE READ CORRECTLY.

013534  012777  000020  167272          MOV     #PARDIS,@WCSST
013542  012700  002000                  MOV     #2000,R0                ;INITIALIZE WCS LOCATION
013546  005001                          CLR     R1              ,INITIALIZE WCS DATA
013550  005004                          CLR     R4              ,R4 WILL CONTAIN A RUNNING
                                                                , OR' OF THE WORDS READ
013552  012705  177777                  MOV     #-1,R5          ,R5 WILL CONTAIN A RUNNING
                                                                ,'AND' OF THE WORDS READ
013556  005037  003046                  CLR     TMP0            ,'TMP0' WILL CONTAIN 'OR' OF THE
                                                                ,DATA PATTERNS THAT FAILED
013562  010537  003050                  MOV     R5,TMP1         ,'TMP1' WILL CONTAIN 'AND' OF THE
                                                                ,DATA PATTERNS THAT FAILED
013566  112737  177773  003064          MOVB    #-5,ERCNT0      ,DON'T REPORT MORE THAN
013574  112737  177773  003065          MOVB    #-5,ERCNT1      ,5 ERRORS EACH
013602  012737  013616  001110          MOV     #2$,$LPERR      ,LOOP ON ERROR
013610  012737  013754  000114          MOV     #8$,@#114       ,SET PARITY TRAP VECTOR
                                                                ,***
013616  010077  167214          2$      MOV     R0,@WCSAR       ,READ FROM THIS WCS LOCATION AND
013622  017702  167212                  MOV     @WCSDR,R2       ,SAVE IT IN R2

013626  050204                          BIS     R2,R4           ,KEEP RUNNING 'OR' OF DATA PATTERNS
013630  005102                          COM     R2              ,READ, IN R4
013632  005105                          COM     R5
013634  050205                          BIS     R2,R5           ,KEEP RUNNING 'AND' OF DATA
013636  005105                          COM     R5              ,PATTERNS READ, IN R5
013640  005102                          COM     R2

013642  020102                          CMP     R1,R2           ,DATA PATTERN READ OK?
013644  001006                          BNE     4$              ,NO, DATA MISCOMPARE OCCURRED

013646  005200                  3$      INC     R0              ,SET UP TO READ NEXT ADDRESS
013650  005201                          INC     R1              ,NEXT DATA PATTERN
013652  020127  000400                  CMP     R1,#256         ,DONE?
013656  001357                          BNE     2$              ,NO
013660  000466                          BR      6$

                                        ,DATA MISCOMPARE OCCURRED ON READING THE DATA FROM THE
                                        ,WCS LOCATION
                                        ,R0 CONTAINS WCS LOCATION READ
                                        ,R1 CONTAINS EXPECTED DATA
                                        ,R2 CONTAINS DATA THAT WAS READ
```

```
013662  105237  003064          4$      INCB    ERCNTO          ,DONT REPORT MORE THAN 5 ERRORS
013666  001407                          BEQ     5$
013670  010037  001162                  MOV     R0,$REG0        ,SAVE WCS LOCATION GIVING DATA ERROR
013674  010137  001164                  MOV     R1,$REG1        ;SAVE EXPECTED DATA
013700  010237  001166                  MOV     R2,$REG2        ;SAVE DATA RECEIVED
013704  104012                          ERROR   12              ;DATA MISCOMPARE OCCURRED ON READING
                                                                ;WCS LOCATION   THIS TEST CONTAINS
                                                                ;A FAULT ANALYZER WHICH
                                                                ;ATTEMPTS TO ANALYZE THE
                                                                ;FAULT.
                                                                ,POSSIBLE ADDRESS ERROR FOR DATA
                                                                ,ARRAY <23 12>.

013706  010146                  5$      MOV     R1,-(SP)        ,MAKE SURE THE DATA MISCOMPARE IS
013710  042716  177400                  BIC     #177400,(SP)    ,IN BITS D<23:16> OF THE
013714  010246                          MOV     R2,-(SP)        ,WCS DATA ARRAY   IF OUTSIDE
013716  042716  177400                  BIC     #177400,(SP)    ;DON'T DO FAULT
013722  022626                          CMP     (SP)+,(SP)+     ,ANALYSIS
013724  001750                          BEQ     3$              ;SKIP FAULT ANALYSIS
013726  005203                          INC     R3              ,KEEP COUNT OF ERRORS IN
                                                                ,DATA BITS D<23 16>
013730  050237  003046                  BIS     R2 TMPO         ,'OR' THE FAILING DATA PATTERN
013734  005102                          COM     R2              ,INTO TMPO
013736  005137  003050                  COM     TMP1            ,'AND' THE FAILING PATTEPN WITH
013742  050237  003050                  BIS     R2,TMP1         ,'TMP1'
013746  005137  003050                  COM     TMP1
013752  000735                          BR      3$              ,RETURN TO DO FURTHER CHECKING

                                        ,IF A PARITY ERROR OCCURED ON READING A WCS LOCATION,
                                        ,ENTER HERE

013754  012737  003344  000114  8$      MOV     #BADPAR,@#114   ,NORMAL BAD PARITY HANDLER
013762  032777  100000  167044          BIT     #PARERR,@WCSST  ,WAS IT A WCS PARITY ERROR?
013770  001420                          BEQ     10$
013772  022626                          CMP     (SP)+,(SP)+     ,RESTORE THE STACK POINTER
013774  017737  167034  001166          MOV     @WCSST,$REG2
014002  012777  000020  167024          MOV     #PARDIS,@WCSST  ,CLEAR OUT THE PARITY ERROR
014010  105237  003065                  INCB    ERCNT1          ,DON'T REPORT MORE THAN 5 ERRORS
014014  001405                          BEQ     9$
014016  010037  001162                  MOV     R0,$REG0        ,SAVE ADDRESS GIVING PARITY ERROR
014022  010137  001164                  MOV     R1,$REG1        ,SAVE EXPECTED DATA
014026  104026                          ERROR   26              ,PARITY ERROR OCCURED ON READING
                                                                ,A WCS LOCATION  NOTE THAT
                                                                ,PARITY ERROR CAN BE FROM ANY
                                                                ,ONE OF THE THREE 16-BIT WORDS
                                                                ,OF THE DATA D<47 0>

014030  000706                  9$      BR      3$              ,DO THE REST OF CHECKING

014032  000137  003344          10$     JMP     BADPAR          ,IF PARITY ERROR IS NOT FROM THE
                                                                ,WCS GO TO THE COMMON PARITY
                                                                ,ERROR HANDLER

                                        ,GO TO THE FAULT ANALYZER AND PRINT OUT WHICH ADDRESS LINES
```

```
                                                ,ARE FAULTY

014036  012737  003344  000114  6$      MOV     #BADPAR,@#114   ,PARITY ERROR  HANDLER
014044  005703                          TST     R3              ,ANY ERROR (D<23-12>) OCURRED?
014046  001412                          BEQ     TST25           ,,EXIT
014050  013700  003046                  MOV     TMP0,R0         ,GET 'OR'
014054  013701  003050                  MOV     TMP1,R1         ,GET 'AND'
014060  012746  042774                  MOV     #MSG25,-(SP)    ,MESSAGE POINTER
014064  012746  176000                  MOV     #176000,-(SP)   ,BIT MASK
014070  004737  037350                  JSR     PC,ANLYS0       ,GO TO THE FAULT ANALYZER


                                ,,*****************************************************************
                                ,*TEST 25       CHECK ADDRESSING FOR DATA ARRAY (23.12), ADDRESS (9 8)
                                                ,THIS TEST CHECKS OUT THE ADDRESSING SCHEME FOR DATA ARRAY <23:12>.
                                                ,THIS GROUP OF 12 CHIPS IS ADDRESSED BY THE SAME SET OF
                                                ,ADDRESS SELECTORS   THERE ARE 10 ADDRESS LINES <00 09>   THIS
                                                ,TEST CHECKS THE COMMON ADDRESS LINES <8 9> AND REPORTS ERRORS.
                                                ,THE FAULT ANALYZER ATTEMPTS TO FIGURE OUT WHICH ONE OF THE
                                                ,ADDRESS LINES WAS FAULTY

                                                ,STARTING AT LOCATION 2077 (OCTAL, TREATING THE WCS AS A
                                                ;16 X 3K DATA ARRAY) AN INCREMENTING COUNT PATTERN IS
                                                ,WRITTEN IN 16 CONSECUTIVE LOCATIONS OF THE VERTICAL ARRAY D<31 16>.
                                                ,THIS IS EQUIVALENT TO WRITING ADDRESS AS DATA INTO A
                                                ,16 WORD DATA ARRAY CORRESPONDING TO A<6 9> AND D<19 16>
                                                ,THEN A READ IS DONE AND DATA COMPARED

                                                ,LOGICAL 'AND' AND 'OR' FUNCTIONS ARE PERFORMED ON
                                                ,ALL THE PATTERNS READ.
                                                ,A SEPERATE LOGICAL 'AND' AND 'OR' IS PERFORMED FROM
                                                ,ONLY THOSE PATTERNS THAT FAIL
                                                ,THE ABOVE INFORMATION IS USED BY THE FAULT ANALYZER
                                                ,ROUTINE (MORE INFO ON IT CAN BE FOUND AT THE BEGINING
                                                ,OF THE ROUTINE 'ANLYZ0')   THE FAULT ANALYZER ALSO TYPES OUT
                                                ,TWO OCTAL NUMBERS (AND & OR)   THESE TWO CAN BE
                                                ,INTERPRETED AS EXPLAINED AT THE BEGINING OF THE ANALYZER
                                ,*****************************************************************
014074  000004                 TST25    SCOPE
014076  012737  014520  003056          MOV     #TST26,NXTST    ,STARTING ADDRESS OF NEXT TEST
014104  004737  036624                  JSR     PC,CLRWCS       ,CLEAR OUT WCS
014110  005077  166720                  CLR     @WCSST
014114  012700  002077                  MOV     #2077,R0                ,INITIALIZE WCS LOCATION (253)
                                                                        ,77, 01 (CONCANTANATE)
014120  005001                          CLR     R1              ,INITIALIZE WCS DATA
014122  010077  166710          1$      MOV     R0,@WCSAR       ,WRITE DATA INTO THIS WCS
014126  010177  166706                  MOV     R1,@WCSDR       ,LOCATION
014132  062700  000100                  ADD     #100,R0         ,NEXT WCS LOCATION
014136  005201                          INC     R1              ,NEXT DATA PATTERN
014140  020127  000020                  CMP     R1,#16          ,DONE?
014144  001366                          BNE     1$

                                                ,READ BACK ALL 16 WORDS THAT WEPE WRITTEN AND CHECK IF
                                                 THEY ARE READ CORRECTLY
```

```
014146  005077  166662                CLR     @WCSST
014152  012700  002077                MOV     #2077,R0                ;INITIALIZE WCS LOCATION
014156  005001                        CLR     R1                      ,INITIALIZE WCS DATA
014160  005004                        CLR     R4                      ,R4 WILL CONTAIN A RUNNING 'OR'
                                                                      ,OF THE WORDS READ
014162  012705  177777                MOV     #-1,R5                  ,R5 WILL CONTAIN A RUNNING 'AND'
                                                                      ;OF THE WORDS READ
014166  005037  003046                CLR     TMP0                    ,'TMP0' WILL CONTAIN 'OR' OF THE
                                                                      ;DATA PATTERNS THAT FAILED
014172  010537  003050                MOV     R5,TMP1                 ,'TMP1' WILL CONTAIN 'AND' OF THE
                                                                      ;DATA PATTERNS THAT FAILED
014176  112737  177773  003064        MOVB    #-5,ERCNT0              ;DONT REPORT MORE THAN 5 ERRORS
014204  112737  177773  003065        MOVB    #-5,ERCNT1
014212  012737  014226  001110        MOV     #2$,$LPERR              ,LOOP ON ERROR
014220  012737  014366  000114        MOV     #8$,@#114               ,SET PARITY TRAP VECTOR
014226  010077  166604          2$    MOV     R0,@WCSAR               ,READ FROM THIS WCS LOCATION AND
014232  017702  166602                MOV     @WCSDR,R2               ,SAVE IT IN R2
014236  050204                        BIS     R2,R4                   ,KEEPING RUNNING 'OR' OF DATA
014240  005102                        COM     R2                      ,PATTERNS READ, IN R4
014242  005105                        COM     R5
014244  050205                        BIS     R2,R5                   ,KEEPING RUNNING 'AND' OF DATA
014246  005105                        COM     R5                      ,PATTERNS READ, IN R5
014250  005102                        COM     R2
014252  020102                        CMP     R1 R2                   ,DATA PATTERN READ OK?
014254  001007                        BNE     4$                      ,NO
014256  062700  000100          3$    ADD     #100,R0                 ,SET UP TO READ NEXT ADDRESS
014262  005201                        INC     R1                      ,NEXT DATA PATTERN
014264  020127  000020                CMP     R1,#16                  ,DONE?
014270  001356                        BNE     2$                      ,NO
014272  000465                        BR      6$

                                      ,DATA MISCOMPARE OCCURRED ON READING THE DATA FROM THE
                                      ,WCS LOCATION
                                      ,R0 CONTAINS WCS LOCATION READ
                                      ,R1 CONTAINS EXPECTED DATA
                                      ,R2 CONTAINS DATA THAT WAS READ

014274  105237  003064          4$    INCB    ERCNT0                  ,DONT REPORT MORE THAN 5 ERRORS
014300  001407                        BEQ     5$
014302  010037  001162                MOV     R0,$REG0                ,SAVE WCS LOCATION GIVING DATA ERROR
014306  010137  001164                MOV     R1,$REG1                ,SAVE EXPECTED DATA
014312  010237  001166                MOV     R2,$REG2                ,SAVE DATA RECEIVED
014316  104012                        ERROR   12                      ,DATA MISCOMPARE OCCURRED ON READING
                                                                      ,WCS LOCATION   (POSSIBLE FAULT
                                                                      ,IN ADDRESS LINES FOR DATA ARRAY
                                                                      ,<23 12>)   THIS TEST CONTAINS A
                                                                      ,FAULT ANALYZER WHICH ATTEMPTS TO
                                                                      ,ANALYZE THE FAULT
014320  010146                  5$    MOV     R1,-(SP)                ,MAKE SURE THE DATA MISCOMPARE
014322  042716  177760                BIC     #177760,(SP)            ,IS IN BITS D<19 16> OF THE
014326  010246                        MOV     R2,-(SP)                ,WCS DATA ARRAY   IF OUTSIDE
014330  042716  177760                BIC     #177760,(SP)            ,DONT DO FAULT ANALYSIS
014334  022626                        CMP     (SP)+,(SP)+
014336  001747                        BEQ     3$                      ,SKIP FAULT ANALYSIS
014340  005203                        INC     R3                      ,KEEP COUNT OF ERRORS IN EATH
                                                                      ,BITS <19 16>
```

```
014342  050237  003046                  B S     R2,TMPO          ,'OR' THE FAILING DATA PATTERN
                                                                   ;INTO 'TMPO'
014346  005102                          COM     R2
014350  005137  003050                  COM     TMP1
014354  050237  003050                  BIS     R2,TMP1          ,'AND' THE FAILING PATTERN WITH
014360  005137  003050                  COM     TMP1             ,'TMP1'
014364  000734                          BR      3$               ;RETURN TO DO FURTHER CHECKING

                                        ,IF A PARITY ERROR OCCURRED ON READING A WCS LOCATION
                                        ,ENTER HERE
014366  012737  003344  000114  8$      MOV     #BADPAR,@#114    ;NORMAL BAD PARITY HANDLER

014374  032777  100000  166432          BIT     #PARERR,@WCSST   ,WAS IT A WCS PARITY ERROR?
014402  001417                          BEQ     10$              ,NO
014404  022626                          CMP     (SP)+,(SP)+      ,RESTORE THE STACK POINTER
014406  017737  166422  001166          MOV     @WCSST,$REG2
014414  012777  000020  166412          MOV     #PARDIS,@WCSST   ,CLEAR OUT THE PARITY ERROR
014422  005077  166406                  CLR     @WCSST
014426  010037  001162                  MOV     R0,$REG0         ,SAVE ADDRESS GIVING PARITY ERROR
014432  010137  001164                  MOV     R1,$REG1         ,SAVE EXPECTED DATA
014436  104026                          ERROR   26               ,PARITY ERROR OCCURRED ON READING A
                                                                 ,WCS LOCATION   THE PARITY ERROR CAN
                                                                 ,BE FROM ANY ONE OF THE   PEE 16-BIT
                                                                 ,WORDS OF THE DATA D<4
014440  000706                  9$      BR      3$               ,DO THE REST OF CHECKING

014442  000137  003344          10$     JMP     BADPAR           ,IF PARITY ERROR IS NOT FROM THE
                                                                 ,WCS GO TO THE COMMON
                                                                 ,PARITY ERROR HANDLER

                                        ,GO TO THE FAULT ANALYZER AND PRINT OUT WHICH ADDRESS
                                        ,LINES ARE FAULTY

014446  012737  003344  000114  6$      MOV     #BADPAR,@#114    ,PARITY ERROR HANDLER
014454  005703                          TST     R3               ,ANY ERRORS IN D<19 16>?
014456  001420                          BEQ     TST26            ,,EXIT
014460  013700  003046                  MOV     TMPO R0          ,GET 'OR'
014464  013701  003050                  MOV     TMP1,R1          ,GET 'AND'
014470  000300                          SWAB    R0               ,POSITION THE 'OR AND 'AND'
014472  000301                          SWAB    R1               ,SO AS TO COVER THE ADDRESS
014474  006200                          ASR     R0               ,LINES BEING TESTED
014476  006200                          ASR     R0               ,MAP BITS <3 0> TO <9 6>
014500  006201                          ASR     R1
014502  006201                          ASR     R1
014504  012746  042774                  MOV     #MSG25,-(SP)     ,MESSAGE POINTER
014510  012746  176077                  MOV     #176077,-(SP)    ,BIT MASK
014514  004737  037350                  JSR     PC,ANLYSO        ,GO TO THE FAULT ANALYZER

                                ,,*****************************************************************
                                #TEST 26        CHECK ADDRESSING FOR DATA ARRAY (35 24), ADDRESS (7 0)
                                        ,THIS TEST CHECKS OUT THE ADDRESSING SCHEME FOR THE DATA ARRAY <35 24>
                                        ,THIS GROUP OF 12 CHIPS IS ADDRESSED BY THE SAME SET OF ADDRESS
                                        ,SELECTORS   THERE ARE 10 ADDRESS LINES <9 0>   THIS TEST CHECKS
                                        ,COMMON ADDRESS LINES <7 0> AND REPORTS ERRORS   THE FAULT
                                        ,ANALYZER ATTEMPTS TO FIGURE OUT WHICH ONE OF THE ADDRESS LINES
                                         WAS FAULTY
```

```
                                                ;STARTING AT LOCATION 2000 (OCTAL, TREATING THE WCS AS A 16 X 3K
                                                ;DATA ARRAY) AN INCREMENTING COUNT PATTERN IS WRITTEN IN
                                                ;256 CONSECUTIVE LOCATIONS OF THE VERTICAL ARRAY D<31 24>
                                                ;THIS IS EQUIVALENT TO WRITING ADDRESS AS DATA INTO A 256
                                                ;WORD DATA ARRAY CORRESPONDING TO A<7 0> AND D<31 24>
                                                ;THEN A READ IS DONE AND DATA COMPARED

                                                ;LOGICAL 'AND' AND 'OR' FUNCTIONS ARE PERFORMED ON ALL THE
                                                ;PATTERNS READ
                                                ;A SEPERATE LOGICAL 'AND' AND 'OR' IS PERFORMED FOR ONLY THOSE PATTERNS
                                                ;THAT FAILED.
                                                ;THE ABOVE INFORMATION IS USED BY THE FAULT ANALYZER ROUTINE
                                                ;(MORE INFO ON IT CAN BE FOUND AT THE BEGINING OF THE
                                                ;ROUTINE 'ANLYZ0').  THE FAULT ANALYZER ALSO TYPES OUT
                                                ;TWO OCTAL NUMBERS (AND & OR)   THESE TWO CAN BE INTERPRETED AS
                                                ;EXPLAINED AT THE BEGINING OF THE ANALYZER
                                        ;;*****************************************************************
014520  000004                          TST26   SCOPE
014522  012737  015146  007056                  MOV     #TST27,NXTST    STARTING ADDRESS OF NEXT TEST
014530  004737  036624                          JSR     PC,CLRWCS       ;CLEAR OUT WCS

014534  005077  166274                          CLR     @WCSST
014540  012700  002000                          MOV     #2000,R0                ;INITIALIZE WCS LOCATION
014544  005001                                  CLR     R1              ;INITIALIZE WCS DATA
014546  012702  000400                          MOV     #256 ,R2        ;COUNT
014552  010077  166260                  1$      MOV     R0,@WCSAR       ;WRITE DATA INTO THIS WCS
014556  010177  166256                          MOV     R1,@WCSDR       ;LOCATION
014562  005200                                  INC     R0              ;NEXT WCS ADDRESS
014564  062701  000400                          ADD     #400,R1         ;NEXT DATA PATTERN
014570  077210                                  SOB     R2 1$           ;DONE?

                                                ;READ BACK ALL (256) WORDS THAT WERE WRITTEN AND CHECK
                                                ;IF THEY ARE READ CORRECTLY

014572  012777  000020  166234                  MOV     #PARDIS,@WCSST
014600  012700  002000                          MOV     #2000,R0                ;INITIALIZE WCS LOCATION
014604  005001                                  CLR     R1              ;INITIALIZE WCS DATA
014606  012737  000400  003052                  MOV     #256 ,COUNT     ;INITIALIZE COUNT
014614  005004                                  CLR     R4              ;R4 WILL CONTAIN A RUNNING 'OR' OF
                                                                        ;THE WORDS READ
014616  012705  177777                          MOV     #-1 R5          R5 WILL CONTAIN A RUNNING 'AND'
                                                                        ;OF THE WORDS READ
014622  005037  003046                          CLR     TMP0            ;'TMP0' WILL CONTAIN 'OR' OF THE
                                                                        ;DATA PATTERNS THAT FAILED
014626  010537  003050                          MOV     R5 TMP1         ;'TMP1' WILL CONTAIN 'AND' OF THE
                                                                        ;DATA PATTERNS THAT FAILED
014632  112737  177773  003064                  MOVB    #-5,ERCNT0
014640  112737  177773  003065                  MOVB    #-5,ERCNT1      ;DONT REPORT MORE THAN 5 ERRORS
014646  012737  014662  001110                  MOV     #2$,$LPERR      ;LOOP ON ERROR
014654  012737  015022  000114                  MOV     #8$,@#114       ;SET PARITY TRAP VECTOR
014662  010077  166150                  2$      MOV     R0,@WCSAR       ;READ FROM THIS LOCATION AND
014666  017702  166146                          MOV     @WCSDR,R2       SAVE IT IN R2
014672  050204                                  BIS     R2,R4           ;KEEP RUNNING 'OR' OF DATA
014674  005102                                  COM     R2              PATTERNS READ  IN R4
014676  005105                                  COM     R5
```

```
014700  050205                          BIS     R2,R5
014702  005105                          COM     R5              ;KEEP RUNNING 'AND' OF DATA
014704  005102                          COM     R2              ;PATTERNS READ, IN R5
014706  020102                          CMP     R1,R2           ;DATA PATTERN READ OK?
014710  001007                          BNE     4$              ;NO
014712  005200                  3$      INC     R0              ;SET UP TO READ NEXT ADDRESS
014714  062701  000400                  ADD     #400,R1         ;NEXT DATA PATTERN
014720  005337  003052                  DEC     COUNT           ;DONE?
014724  001356                          BNE     2$
014726  000466                          BR      6$

                                        ;DATA MISCOMPARE OCCURRED ON READING THE DATA FROM THE
                                        ;WCS LOCATION
                                        ;R0 CONTAINS WCS LOCATION READ
                                        ;R1 CONTAINS EXPECTED DATA
                                        ;R2 CONTAINS DATA THAT WAS READ

014730  105237  003064          4$      INCB    ERCNT0          ;DONT REPORT MORE THAN 5 ERRORS
014734  001407                          BEQ     5$
014736  010037  001162                  MOV     R0,$REG0        ;SAVE WCS LOCATION GIVING DATA
                                                                ;ERROR
014742  010137  001164                  MOV     R1,$REG1        ;SAVE EXPECTED DATA
014746  010237  001166                  MOV     R2,$REG2        ;SAVE DATA RECEIVED
014752  104012                          ERROR   12              ;DATA MISCOMPARE OCCURRED ON READING
                                                                ;WCS LOCATION   POSSIBLE FAULT IN
                                                                 ADDRESS LINES FOR DATA ARRAY
                                                                ;(35 24)   THIS TEST CONTAINS A
                                                                ;FAULT ANALYZER WHICH ATTEMPTS TO
                                                                 ANALYZE THE FAULT
014754  010146                  5$      MOV     R1,-(SP)        ;MAKE SURE THE DATA MISCOMPARE IS
014756  042716  000377                  BIC     #377,(SP)       ;IN BITS D(31 24) OF THE WCS
014762  010246                          MOV     R2,-(SP)        ;DATA ARRAY   IF OUTSIDE DONT DO
014764  042716  000377                  BIC     #377,(SP)        FAULT ANALYSIS
014770  022626                          CMP     (SP)+,(SP)+
014772  001747                          BEQ     3$              ;SKIP FAULT ANALYSIS
014774  005203                          INC     R3               KEEP COUNT OF ERRORS IN DATA
                                                                 ARRAY BITS (31 24)
014776  050237  003046                  BIS     R2,TMP0         ;'OR' THE FAILING DATA PATTERN IN
                                                                ;'TMP0'
015002  005102                          COM     R2
015004  005137  003050                  COM     TMP1            ;'AND' THE FAILING DATA PATTERN
015010  050237  003050                  BIS     R2,TMP1         ;WITH 'TMP1'
015014  005137  003050                  COM     TMP1
015020  000734                          BR      3$              ;RETURN TO DO FURTHER CHECKING

                                         IF A PARITY ERROR OCCURRED ON READING A WCS LOCATION
                                         ENTER HERE

015022  012737  003344  000114  8$      MOV     #BADPAR,@#114   ;PARITY ERROR HANDLER
015030  032777  100000  165776          BIT     #PARERR,@WCSST  ;WAS IT A WCS PARITY ERROR?
015036  001420                          BEQ     10$             ;NO
015040  022626                          CMP     (SP)+,(SP)+     ;RESTORE THE STACK POINTER
015042  017737  165766  001166          MOV     @WCSST,$REG2    ;SAVE STATUS REGISTER
015050  012777  000020  165756          MOV     #PARDIS,@WCSST  ;CLEAR PARITY ERROR
015056  105237  003065                  INCB    ERCNT1          ;DONT REPORT MORE THAN 5 ERRORS
015062  001405                          BEQ     9$
```

```
015064  010037  001162                  MOV     R0,$REG0        ;SAVE ADDRESS GIVING PARITY ERROR
015070  010137  001164                  MOV     R1,$REG1        ;SAVE EXPECTED DATA
015074  104026                          ERROR   26              ;PARITY ERROR OCCURRED ON READING
                                                                ;A WCS LOCATION   NOTE THE PARITY
                                                                ;ERROR CAN BE FROM ANY ONE OF THE
                                                                ;THREE 16-BIT WORDS OF THE DATA
                                                                ;D<47 0>
015076  000705                  9$      BR      3$              ;DO THE REST OF CHECKING

015100  000137  003344          10$     JMP     ?ADPAR          ;IF PARITY ERROR IS NOT FROM THE
                                                                ;WCS GO TO THE COMMON PARITY
                                                                ;ERROR HANDLER

                                        ;GO TO THE FAULT ANALYZER AND PRINT OUT WHICH ADDRESS LINES
                                        ;ARE FAULTY

015104  012737  003344  000114  6$      MOV     #BADPAR, @#114  ;PARITY ERROR HANDLER
015112  005703                          TST     R3              ;ANY ERROR IN D<31 24>?
015114  001414                          BEQ     TST27           ;;EXIT
015116  013700  003046                  MOV     TMP0,R0         ;GET 'OR'
015122  013701  003050                  MOV     TMP1,R1         ;GET 'AND'
015126  000300                          SWAB    R0              ;MAP BITS <15 8> TO <7 0>
015130  000301                          SWAB    R1              ;POSITION THE 'AND' AND 'OR' SO
                                                                ;AS TO COVER THE ADDRESS
015132  012746  043026                  MOV     #MSG26,-(SP)    ;MESSAGE POINTER
015136  012746  177400                  MOV     #177400,-(SP)   ;BIT MASK
015142  004737  037350                  JSP     PC,ANLYS0       ;GO TO THE FAULT ANALYZER

                                ;*****************************************************************
                                ;TEST 27        CHECK ADDRESSING FOR DATA ARRAY (35 24), ADDRESS (9 8)
                                        ;THIS TEST CHECKS OUT THE ADDRESSING SCHEME FOR THE DATA
                                        ;ARRAY <35 24>   THIS GROUP OF 12 CHIPS IS ADDRESSED BY
                                        ;THE SAME SET OF ADDRESS SELECTORS   THERE ARE 10 ADDRESS LINES
                                        ;<9 0>   THIS TEST CHECKS THE COMMON ADDRESS LINES <9 8> AND REPORTS
                                        ;ERRORS   THE FAULT ANALYZER ATTEMPTS TO FIGURE OUT WHICH
                                        ;ONE OF THE ADDRESS LINES WAS FAULTY

                                        ;STARTING AT LOCATION 375 (OCTAL, TREATING THE WCS AS A
                                        ;16 X 3K DATA ARRAY) AN INCREMENTING COUNT PATTERN IS WRITTEN
                                        ;IN 16  LOCATIONS OF THE VERTICAL ARRAY D<27 24>
                                        ;THIS IS EQUIVALENT TO WRITING ADDRESS AS DATA INTO A
                                        ;16 WORD DATA ARRAY CORRESPONDING TO A<11 8> AND
                                        ;D<27 24>   THEN A READ IS DONE AND DATA COMPARED

                                        ;LOGICAL 'AND' AND 'OR' FUNCTIONS ARE PERFORMED ON ALL
                                        ;THE PATTERNS READ
                                        ;A SEPERATE LOGICAL 'AND' AND 'OR' FUNCTIONS ARE PERFORMED
                                        ;FOR ONLY THOSE PATTERNS THAT FAIL
                                        ;THE ABOVE INFORMATION IS USED BY THE FAULT ANALYZER ROUTINE
                                        ;(MORE INFO ON IT CAN BE FOUND AT THE BEGINING OF
                                        ;THE ROUTINE 'ANLYZ0')   THE FAULT ANALYZER ALSO TYPES OUT
                                        ;TWO OCTAL NUMBERS (AND & OR)   THESE TWO CAN BE
                                        ;INTERPRETED AS EXPLAINED AT THE BEGINING OF THE ANALYZER
                                ;*****************************************************************
015146  000004                  TST27   SCOPE
015150  012737  015576  003056          MOV     #TST30,NXTST    STARTING ADDRESS OF NEXT TEST
```

```
015156  004737  036624                  JSR     PC,CLRWCS       ;CLEAR OUT WCS
015162  005077  165646                  CLR     @WCSST
015166  012700  002000                  MOV     #2000,R0        ;INITIALIZE WCS LOCATION (253)
                                                                ;77, 01 (CONCATENATE)
015172  005001                          CLR     R1              ;INITIALIZE WCS DATA
015174  012702  000020                  MOV     #16.,R2
015200  010077  165632          1$      MOV     R0,@WCSAR       ;WRITE DATA INTO THIS
015204  010177  165630                  MOV     R1,@WCSDR       ;WCS LOCATION
015210  062700  000100                  ADD     #100,R0         ;NEXT WCS LOCATION
015214  062701  000400                  ADD     #400,R1         ;NEXT DATA PATTERN
015220  077211                          SOB     R2,1$           ;DONE?

                                        ;READ BACK ALL 16 WORDS THAT WERE WRITTEN AND CHECK IF
                                        ;THEY ARE READ CORRECTLY

015222  012777  000020  165604          MOV     #PARDIS,@WCSST
015230  012700  002000                  MOV     #2000,R0        ;INITIALIZE WCS LOCATION
015234  005001                          CLR     R1              ;INITIALIZE WCS DATA
015236  005004                          CLR     R4              ;R4 WILL CONTAIN A RUNNING 'OR'
                                                                ;OF THE WORDS READ
015240  012705  177777                  MOV     #-1,R5          ;R5 WILL CONTAIN A RUNNING 'AND'
                                                                ;OF THE WORDS READ
015244  005037  003046                  CLR     TMP0            ;'TMP0' WILL CONTAIN 'OR' OF THE
                                                                ;DATA PATTERN THAT FAILED
015250  010537  003050                  MOV     R5,TMP1         ;'TMP1' WILL CONTAIN 'AND' OF THE
                                                                ;DATA PATTERNS THAT FAILED
015254  112737  177773  003064          MOVB    #-5,ERCNT0
015262  112737  177773  003065          MOVB    #-5,ERCNT1      DONT REPORT MORE THAN 5 ERRORS
015270  012737  000020  003052          MOV     #16.,COUNT      ;INITIALIZE COUNT
015276  012737  015312  001110          MOV     #2$,$LPERR      ;LOOP ON ERROR
015304  012737  015454  000114          MOV     #8$,@#114       ;SET PARITY TRAP VECTOR
015312  010077  165520          2$      MOV     R0,@WCSAR       READ FROM THIS LOCATION AND
015316  017702  165516                  MOV     @WCSDR,R2       ;SAVE THIS IN R2
015322  050204                          BIS     R2,R4           ;KEEP RUNNING 'OR' OF DATA
015324  005102                          COM     R2              PATTERNS READ, IN R4
015326  005105                          COM     R5
015330  050205                          BIS     R2,R5           ;KEEP RUNNING 'AND' OF PATTERNS
015332  005105                          COM     R5              READ IN R5
015334  005102                          COM     R2
015336  020102                          CMP     R1,R2           ;DATA PATTERNS READ OK?
015340  001010                          BNE     4$              ;NO
015342  062700  000100          3$      ADD     #100,R0         ;SET UP TO READ NEXT ADDRESS
015346  062701  000400                  ADD     #400,R1         ;NEXT DATA PATTERN
015352  005337  003052                  DEC     COUNT           ;DONE?
015356  001355                          BNE     2$
015360  000463                          BR      6$              YES

                                        ;DATA MISCOMPARE OCCURRED ON READING THE DATA FROM THE
                                        ;WCS LOCATION
                                        ;R0 CONTAINS WCS LOCATION READ
                                        ;R1 CONTAINS EXPECTED DATA
                                        ;R2 CONTAINS DATA THAT WAS READ

015362  105237  003064          4$      INCB    ERCNT0          DONT REPORT MORE THAN 5 ERRORS
015366  001407                          BEQ     5$
```

```
015370  010037  001162                  MOV     R0,$REG0        ;SAVE WCS LOCATION GIVING DATA ERROR
015374  010137  001164                  MOV     R1,$REG1        ;SAVE EXPECTED DATA
015400  010237  001166                  MOV     R2,$REG2        ;SAVE DATA RECEIVED
015404  104012                          ERROR   12              ;DATA MISCOMPARE OCCURRED ON READING
                                                                ;WCS LOCATION.  (POSSIBLE FAULT
                                                                ;IN ADDRESS LINES FOR DATA
                                                                ;ARRAY (35 24)).  THIS TEST
                                                                ;CONTAINS A FAULT ANALYZER WHICH
                                                                ;ATTEMPTS TO ANALYZE THE FAULT
015406  010146                  5$      MOV     R1,-(SP)        ;MAKE SURE THE DATA MISCOMPARE IS
015410  042716  170377                  BIC     #170377,(SP)    ;IN BITS D(27 24) OF THE
015414  010246                          MOV     R2,-(SP)        ;WCS DATA ARRAY
015416  042716  170377                  BIC     #170377,(SP)
015422  022626                          CMP     (SP)+,(SP)+
015424  001746                          BEQ     3$              ;SKIP FAULT ANALYSIS
015426  005203                          INC     R3              ;KEEP COUNT OF ERROR IN DATA
                                                                ;BITS D(27 24)
015430  050237  003046                  BIS     R2,TMP0         ;'OR' THE FAILING DATA PATTERNS
                                                                ;INTO 'TMP0'
015434  005102                          COM     R2
015436  005137  003050                  COM     TMP1
015442  050237  003050                  BIS     R2,TMP1         ;'AND' THE FAILING PATTERN W TH
015446  005137  003050                  COM     TMP1            ;'TMP1'
015452  000733                          BR      3$              ;RETURN TO DO FURTHER CHECKING

                                        ;IF A PARITY ERROR OCCURRED ON READING A WCS LOCATION
                                        ;ENTER HERE

015454  012737  003344  000114  8$      MOV     #BADPAR,@#114   ;PARITY ERROR HANDLER
015462  052777  100000  165344          BIS     #PARERR,@WCSST  ;WCS PARITY ERROR?
015470  001415                          BEQ     10$             ;NO
015472  022626                          CMP     (SP)+,(SP)+     ;RESTORE THE STACK POINTER
015474  017737  165334  001166          MOV     @WCSST,$REG2    ;SAVE STATUS REGISTER
015502  012777  000020  165324          MOV     #PARDIS,@WCSST  ;CLEAR OUT THE PARITY ERROR
015510  010037  001162                  MOV     R0,$REG0        ;SAVE ADDRESS GIVING PARITY ERROR
015514  010137  001164                  MOV     R1,$REG1        ;SAVE EXPECTED DATA
015520  104026                          ERROR   26              ;PARITY ERROR OCCURRED ON READING
                                                                ;A WCS LOCATION.  THE PARITY
                                                                ;ERROR CAN BE FROM ANY ONE OF
                                                                ;THE THREE 16-BIT WORDS OF THE
                                                                ;DATA ARRAY D(47 0)
015522  000707                  9$      BR      2$              ;DO REST OF THE CHECKING

015524  000137  003344          10$     JMP     BADPAR          ;IF PARITY ERROR IS NOT FROM
                                                                ;THE WCS GO TO THE COMMON
                                                                ;PARITY ERROR HANDLER

                                        ;GO TO THE FAULT ANALYZER AND PRINT OUT WHICH ADDRESS
                                        ;LINES ARE FAULTY

015530  012777  003344  162356  6$      MOV     #BADPAR,@114    ;PARITY ERROR HANDLER
015536  005703                          TST     R3              ;ANY ERROR IN D(27 24)?
015540  001416                          BEQ     TST30           ;;EXIT
015542  013700  003046                  MOV     TMP0,R0         ;GET 'OR'
015546  013701  003050                  MOV     TMP1,R1         ;GET 'AND'
015552  006200                          ASR     R0               POSITION 'AND'  'OR' S  AS T
```

```
015554  006200                          ASR     R0              ;COVER THE ADDRESS LINES BEING CHECKED
015556  006201                          ASR     R1              ;MAP BITS <11 8> TO <9 5>
015560  006201                          ASR     R1
015562  012746  043026                  MOV     #MSG26,-(SP)    ;MESSAGE POINTER
015566  012746  176077                  MOV     #176077,-(SP)   ;BIT MASK?
015572  004737  037350                  JSR     PC,ANLYSO       ;GO TO THE FAULT ANALYZER

                                ;;*****************************************************************
                                ;*TEST 30        CHECK ADDRESSING FOR DATA ARRAY (47 36),ADDRESS (9 0)
                                        ;THIS TEST CHECKS OUT THE ADDRESSING SCHEME FOR DATA ARRAY <47 36>
                                        ;THIS GROUP OF 12 CHIPS IS ADDRESSED BY THE SAME SET OF ADDRESS
                                        ;SELECTORS.  THERE ARE 10 ADDRESS LINES <9 0>   THIS TEST CHECKS
                                        ;ALL THE COMMON ADDRESS LINES AND REPORTS ERRORS   THE FAULT
                                        ;ANALYZER ATTEMPTS TO FIGURE OUT WHICH ONE OF THE ADDRESS
                                        ;LINES WAS FAULTY.

                                        ;STARTING AT LOCATION 4000 (TREATING THE WCS AS A 16 X 3K DATA
                                        ;ARRAY) AN INCREMENTING COUNT PATTERN IS WRITTEN IN 1024
                                        ;CONSECUTIVE LOCATIONS OF THE VERTICAL ARRAY D<45 36>   THIS
                                        ;IS EQUIVALENT TO WRITING ADDRESS AS DATA INTO A 1024
                                        ;WORD DATA ARRAY CORRESPONDING TO A<9 0> AND D<45 36>
                                        ;THEN A READ IS DONE AND DATA COMPARED

                                        ;LOGICAL 'AND' AND 'OR' FUNCTIONS ARE PERFORMED ON ALL THE PATTERN
                                        ;READ
                                        ;A SEPERATE LOGICAL 'AND' AND 'OR' IS PERFORMED FOR ONLY
                                        ;THOSE PATTERNS THAT FAIL.
                                        ;THE ABOVE INFORMATION IS USED BY THE FAULT ANALYZER ROUTINE
                                        ;(MORE INFO ON IT CAN BE FOUND AT THE BEGINING OF
                                        ;THE ROUTINE 'ANLYZO'))  THE FAULT ANALYZER ALSO TYPES
                                        ;OUT TWO OCTAL NUMBERS (AND & OR)   THESE TWO CAN
                                        ;BE INTERPRETED AS EXPLAINED AT THE BEGINING OF THE ANALYZER
                                ;;*****************************************************************
015576  000004                  TST30   SCOPE
015600  012737  016240  003056          MOV     #TST31,NXTST    ;STARTING ADDRESS OF NEXT TEST
015606  004737  036624                  JSR     PC,CLRWCS       ;CLEAR OUT WCS
015612  005003                          CLR     R3              ;CLEAR ERROR INDICATOR
015614  005077  165214                  CLR     @WCSST
015620  012700  004000                  MOV     #4000,R0                ;INITIALIZE WCS LOCATION
015624  005001                          CLR     R1              ;INITIALIZE WCS DATA
015626  012702  002000                  MOV     #1024 ,R2       ;INITIALIZE COUNT
015632  010077  165200          1$      MOV     R0,@WCSAR       ;WRITE DATA INTO THIS
015636  010177  165176                  MOV     R1,@WCSDR       ;WCS LOCATION
015642  005200                          INC     R0              ;NEXT WCS ADDRESS
015644  062701  000020                  ADD     #20,R1          ;NEXT DATA PATTERN
015650  077210                          SOB     R2,1$           ;DONE?

                                        ;READ BACK ALL (1024) WORDS THAT WERE WRITTEN AND CHECK
                                        ;IF THEY ARE READ CORRECTLY

015652  012777  000020  165154          MOV     #PARDIS,@WCSST
015660  012700  004000                  MOV     #4000,R0        ;INITIALIZE WCS LOCATION
015664  005001                          CLR     R1              ;INITIALIZE WCS DATA
015666  012737  002000  003052          MOV     #1024 ,COUNT    ;INITIALIZE COUNT
015674  005004                          CLR     R4              ;R4 WILL CONTAIN A RUNNING 'OR'
                                                                ;OF THE WORDS READ
```

```
015676  012705  177777                  MOV     #-1,R5          ;R5 WILL CONTAIN A RUNNING  AND'
                                                                ;OF THE WORDS READ
015702  005037  003046                  CLR     TMPO            ;'TMPO' WILL CONTAIN 'OR' OF THE
                                                                ;DATA PATTERNS THAT FAILED
015706  010537  003050                  MOV     R5,TMP1         ;'TMP1' WILL CONTAIN 'AND' OF THE
                                                                ;DATA PATTERNS THAT FAILED
015712  112737  177773  003064          MOVB    #-5,ERCNTO
015720  112737  177773  003065          MOVB    #-5,ERCNT1      ;DONT REPORT MORE THAN 5 ERRORS
015726  012737  015742  001110          MOV     #2$,$LPERR      ;LOOP ON ERROR
015734  012737  016102  000114          MOV     #8$,@#114       ;SET PARITY TRAP VECTOR
015742  010077  165070          2$      MOV     R0,@WCSAR       ;HEAD FROM THIS LOCATION AND
015746  017702  165066                  MOV     @WCSDR,R2       ;SAVE IT IN R2
015752  050204                          BIS     R2,R4           ;KEEP RUNNING 'OR' OF THE DATA
                                                                ;PATTERNS READ IN R4
015754  005102                          COM     R2
015756  005105                          COM     R5              ;KEEP RUNNING 'AND' OF PATTERNS
015760  050205                          BIS     R2,R5           ;READ, IN R5
015762  005105                          COM     R5
015764  005102                          COM     R2
015766  020102                          CMP     R1,R2           ;DATA PATTERN READ OK?
015770  001007                          BNE     4$              ;NO
015772  005200                  3$      INC     R0              ;SET UP TO READ NEXT ADDRESS
015774  062701  000020                  ADD     #20,R1          ;NEXT DATA PATTERN
016000  005337  003052                  DEC     COUNT           ;DONE?
016004  001356                          BNE     2$
016006  000466                          BR      6$

                                        ;DATA MISCOMPARE OCCURRED ON READING THE DATA FROM THE
                                        ;WCS LOCATION
                                        ;R0 CONTAINS WCS LOCATION READ
                                        ;R1 CONTAINS EXPECTED DATA
                                        ;R2 CONTAINS DATA THAT WAS READ

016010  105237  003064          4$      INCB    ERCNTO          ;DONT REPORT MORE THAN 5 ERRORS
016014  001407                          BEQ     5$
016016  010037  001162                  MOV     R0,$REG0        ;SAVE WCS LOCATION GIVING
                                                                ;DATA ERROR
016022  010137  001164                  MOV     R1,$REG1        ;SAVE EXPECTED DATA
016026  010237  001166                  MOV     R2,$REG2        ;SAVE DATA RECEIVED
016032  104012                          ERROR   12              ;DATA MISCOMPARE OCCURRED ON READING
                                                                ;WCS LOCATION  POSSIBLE FAULT IN
                                                                ;ADDRESS LINES FOR DATA ARRAY <47 36>
                                                                ;THIS TEST CONTAINS A FAULT ANALYZER
                                                                ;WHICH ATTEMPTS TO ANALYZE THE FAULT
016034  010146                  5$      MOV     R1,-(SP)        ;MAKE SURE THE DATA MISCOMPARE IS
016036  042716  140013                  BIC     #140013,(SP)    ;IN BITS D<45 36> OF THE WCS
016042  010246                          MOV     R2,-(SP)        ;DATA ARRAY
016044  042716  140013                  BIC     #140013,(SP)
016050  022626                          CMP     (SP)+,(SP)+
016052  001747                          BEQ     3$              ;SKIP FAULT ANALYSIS
016054  005203                          INC     R3              ;KEEP COUNT OF ERRORS IN DATA
                                                                ;ARRAY BITS D<45 36>
016056  050237  003046                  BIS     R2,TMPO         ;'OR' THE FAILING DATA PATTERN IN
                                                                ;'TMPO'
016062  005102                          COM     R2
016064  005137  003050                  COM     TMP1            ;'AND' THE FAILING DATA PATTERN
```

```
016070  050237  003050                   BIS     R2,TMP1          ,WITH 'TEMP1'
016074  005137  003050                   COM     TMP1
016100  000734                           BR      3$               ,RETURN TO DO FURTHER CHECKING

                                         ,IF A PARITY ERROR OCCURRED ON READING A WCS LOCATION,
                                         ,ENTER HERE.

016102  012737  003344  000114  8$       MOV     #BADPAR,@#114    ;PARITY ERROR HANDLER
016110  032777  100000  164716           BIT     #PARERR,@WCSST   ,WCS PARITY ERROR?
016116  001420                           BEQ     10$              ;NO
016120  022626                           CMP     (SP)+,(SP)+      ;RESTORE STACK POINTER
016122  017737  164706  001166           MOV     @WCSST,$REG2     ;SAVE STATUS REGISTER
016130  012777  000020  164676           MOV     #PARDIS,@WCSST   ;CLEAR PARITY ERROR
016136  105237  003065                   INCB    ERCNT1           ,DONT REPORT MORE THAN 5 ERRORS
016142  001405                           BEQ     9$
016144  010037  001162                   MOV     R0,$REG0         ;SAVE ADDRESS GIVING PARITY ERROR
016150  010137  001164                   MOV     R1,$REG1         ,SAVE EXPECTED DATA
016154  104026                           ERROR   26               ,PARITY ERROR OCCURRED ON READING A
                                                                  ,WCS LOCATION   THE PARITY ERROR
                                                                  ,CAN BE FROM ANY ONE OF THE THREE
                                                                  ,16 BIT WORDS OF THE DATA D<47.0>
016156  000705                   9$      BR      3$               ,DO THE REST OF CHECKING

016160  000137  003344           10$     JMP     BADPAR           ,IF PARITY ERROR IS NOT FROM
                                                                  ,THE WCS GO TO THE COMMON
                                                                  ,PARITY ERROR HANDLER
                                         ,GO TO THE FAULT ANALYZER AND PRINT OUT WHICH ADDRESS
                                         ,LINES ARE FAULTY

016164  012737  003344  000114  6$       MOV     #BADPAR,@#114    ,PARITY ERROR HANDLER
016172  005077  164636                   CLR     @WCSST
016176  005703                           TST     R3               ,ANY ERROR IN D<45 36>?
016200  001417                           BEQ     TST31            ,,EXIT
016202  013700  003046                   MOV     TMP0,R0          ,GET 'OR'
016206  013701  003050                   MOV     TMP1,R1           GET 'AND'
016212  072027  177774                   ASH     #-4,R0           ,POSITION 'AND', 'OR' SO AS TO
016216  072127  177774                   ASH     #-4,R1           ,MAP BITS <13 4> TO <9 0>
016222  006201                           ASR     R1
016224  012746  043060                   MOV     #MSG27,-(SP)     ,MESSAGE POINTER
016230  042746  176000                   BIC     #176000,-(SP)    ,BIT MASK
016234  004737  037350                   JSR     PC,ANLYS0        ,GO TO THE FAULT ANALYZER


                                 ;*****************************************************************
                                 ;*TEST 31        CHECK ADDRESS REGISTER - ADREG(11.0)
                                         ,THIS TESTS CHECKS THAT THE ADDRESS REGISTER (ADREG<11 0>)
                                         ,BY RIPPLING A COUNT PATTERN FROM 0 TO 5777
                                 ;;*****************************************************************
016240  000004                   TST31   SCOPE
016242  012737  016360  003056           MOV     #TST32,NXTST     ,STARTING ADDRESS OF NEXT TEST
016250  013704  003036                   MOV     WCSAR,R4
016254  013705  003040                   MOV     WCSDR,R5
016260  012777  000020  164546           MOV     #PARDIS,@WCSST
016266  012703  177766                   MOV     #-10 ,R3         ,DONT REPORT MORE THAN 10 ERRORS
016272  005001                           CLR     R1
016274  010114                   1$      MOV     R1,@R4           ,ADDRESS THE WCS
```

```
016276  010115                          MOV     R1,@R5          ;WRITE DATA INTO WCS
016300  005201                          INC     R1              ;NEXT LOC
016302  020127  006000                  CMP     R1,#3072        ;DONE?
016306  001372                          BNE     1$
016310  005001                          CLR     R1
016312  010114                  2$      MOV     R1,@R4          ;ADDRESS THE WCS
016314  011502                          MOV     @R5,R2          ;READ DATA
016316  020102                          CMP     R1,R2           ;DATA CORRECT?
016320  001411                          BEQ     3$              ;OK
016322  005203                          INC     R3              ;NO MORE THAN 10 ERRORS
016324  100013                          BPL     4$
016326  010137  001162                  MOV     R1,$REG0        ;GET WCS LOC
016332  010137  001164                  MOV     R1,$REG1        ;GET EXPCTD DATA
016336  010237  001166                  MOV     R2,$REG2        ;GET DATA RECVD
016342  104012                          ERROR   12              ;DATA ERROR ON READING FROM WCS
016344  005201                  3$      INC     R1              ;NEXT LOC.
016346  020127  006000                  CMP     R1,#3072        ;DONE?
016352  001357                          BNE     2$
016354  005077  164454          4$      CLR     @WCSST

                                ;;*****************************************************************
                                 *TEST 32        TEST DATA ARRAY-MARCHING 1'S AND 0'S
                                        ;THIS IS A MEMORY-TYPE TEST OF THE WCS DATA ARRAY (16 X 3K), AND
                                        ;IS KNOWN AS THE "MARCHING ONES AND ZEROES" TEST   THE MEMORY
                                        ;IS FIRST WRITTEN TO THE ALL ZEROES STATE   THEN SEQUENTIALLY,
                                        ;STARTING AT THE FIRST ADDRESS, THE ZERO IS READ AND A
                                        ;ONE (177777) IS WRITTEN   THIS SEQUENCE IS CONTINUED TO THE
                                        ;LAST LOCATION   AT THIS STAGE, THE DATA ARRAY IS FULL OF 1'S
                                        ;THEN STARTING AT THE HIGHEST LOCATION, A ONE IS READ AND
                                        ;A ZERO IS WRITTEN   THE ADDRESS IS DECREMENTED AND THE
                                        ;SEQUENCE IS REPEATED UNTILL THE LOWEST LOCATION IS REACHED
                                        ;THIS TEST WILL DETECT FAULTS IN THE INDIVIDUAL MEMORY CHIP
                                        ;ADDRESSING LINES AS WELL AS DATA PROBLEMS  GENERALLY, ADDRESSING
                                        ;FAULTS WILL SHOW UP IN REPEATED ERRORS WITH A DEFINITE FAILURE
                                        ;PATTERN
                                ;;*****************************************************************
016360  000004                  TST32.  SCOPE
016362  012737  016576  003056          MOV     #TST33,NXTST    ;STARTING ADDRESS OF NEXT TEST
016370  012737  177766  003052          MOV     #-10 ,COUNT     ;DONT REPORT MORE THAN
016376  012737  177766  003054          MOV     #-10 ,COUNTO    ;10 ERRORS
016404  012777  000020  164422          MOV     #PARDIS,@WCSST  ;DISABLE PARITY ERROR TRAPS
016412  013704  003036                  MOV     WCSAR,R4        ;WCS ADDRESS REGISTER
016416  013705  003040                  MOV     WCSDR,R5        ;WCS DATA REGISTER
016422  012703  177777                  MOV     #-1,R3          ;INITIALIZE DATA PATTERN TO BE WRITTEN

                                        ;CLEAR THE ENTIRE WCS DATA ARRAY

016426  012701  006000                  MOV     #3072  R1
016432  005014                          CLR     @R4             ;ADDRESS THE WCS
016434  005015                  1$      CLR     @R5             ;CLEAR THE LOCATION
016436  005214                          INC     @R4
016440  077103                          SOB     R1,1$           ;DONE?
```

```
                                                  ,WRITE AND READ "MARCHING ONES "
                                                  ,STARTING AT THE LOWEST ADDRESS, EACH LOCATION IS READ AND CHECKED
                                                  ,IF IT WAS 0, THEN IT IS WRITTEN WITH ALL 1'S   THE TEST IS REPEATED
                                                  ,INCREMENTALLY FOR ALL ADDRESSES

016442  012700  006000                            MOV     #3072 ,R0         ,INTIALIZE COUNT
016446  005001                                    CLR     R1
016450  012737  016456  001110                    MOV     #2$,$LPERR        ,LOOP ON ERROR
016456  010114                          2$        MOV     R1,@R4            ,ADDRESS THE WCS LOCATION
016460  011502                                    MOV     @R5,R2            ,READ THE LOCATION
016462  001412                                    BEQ     3$                ,OK, IF IT WAS 0
016464  005237  003052                            INC     COUNT             ,NO MORE THAN 10 ERRORS
016470  100007                                    BPL     3$
016472  010137  001162                            MOV     R1,$REG0          ,SAVE ADDRESS THAT WAS READ
016476  005037  001164                            CLR     $REG1             ,SAVE EXPECTED DATA PATTERN (0)
016502  010237  001166                            MOV     R2,$REG2          ,SAVE DATA PATTERN THAT WAS READ
016506  104012                                    ERROR   12                ,DATA ERROR!  LOCATION(GIVEN IN
                                                                            ,ERROR MESSAGE) WAS READ AND IT
                                                                            ,WAS NOT 0.   THE ENTIRE DATA
                                                                            ,ARRAY WAS CLEARED PREVIOUSLY
016510  010315                          3$        MOV     R3,@R5            ,WRITE A PATTERN OF ALL 1'S IN THIS
                                                                            ,LOCATION
016512  005201                                    INC     R1                ,POINT TO THE NEXT WCS LOC
016514  077020                                    SOB     R0,2$             ,DONE?

                                                   AT THIS POINT, THE ENTIRE WCS DATA ARRAY (16X3K) SHOULD CONTAIN
                                                  ,ALL 1'S   THE FOLLOWING IS A "MARCHING ZERO" TEST   STARTING
                                                  ,AT THE HIGHEST ADDRESS, EACH LOCATION IS READ AND CHECKED
                                                   IF IT WAS ALL 1'S, THEN IT IS WRITTEN TO BE 0   THE SAME
                                                   TEST IS REPEATED (DECREMENTALLY) FOR ALL LOCATIONS

016516  012701  005777                            MOV     #3071 ,R1         ,INITIALIZE WCS ADDRESS (LAST)
016522  012700  006000                            MOV     #3072 ,R0         ,INITIALIZE COUNT
016526  012737  016534  001110                    MOV     #4$,$LPERR        ,LOOP ON ERROR
016534  010114                          4$        MOV     R1,@R4            ,ADDRESS THE WCS LOC
016536  011502                                    MOV     @R5,R2            ,READ THAT LOC
016540  020203                                    CMP     R2,R3             ,DATA CORRECT?  (177777)
016542  001412                                    BEQ     5$                ,YES
016544  005237  003054                            INC     COUNTO
016550  100012                                    BPL     TST33             ,,EXIT
016552  010137  001162                            MOV     R1,$REG0          ,SAVE WCS ADDRESS
016556  010337  001164                            MOV     R3,$REG1          ,SAVE EXPECTED DATA (177777)
016562  010237  001166                            MOV     R2,$REG2          ,SAVE DATA RECIEVED
016566  104012                                    ERROR   12                ,DATA ERROR!  LOCATION (GIVEN IN
                                                                            ,ERROR MESSAGE) WAS READ AND
                                                                            ,IT DID NOT CONTAIN 177777 AS
                                                                            ,EXPECTED
016570  005015                          5$        CLR     @R5               ,CLEAR THAT WCS LOCATION
016572  005301                                    DEC     R1                ,POINT TO NEXT ADDRESS
016574  077021                                    SOB     R0,4$             ,DONE?

                                         ,*************************************************************
                                         #TEST 33        TEST DATA ARRAY MARCHING 0'S AND 1'S
                                                  ,THIS IS A MEMORY-TYPE TEST OF THE WCS DATA ARRAY (16 X 3K),
                                                  ,AND IS KNOWN AS THE "MARCHING ONES AND ZEROES" TEST  THE
                                                  ,MEMORY IS FIRST WRITTEN WITH ALL 1'S   THEN SEQUENTIALLY, STARTING
```

```
                                                ;AT THE FIRST ADDRESS, THE PATTERN (177777) IS READ AND A ZERO IS
                                                ;WRITTEN.  THIS SEQUENCE IS CONTINUED TO THE LAST LOCATION.  AT
                                                ;THIS STAGE, THE DATA ARRAY IS CLEARED.  THEN STARTING
                                                ;AT THE HIGHEST LOCATION, A ZERO IS READ AND ALL 1'S (177777)
                                                ;IS WRITTEN.  THE ADDRESS IS DECREMENTED AND THE SEQUENCE
                                                ;IS REPEATED UNTILL THE LOWEST LOCATION IS REACHED.
                                                ;THIS TEST WILL DETECT FAULTS IN INDIVIDUAL CHIP ADDRESSING
                                                ;LINES AND DATA PROBLEMS  GENERALLY, ADDRESSING FAULTS WILL SHOW
                                                ;UP IN REPEATED ERRORS WITH A DEFINITE FAILURE PATTERN
                                        ;;*****************************************************************
016576  000004                          TST33   SCOPE
016600  012737  017014  003056                  MOV     #TST34,NXTST    ;STARTING ADDRESS OF NEXT TEST
016606  012777  000020  164220                  MOV     #PARDIS,@WCSST  ;DISABLE PARITY ERROR TRAPS
016614  012737  177766  003052                  MOV     #-10.,COUNT     ;DONT REPORT MORE THAN
016622  012737  177766  003054                  MOV     #-10.,COUNTO    ;10 ERRORS
016630  013704  003036                          MOV     WCSAR,R4        ;WCS ADDRESS REGISTERS
016634  013705  003040                          MOV     WCSDR,R5        ;WCS DATA REGISTER
016640  012703  177777                          MOV     #-1, R3         ;INITIALIZE DATA PATTERN

                                                ;FILL THE ENTIRE WCS DATA ARRAY WITH 1'S

016644  012701  006000                          MOV     #3072.,R1
016650  005014                                  CLR     @R4             ;ADDRESS THE WCS
016652  010315                          1$      MOV     R3,@R5          ;WRITE A PATTERN (177777)
016654  005214                                  INC     @R4             ;NEXT WCS ADDRESS
016656  077103                                  SOB     R1,1$           ;DONE?

                                                ;WRITE AND READ "MARCHING 0'S"
                                                ;STARTING AT THE LOWEST ADDRESS, EACH LOCATION IS READ AND
                                                ;CHECKED IF IT WAS ALL 1'S, THEN IT IS WRITTEN WITH A 0
                                                ;THE TEST IS REPEATED INCREMENTALLY FOR ALL ADDRESSES

016660  012700  006000                          MOV     #3072.,R0       ;INITAILIZE COUNT
016664  005001                                  CLR     R1              ;INTIALIZE WCS LOCATION
016666  012737  016674  001110                  MOV     #2$,$LPERR      ;LOOP ON ERROR
016674  010114                          2$:     MOV     R1,@R4          ADDRESS THE WCS LOCATION
016676  011502                                  MOV     @R5,R2          ;READ THE LOCATION
016700  020203                                  CMP     R2,R3           ;DATA CORRECT (177777)?
016702  001412                                  BEQ     3$              ;YES
016704  005237  003052                          INC     COUNT
016710  100007                                  BPL     3$
016712  010137  001162                          MOV     R1,$REG0        ;SAVE ADDRESS THAT WAS READ
016716  010337  001164                          MOV     R3,$REG1        ;SAVE EXPECTED DATA PATTERN (177777)
016722  010237  001166                          MOV     R2,$REG2        ;SAVE DATA PATTERN THAT WAS READ
016726  104012                                  ERROR   12              ;DATA ERROR!  LOCATION (GIVEN IN
                                                                        ;ERROR MESSAGE) WAS READ AND THE
                                                                        ;DATA WAS NOT CORRECT.  THE ENTIRE
                                                                        ;ARRAY WAS WRITTEN WITH A BACKGROUND
                                                                        ;PATTERN OF 1'S PREVIOUSLY
016730  005015                          3$      CLR     @R5             ;WRITE A PATTERN (0) IN THIS LOCATION
016732  005201                                  INC     R1              ;POINT TO THE NEXT WCS LOC
016734  077021                                  SOB     R0,2$           ;DONE?

                                                ;AT THIS POINT, THE ENTIRE WCS DATA ARRAY (16X3K) SHOULD BE
                                                ;CLEARED.  THE FOLLOWING IS A "MARCHING ONE" TEST.  STARTING
                                                ;AT THE HIGHEST ADDRESS, EACH LOCATION IS READ AND CHECKED
```

```
                                                ;IF IT WAS ALL 0'S, THEN IT IS WRITTEN TO BE ALL 1'S,
                                                ;(177777)   THE SAME TEST IS REPEATED (DECREMENTALLY FOR ALL
                                                ;LOCATIONS.

016736  012701  005777                          MOV     #3071 ,R1       ;INITIALIZE WCS ADDRESS (LAST)
016742  012700  006000                          MOV     #3072 ,R0       ;INITIALIZE COUNT
016746  012737  016754  001110                  MOV     #4$,$LPERR      ;LOOP ON ERROR
016754  010114                          4$      MOV     R1,@R4          ;ADDRESS THE WCS LOC
016756  011502                                  MOV     @R5,R2          ;READ THAT LOC
016760  001412                                  BEQ     5$              ;DATA CORRECT (0)?
016762  005237  003054                          INC     COUNT0
016766  100012                                  BPL     TST34           ;;EXIT
016770  010137  001162                          MOV     R1,$REG0        ;SAVE WCS ADDRESS
016774  005037  001164                          CLR     $REG1           ;SAVE EXPECTED DATA (0)
017000  010237  001166                          MOV     R2,$REG2        ;SAVE DATA RECIEVED
017004  104012                                  ERROR   12              ;DATA ERROR!  LOCATION (GIVEN IN
                                                                        ;ERROR MESSAGE) WAS READ AND
                                                                        ;IT DID NOT CONTAIN 0 AS
                                                                        ;EXPECTED
017006  010315                          5$      MOV     R3,@R5          ;WRITE ALL 1'S (177777) IN THE LOC ?
017010  005301                                  DEC     R1              ;POINT TO NEXT ADDRESS
017012  077020                                  SOB     R0,4$           ;DONE?

                                        ***********************************************************
                                        #TEST 34        TEST PARITY BIT STORAGE CHIPS-MARCHING 1'S AND 0'S
                                                ;THIS IS A TEST OF THE WCS PARITY BIT STORAGE CHIP (1 X 1K), AND
                                                ;IS KNOWN AS THE "MARCHING ONES AND ZEROES" TEST   THE MEMORY
                                                 S FIRST WRITTEN TO THE ALL ZEROES STATE   THEN SEQUENTIALLY,
                                                STARTING AT THE FIRST ADDRESS, THE ZERO IS READ AND A
                                                ONE IS WRITTEN   THIS SEQUENCE IS CONTINUED TO THE
                                                LAST LOCATION   AT THIS STAGE, THE DATA ARRAY IS FULL OF 1'S
                                                ;THEN STARTING AT THE HIGHEST LOCATION, A ONE IS READ AND
                                                ;A ZERO IS WRITTEN   THE ADDRESS IS DECREMENTED AND THE
                                                ;SEQUENCE IS REPEATED UNTILL THE LOWEST LOCATION IS REACHED
                                                ;THIS TEST WILL DETECT FAULTS IN THE INDIVIDUAL MEMORY CHIP
                                                ;ADDRESSING LINES AS WELL AS DATA PROBLEMS  GENERALLY, ADDRESSING
                                                 FAULTS WILL SHOW UP IN REPEATED ERRORS WITH A DEFINITE FAILURE
                                                ;PATTERN
                                                ;THE TEST IS REPEATED FOR THE THREE PARITY BIT STORAGE CHIPS
                                                ;CHIP 0, SEGMENT 0, PAR 0,   ADDRESSES  0,1,2,
                                                ;CHIP 1, SEGMENT 1, PAR 1,   ADDRESSES  2000,2001,
                                                ;CHIP 2, SEGMENT 2, PAR 2,   ADDRESSES  4000,4001,
                                        ***********************************************************
017014  000004                          TST34   SCOPE
017016  012737  017372  003056                  MOV     #TST35,NXTST    ;STARTING ADDRESS OF NEXT TEST
017024  012737  177766  003052                  MOV     #-10 ,COUNT      DONT REPORT MORE THAN
017032  012737  177766  003054                  MOV     #-10 ,COUNT0    ;10 ERRORS
017040  012777  000020  163766                  MOV     #PARDIS,@WCSST  ;DISABLE PARITY ERROR TRAPS
017046  012703  077777                          MOV     #77777,R3       ;INITIALIZE DATA PATTERN TO BE WRITTEN
017052  005037  003046                          CLR     TMP0            ;SEGMENT NUMBER
017056  012700  000002                          MOV     #PAR0,R0        ;PAR BIT MASK
017062  005037  003050                          CLR     TMP1            ;INIT  WCS ADR

                                                ;CLEAR THE  PAR CHIP

017066  013701  003050                  6$      MOV     TMP1,R1
```

```
017072  012704  002000                  MOV     #1024 ,R4
017076  010177  163734                  MOV     R1,@WCSAR          ,ADDRESS THE WCS
 17102  005077  163732          1$      CLR     @WCSDR             ,CLEAR THE LOCATION
017106  005201                          INC     R1
017110  077404                          SOB     R4,1$              ,DONE?

                                        ,WRITE AND READ "MARCHING ONES."
                                        ,STARTING AT THE LOWEST ADDRESS, EACH LOCATION  S READ AND CHECKED
                                        ,IF IT WAS 0, THEN IT IS WRITTEN WITH ALL 1'S   THE TEST IS REPEATED
                                        ,INCREMENTALLY FOR ALL ADDRESSES

017112  012704  002000                  MOV     #1024.,R4          ,INTIALIZE COUNT
017116  013701  003050                  MOV     TMP1,R1
017122  012737  017130  001110          MOV     #2$,$LPERR         ,LOOP ON ERROR
017130  010177  163702          2$      MOV     R1,@WCSAR          ,ADDRESS THE WCS LOCATION
017134  017702  163700                  MOV     @WCSDR,R2
017140  017705  163670                  MOV     @WCSST,R5
017144  030005                          BIT     R0,R5              ,PAR BIT CLEAR?
017146  001410                          BEQ     3$                 ,YES
017150  005237  003052                  INC     COUNT              ,NO MORE THAN 10 ERRORS
017154  100005                          BPL     3$
017156  010137  001162                  MOV     R1,$REG0           ,SAVE ADDRESS THAT WAS READ
017162  010537  001164                  MOV     R5,$REG1
017166  000451                          BR      7$                 ,REPORT ERROR
017170  010377  163644          3$      MOV     R3,@WCSDR          ,WRITE A PATTERN OF ALL 1'S IN THIS
                                                                   ,LOCATION
017174  005201                          INC     R1                 ,POINT TO THE NEXT WCS LOC
017176  077424                          SOB     R4,2$              ,DONE?

                                        ,AT THIS POINT, THE PARITY CHIP SHOULD CONTAIN
                                        ,ALL 1'S   THE FOLLOWING IS A "MARCHING ZERO" TEST   STARTING
                                        ,AT THE HIGHEST ADDRESS, EACH LOCATION IS READ AND CHECKED
                                        ,IF IT WAS ALL 1'S, THEN IT IS WRITTEN TO BE 0   THE SAME
                                        ,TEST IS REPEATED (DECREMENTALLY) FOR ALL LOCATIONS

017200  005301                          DEC     R1
017202  012704  002000                  MOV     #1024 ,R4          ,INITIALIZE COUNT
017206  012737  017214  001110          MOV     #4$,$LPERR         ,LOOP ON ERROR
017214  010177  163616          4$      MOV     R1,@WCSAR          ,ADDRESS THE WCS LOC
017220  017702  163614                  MOV     @WCSDR,R2          ,READ THAT LOC
017224  017705  163604                  MOV     @WCSST,R5
017230  030005                          BIT     R0,R5              ,PAR BIT SET?
017232  001010                          BNE     5$                 ,YES
017234  005237  003054                  INC     COUNTO
017240  100054                          BPL     TST35              ,,EXIT
017242  010137  001162                  MOV     R1,$REG0           ,SAVE WCS ADDRESS
017246  010537  001164                  MOV     R5,$REG1
017252  000433                          BR      8$                 ,REPORT ERROR
017254  005077  163560          5$      CLR     @WCSDR             ,CLEAR THAT WCS LOCATION
017260  005301                          DEC     R1                 ,POINT TO NEXT ADDRESS
017262  077424                          SOB     R4,4$              ,DONE?

017264  062737  002000  003050           ADD     #2000,TMP1
017272  006300                          ASL     R0                 ,PAR BIT MASK FOR NEXT PAR CHIP
017274  005237  003046                  INC     TMP0
017300  023727  003046  000003          CMP     TMP0,#3             DONE?
```

```
017306  001267                          BNE     6$
017310  000430                          BR      TST35           ;;EXIT

017312  013702  003046          7$      MOV     TMP0,R2
017316  006302                          ASL     R2              ;FORM OFFSET
017320  006302                          ASL     R2
017322  000162  017326                  JMP     9$(R2)          ;GO TO THE ERROR CALL
017326  104071                  9$      ERROR   71              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 0 (PAR0). PAR0 (BIT
                                                                ;1 IN STATUS REG) SHOULD BE A 0
017330  000717                          BR      3$
017332  104072                          ERROR   72              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 1 (PAR1)  PAR1 (BIT
                                                                ;2 IN STATUS REG) SHOULD BE A 0
017334  000715                          BR      3$
017336  104073                          ERROR   73              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                 FROM PAR CHIP 2 (PAR2)  PAR2 (BIT
                                                                ;3 IN STATUS REG) SHOULD BE A 0
017340  000713                          BR      3$

017342  013702  003046          8$      MOV     TMP0,R2
017346  006302                          ASL     R2
017350  006302                          ASL     R2
017352  000162  017356                  JMP     10$(R2)
017356  104071                  10$     ERROR   71              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 0 (PAR0)  PAR0 (BIT
                                                                ;1 IN STATUS REG) SHOULD BE A 1
017360  000735                          BR      5$
017362  104072                          ERROR   72              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 1 (PAR1)  PAR1 (BIT
                                                                ;2 IN STATUS REG) SHOULD BE A 1
017364  000733                          BR      5$
017366  104073                          ERROR   73              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 2 (PAR2)  PAR2 (BIT
                                                                ;3 IN STATUS REG) SHOULD BE A 1
017370  000731                          BR      5$
                                ;;*****************************************************************
                                ;TEST 35        TEST PARITY BIT STORAGE CHIPS, MARCHING 0'S AND 1'S
                                        ;THIS IS A TEST OF THE WCS PARITY BIT STORAGE CHIP (1 X 1K), AND
                                        ;IS KNOWN AS THE "MARCHING ONES AND ZEROES" TEST   THE MEMORY
                                        ;IS FIRST WRITTEN TO THE ALL ONES STATE   THEN SEQUENTIALLY,
                                        ;STARTING AT THE FIRST ADDRESS, THE ONE IS READ AND A
                                        ;ZERO IS WRITTEN   THIS SEQUENCE IS CONTINUED TO THE
                                         LAST LOCATION   AT THIS STAGE, THE DATA ARRAY IS FULL OF 0'S
                                        ;THEN STARTING AT THE HIGHEST LOCATION, A ZERO IS READ AND
                                         A ONE IS WRITTEN   THE ADDRESS IS DECREMENTED AND THE
                                        ;SEQUENCE IS REPEATED UNTILL THE LOWEST LOCATION IS REACHED
                                        ;THIS TEST WILL DETECT FAULTS IN THE INDIVIDUAL MEMORY CHIP
                                        ;ADDRESSING LINES AS WELL AS DATA PROBLEMS  GENERALLY, ADDRESSING
                                        ;FAULTS WILL SHOW UP IN REPEATED ERRORS WITH A DEFINITE FAILURE
                                        ;PATTERN
                                         THE TEST IS REPEATED FOR THE THREE PARITY BIT STORAGE CHIPS
                                        ;CHIP 0, SEGMENT 0, PAR 0,   ADDRESSES  0,1,2,
                                         CHIP 1, SEGMENT 1, PAR 1,   ADDRESSES  2000 2001
                                         CHIP 2, SEGMENT 2  PAR 2,   ADDRESSES  4000 4001
```

```
                                        ;;*****************************************************************
017372  000004                          TST35:  SCOPE
017374  012737  017750  003056                  MOV     #TST36,NXTST    ;STARTING ADDRESS OF NEXT TEST
017402  012777  000020  163424                  MOV     #PARDIS,@WCSST  ;DISABLE PARITY ERROR TRAPS
017410  012737  177766  003052                  MOV     #-10.,COUNT     ;DONT REPORT MORE THAN
017416  012737  177766  003054                  MOV     #-10.,COUNTO    ;10 ERRORS
017424  012703  077777                          MOV     #77777, R3              ;INITIALIZE DATA PATTERN
017430  005037  003046                          CLR     TMPO            ;SEGMENT NUMBER
017434  012700  000002                          MOV     #PARO,RO        ;PAR BIT MASK
017440  005037  003050                          CLR     TMP1

                                                ;FILL THE PARITY CHIP WITH 1 S

017444  013701  003050          6$              MOV     TMP1,R1
017450  012704  002000                          MOV     #1024 ,R4
017454  010177  163356          1$              MOV     R1,@WCSAR
017460  010377  163354                          MOV     R3,@WCSDR               ;WRITE A PATTERN (177777)
017464  005201                                  INC     R1              ;NEXT WCS ADDRESS
017466  077406                                  SOB     R4,1$           ;DONE?

                                                 WRITE AND READ "MARCHING 0'S"
                                                ;STARTING AT THE LOWEST ADDRESS, EACH LOCATION IS READ AND
                                                ;CHECKED IF IT WAS ALL 1'S, THEN IT IS WRITTEN WITH A 0
                                                ;THE TEST IS REPEATED INCREMENTALLY FOR ALL ADDRESSES

017470  012704  002000                          MOV     #1024 ,R4       ;INITAILIZE COUNT
017474  013701  003050                          MOV     TMP1,R1
017500  012737  017506  001110                  MOV     #2$,$LPERR      ;LOOP ON ERROR
017506  010177  163324          2$              MOV     R1,@WCSAR       ;ADDRESS THE WCS LOCATION
017512  017702  163322                          MOV     @WCSDR,R2
017516  017705  163312                          MOV     @WCSST,R5       ;READ PARITY BIT
017522  030005                                  BIT     RO,R5           PAR BIT SET?
017524  001010                                  BNE     3$              YES
017526  005237  003052                          INC     COUNT
017532  100005                                  BPL     3$
017534  010137  001162                          MOV     R1,$REG0        ;SAVE ADDRESS THAT WAS READ
017540  010537  001164                          MOV     R5,$REG1
017544  000451                                  BR      7$              ;REPORT ERROR
017546  005077  163266          3$              CLR     @WCSDR          ;WRITE A PATTERN (0) IN THIS LOCATION
017552  005201                                  INC     R1              POINT TO THE NEXT WCS LOC
017554  077424                                  SOB     R4 2$           ;DONE?

                                                ;AT THIS POINT, THE WCS PARITY CHIP (1X1F) SHOULD BE
                                                ;CLEARED   THE FOLLOWING IS A "MARCHING ONE" TEST   STARTING
                                                 AT THE HIGHEST ADDRESS, EACH LOCATION IS READ AND CHECKED
                                                ;IF IT WAS ALL 0'S, THEN IT IS WRITTEN TO BE ALL 1'S
                                                 THE SAME TEST IS REPEATED (DECREMENTALLY FOR ALL
                                                ;LOCATIONS

017556  005301                                  DEC     R1
017560  012704  002000                          MOV     #1024 ,R4       ;INITIALIZE COUNT
017564  012737  017572  001110                  MOV     #4$,$LPERR      ;LOOP ON ERROR
017572  010177  163240          4$              MOV     R1,@WCSAR       ADDRESS THE WCS LOC
017576  017702  163236                          MOV     @WCSDR,R2       READ THAT LOC
017602  017705  163226                          MOV     @WCSST,R5       READ PAR BIT
017606  030005                                  BIT     RO,R5           PAR BIT CLEAR?
```

```
017610  001410                          BEQ     5$              ;YES
017612  005237  003054                  INC     COUNTO
017616  100054                          BPL     TST36           ;;EXIT
017620  010137  001162                  MOV     R1,$REG0        ;SAVE WCS ADDRESS
017624  010537  001164                  MOV     R5,$REG1
017630  000433                          BR      8$              ;REPORT ERROR
017632  010377  163202          5$      MOV     R3,@WCSDR
017636  005301                          DEC     R1              ;POINT TO NEXT ADDRESS
017640  077424                          SOB     R4,4$           ;DONE?
017642  062737  002000  003050          ADD     #2000,TMP1
017650  006300                          ASL     R0              ;PAR BIT MASK FOR NEXT CHIP
017652  005237  003046                  INC     TMP0
017656  023727  003046  000003          CMP     TMP0,#3         ;DONE?
017664  001267                          BNE     6$

017666  000430                          BR      TST36           ;;EXIT

017670  013702  003046          7$      MOV     TMP0,R2
017674  006302                          ASL     R2              ;FORM OFFSET
017676  006302                          ASL     R2
017700  000162  017704                  JMP     9$(R2)  ;GO TO THE ERROR CALL
017704  104071                  9$      ERROR   71              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 0 (PAR0)  PAR0 (BIT
                                                                ;1 IN STATUS REG) SHOULD BE A 1
017706  000717                          BR      3$
017710  104072                          ERROR   72              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 1 (PAR1)  PAR1 (BIT
                                                                ;2 IN STATUS REG) SHOULD BE A 1
017712  000715                          BR      3$
017714  104073                          ERROR   73              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 2 (PAR2)  PAR2 (BIT
                                                                ;3 IN STATUS REG) SHOULD BE A 1
017716  000713                          BR      3$

017720  013702  003046          8$      MOV     TMP0,R2
017724  006302                          ASL     R2
017726  006302                          ASL     R2
017730  000162  017734                  JMP     10$(R2)
017734  104071                  10$     ERROR   71              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 0 (PAR0)  PAR0 (BIT
                                                                ;1 IN STATUS REG) SHOULD BE A 0
017736  000735                          BR      5$
017740  104072                          ERROR   72              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 1 (PAR1)  PAR1 (BIT
                                                                ;2 IN STATUS REG) SHOULD BE A 0
017742  000733                          BR      5$
017744  104073                          ERROR   73              ;CORRECT PARITY BIT WAS NOT READ BACK
                                                                ;FROM PAR CHIP 2 (PAR2)  PAR2 (BIT
                                                                ;3 IN STATUS REG) SHOULD BE A 0
017746  000731                          BR      5$
                                ;;;
```

```
                                                  ;THIS RANGE.  IF THE TIMER IS NON-OPERATIONAL THE RESULTS OF
                                                  ;SUBSEQUENT TESTS WHICH USE THE TIMER MAY NOT BE CORRECT
                                          ;;*****************************************************************
017750  000004                            TST36   SCOPE
017752  012737  020052  003056                    MOV     #TST37,NXTST    ;STARTING ADDRESS OF NEXT TEST

017760  012702  177160                            MOV     #-400 ,R2       ;COUNT
017764  012737  020030  000114                    MOV     #3$,@#114       ;TIMEOUT VECTOR FOR WCS WATCH DOG
017772  012777  001000  163034                    MOV     #MAINT,@WCSST   ;ENABLE TIMER

020000  005777  163034                            TST     @WCSDR          ;KICK OFF THE THE WCS TIMER
020004  005202                            1$      INC     R2              ;KEEP TIME
020006  001376                                    BNE     1$              ;WAITED ENOUGH?
                                                                          ;YES, THE WCS WATCH DOG DID
                                                                          ;NOT TIME OUT-REPORT ERROR
020010  042777  001000  163016                    BIC     #MAINT,@WCSST   ;SHUT OFF TIMER
020016  012737  003344  000114                    MOV     #BADPAR,@#114
020024  104064                                    ERROR   64              ;WCS-WATCH-DOG TIMER DID NOT
                                                                          ;TIME OUT AS REQUIRED  THE
                                                                          ;PROGRAM WAITED FOR 2-56 SECTENDS
                                                                          ;BEFORE GIVING THIS ERROR,
                                                                          ;NORMALLY THE WCS-WATCH-DOG
                                                                          ;SHOULD TIME OUT BETWEEN
                                                                          ;70-150 M S
020026  000411                                    BR      TST37           ;;EXIT
                                                                          ;ENTER HERE WHEN WCS WATCH DOG TIMER-OUT

020030  022626                            3$      CMP     (SP)+,(SP)+     ;RESTORE STACK
020032  012777  000020  162774                    MOV     #PARDIS,@WCSST  ;CLEAR ERROR B T 15
020040  005077  162770                            CLR     @WCSST
020044  012737  003344  000114                    MOV     #BADPAR,@#114

                                          ;;*****************************************************************
                                          ;*TEST 37        CHECK THE WCS INITIALIZATION BY BM MICRO-CODE
                                          ;*****************************************************************
020052  000004                            TST37   SCOPE
020054  012737  020250  003056                    MOV     #TST40,NXTST    ;STARTING ADDRESS OF NEXT TEST
020062  005002                                    CLR     R2              ;ERROR COUNT

                                                  ;WRITE WRONG PARITY IN THE ENTIRE WCS ARRAY

020064  012777  000060  162742                    MOV     #WWP+PARDIS @WCSST      ;DISABLE PARITY TRAPS, WWP
020072  005001                                    CLR     R1
020074  010177  162736                    1$      MOV     R1 @WCSAR               ;WRITE WRONG PARITY INTO
020100  005077  162734                            CLR     @WCSDR                  ;THIS WCS LOC
020104  005201                                    INC     R1                      ;NEXT LOC
020106  020127  006000                            CMP     R1,#6000        ;DONE?
020112  001370                                    BNE     1$
020114  042777  000040  162712                    BIC     #WWP,@WCSST     ;CLEAR WWP

                                                  ;INITIALIZE THE WCS DATA ARRAY BY SETTING BITS 15 AND 10 IN
                                                  ;THE INIT REGISTER IN THE BASE MACHINE (BM)  INITIALIZATION CLEANS
                                                  ;UP BAD PARITY, IF PRESENT  IN THE WCS   NOTE, SIMILIAR INIT-
                                                  ;-IALIZATION IS DONE BY BASE MACHINE ON POWER-UP IF WCS IS PRESENT
```

```
020122  012700  102000                  MOV     #BIT15+BIT10,R0 ,SET THESE BITS IN "INIT" REGISTER
020126  076600                          MED
020130  000352                          352                     ;MED CODE FOR "INIT"

                                        ,READ THE WCS DATA ARRAY  THE INITIALIZATION MICRO-CODE SHOULD HAVE
                                        ,CLEANED UP THE WCS ARRAY, HENCE WCS PARITY ERROR SHOULD NOT OCCUR

020132  012737  020170  000114          MOV     #4$,@#114       ,PARITY TRAP VECTOR
020140  005077  162670                  CLR     @WCSST          ,CLEAR UP PARDIS
020144  005000                          CLR     R0

020146  010077  162664          2$      MOV     R0,@WCSAR       ,READ THE WCS
020152  017701  162662                  MOV     @WCSDR,R1       ,ARRAY
020156  005200                  3$      INC     R0              ,NEXT LOC
020160  020027  006000                  CMP     R0,#6000        ,DONE?
020164  001370                          BNE     2$
020166  000425                          BR      6$

                                        ,ENTER HERE IF A PARITY ERROR OCCURS ON READING WCS

020170  005777  162640          4$      TST     @WCSST          ,PARITY ERROR FROM WCS?
020174  100020                          BPL     5$              ,NO
020176  012777  000020  162630          MOV     #PARDIS,@WCSST  ,CLEAR ERROR
020204  005077  162624                  CLR     @WCSST          ,CLEAR PARDIS
020210  022626                          CMP     (SP)+,(SP)+     ,POP THE STACK
020212  017737  162616  001162          MOV     @WCSST,$REG0    ,SAVE STATUS
020220  020227  000012                  CMP     R2,#10          ,DONT REPORT MORE THAN 10 ERRORS
020224  101006                          BHI     6$

020226  010037  001164                  MOV     R0,$REG1        ,SAVE WCS ADDRESS WHICH GAVE PARITY ERROR
020232  104067                          ERROR   67              ,PARITY ERROR TRAP OCCURED ON
                                                                 READING WCS LOC (GIVEN IN ERROR MESSAGE)
                                                                ,THIS INDICATES THAT THE BASE MACHINE
                                                                ,INITIALIZATION MICROCODE DID NOT CLEAN
                                                                ,UP THE BAD PARITY IN THE WCS  (BAD PARITY
                                                                ,WAS WRITTEN, PREVIOUSLY, IN THE WCS)

020234  000750                          BR      3$

                                        ;ENTER HERE IF A PARITY ERROR OCCURED AND IT WAS NOT FROM THE WCS

020236  000137  003344          5$      JMP     BADPAR          ,GO TO COMMON PARITY ERROR HANDLER

020242  012737  003344  000114  6$      MOV     #BADPAR,@#114   ,REESTABLISH PARITY TRAP VECTOR
```

```
                                        SBTTL  ---TEST OF WCS XFC OPCODE DISPATCH---
                                 ,,*****************************************************************
                                 ,*TEST 40       CHECK "OTHER USER" DISPATCH TO 6001, XFC=076000-076077
                                         ,THIS TEST CHECKS THE "OTHER USER" DISPATCH OF THE XFC
                                         ,INSTRUCTION TO 6001   THE XFC OPCODE GROUP CHECKED
                                         ,IN THIS TEST IS 076000-076077   WHEN AN XFC
                                         ,OPCODE FROM THIS GROUP  S EXECUTED, THE BASE MACHINE
                                         ,SHOULD TRANSFER CONTROL TO THE WCS, THE ENTRY
                                         ,POINT IN THE WCS IS 6001 (MICRO-ADDRESS IN
                                         ,PAGE6)
                                         ,THE TEST SEQUENCE IS AS FOLLOWING.

                                         ,MICRODE IS LOADED INTO THE WCS FOR SERVICING THE DISPATCH
                                         ,AT 6001  THE LOADED MICRO CODE FUNCTIONS IS TO READ
                                         ,CSP MD  AND WRITE IT IN R3 (BOTH A&B SIDE)

                                         ,AN XFC OP-CODE IS EXECUTED
                                         ,THE CONTROL SHOULD TRANSFER TO 6001 IN WCS AND
                                         ,MICRO-CODE GETS EXECUTED  RETURN IS MADE BACK TO
                                         ,BASE MACHINE

                                         ,UPON RETURN TO THE BASE MACHINE, IT IS CHECKED IF
                                          THE CORRECT XFC-OPCODE WAS SAVED IN R3
                                         ,(FROM CSP MD ) WHILE RUNNING FROM WCS

                                          IF CORRECT OP-CODE WAS NOT SAVED AN ERROR IS REPORTED

                                          THE ABOVE SEQUENCE IS REPEATED FOR ALL THE XFC
                                          OP-CODES IN THE GROUP
                                         ,THIS TEST USES THE WCS WATCH-DOG-TIMER  IF, AS A RESULT
                                         ,OF SOME FAULTY CONDITION, THE CONTROL IS NOT
                                          TRANSFERRED  BACK TO THE BASE MACHINE THE WATCH-DOG
                                          TIMES OUT AND A TRAP TO 114 OCCURS

                                          FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                  BASE MACHINE XFC DECODE AND DISPATCH
                                         ,        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                         ,        CONTROL-PATH USED BY THE MICRO-CODE EXECUTING FROM
                                         ,        THE WCS  (NUA<9 0>, ARRAY ADDRESS MUX-APORT,
                                         ,        BUS-U MUX-BPORT,BUS-U LINES
                                 ,*****************************************************************
020250  000004                   TST40   SCOPE
020252  012737  020420  003056           MOV     #TST41,NXTST     ,STARTING ADDRESS OF NEXT TEST
020260  012700  000100                   MOV     #100,R0          ,LOAD COUNT
020264  012701  076000                   MOV     #76000,R1        ,INITIALIZE XFC OPCODE
020270  004537  037472                   JSR     R5 LDWCS         ,LOAD WCS STARTING AT THIS
020274  006151                           6151                     ,WCS ADDRESS (IN CONTROL SPACE
020276  061760                           MXFC1                     FROM THIS MEMORY LOCATION
020300  006001                           OTHDIS                   ,ENTRY POINT INTO WCS
```

```
020302  010137  020326          1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
020306  012737  020370  000114          MOV     #4$,@#114       ;SET UP SERVICE VECTOR FOR WCS
                                                                ;WATCH DOG TIMEOUT
020314  012777  001000  162512          MOV     #MAINT,@WCSST   ;SET MAINTENANCE BIT
020322  005777  162512                  TST     @WCSDR          ;KICK OFF THE WATCH-DOG TIMER

020326  000000                  2$      WORD    0               ;THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                ;TO BE EXECUTED  AT THIS POINT CONTROL
                                                                ;IS TRANSFERRED TO THE WCS


                                                                ;RETURN FROM WCS OCCURS HERE
020330  042777  001000  162476          BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
020336  012737  003344  000114          MOV     #BADPAR,@#114
020344  020301                          CMP     R3,R1           ;WAS CORRECT OPCODE SAVED IN R4,
                                                                ;WHILE IN WCS?
020346  001405                          BEQ     3$              ;YES
020350  010137  001162                  MOV     R1,$REG0        ;EXPCTD XFC CODE
020354  010337  001164                  MOV     R3,$REG1        ;CODE RECVD
020360  104030                          ERROR   30              ;CORRECT XFC OPCODE WAS NOT SAVED IN R3
                                                                ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                ;NOTE, THAT XFC OPCODE SHOULD HAVE
                                                                ;TRANSFERRED CONTROL TO THE WCS


020362  005201                  3$      INC     R1              ;NEXT XFC OPCODE
020364  077032                          SOB     R0,1$           ;DONE?
020366  000414                          BR      TST41           ;;EXIT

                                        ;ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                        ;AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                        ;WCS) TO THE BASE MACHINE

020370  022626                  4$      CMP     (SP)+,(SP)+     ;POP THE STACK

020372  012737  003344  000114          MOV     #BADPAR,@#114
020400  012777  000020  162426          MOV     #PARDIS,@WCSST
020406  005077  162422                  CLR     @WCSST
020412  010137  001162                  MOV     R1,$REG0        ;XFC OP-CODE
020416  104031                          ERROR   31              ;WCS WATCH DOG TIMER TIMED OUT
                                                                ;UPON TRANSFERRING CONTROL FROM THE
                                                                ;BASE MACHINE TO THE WCS MICO-CODE
                                                                ;NORMALLY, AFTER UCODE EXECUTION
                                                                ;CONTROL SHOULD HAVE RETURNED TO
                                                                ;BASE MACHINE


                                ;;*****************************************************************
                                #TEST 41        CHECK "OTHER USER" DISPATCH TO 6011, XFC=076100-076177
                                        ;THIS TEST CHECKS THE "OTHER USER" DISPATCH OF THE XFC
                                        ;INSTRUCTION TO 6011  THE XFC OPCODE GROUP CHECKED
                                        ;IN THIS TEST IS 076100-076177  WHEN AN XFC
                                         OPCODE FROM THIS GROUP IS EXECUTED, THE BASE MACHINE
                                        ;SHOULD TRANSFER CONTROL TO THE WCS, THE ENTRY
```

```
                                                ;POINT IN THE WCS IN 6011 (MICRO-ADDRESS IN
                                                ;PAGE 6).
                                                ;THE TEST SEQUENCE IS AS FOLLOWING

                                                ;MICRODE IS LOADED INTO THE WCS FOR SERVICING THE DISPATCH
                                                ;AT 6011. THE LOADED MICRO CODES FUNCTIONS IS TO READ
                                                ;CSP MD  AND WRITE IT IN R3(BOTH A&B SIDE)

                                                ;AN XFC OP-CODE IS EXECUTED
                                                ;THE CONTROL SHOULD TRANSFER TO 6011 IN WCS AND
                                                ;MICRO-CODE GETS EXECUTED  RETURN IS MADE BACK TO
                                                ;BASE MACHINE.

                                                ;UPON RETURN TO THE BASE MACHINE, IT IS CHECKED IF
                                                ;THE CORRECT XFC-OPCODE WAS SAVED IN R3
                                                ;(FROM CSP MD  WHILE RUNNING FROM WCS

                                                ;IF CORRECT OP-CODE WAS NOT SAVED AN ERROR IS REPORTD

                                                ;THE ABOVE SEQUENCE IS REPEATED FOR ALL THE XFC
                                                ;OP-CODES IN THE GROUP.
                                                ;THIS TEST USES THE WCS WATCH-DOG-TIMES  IF, AS A RESULT
                                                ;OF SOME FAULTY CONDITION, THE CONTROL IS NOT
                                                ;TRANSFERRED BACK TO THE BASE MACHINE THE WATCH-DOG
                                                ;TIMES OUT AND A TRAP TO 114 OCCURS

                                                ;FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                ;       BASE MACHINE XFC DECODE AND DISPATCH
                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCU T
                                                ;       CONTROL-PATH USED BY THE MIRO-CODE EXECUTING FROM
                                                ;       THE WCS. (NUA<9 0>,ARRAY ADDRESS MUX-APORT,
                                                ;       BUS-U MUS-BPORT, BUS-U LINES
                                        ;;*****************************************************************
020420  000004                          TST41   SCOPE
020422  012737  020570  003056                  MOV     #TST42,NXTST    ;STARTING ADDRESS OF NEXT TEST
020430  012700  000100                          MOV     #100,R0         ;LOAD COUNT
020434  012701  076100                          MOV     #76100,R1       ;INITIALIZE XFC OPCODE
020440  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
020444  006351                                  6351                    ;MAIN-CONTROL-BLOCK LOADED HERE
020446  062012                                  MXFC11                  ;FROM THIS MEMORY LOCATION
020450  006011                                  OTH11                   ;ENTRY POINT UNITS WCS

020452  010137  020476                  1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
020456  012737  020540  000114                  MOV     #4$,@#114       ;SET UP SERVICE VECTOR FOR WCS
                                                                        ;WATCH DOG TIMEOUT
020464  012777  001000  162342                  MOV     #MAINT,@WCSST   ;SET MAINTENANCE BIT
020472  005777  162342                          TST     @WCSDR          ;KICK OFF THE WATCH-DOG TIMER

020476  000000                          2$       WORD   0               ;THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                        ;TO BE EXECUTED   AT THIS POINT CONTROL
                                                                        ;IS TRANSFERRED TO THE WCS


                                                                        ;RETURN FROM WCS OCCURS HERE
020500  042777  001000  162326                  BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
020506  012737  003344  000114                  MOV     #BADPAR,@#114
020514  020301                                  CMP     R3,R1            WAS CORRECT OPCODE SAVED ( F4
```

```
020516  001405                          BEQ     3$              ;WHILE IN WCS?
020520  010137  001162                  MOV     R1,$REG0        ;YES
020524  010337  001164                  MOV     R3,$REG1        ;EXPCTD XFC CODE
020530  104030                          ERROR   30              ;CODE RECVD
                                                                ;CORRECT XFC OPCODE WAS NOT SAVED IN R3
                                                                ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                ;NOTE, THAT XFC OPCODE SHOULD HAVE
                                                                ;TRANSFERRED CONTROL TO THE WCS

020532  005201                  3$      INC     R1              ;NEXT XFC OPCODE
020534  077032                          SOB     R0,1$           ;DONE?
020536  000414                          BR      TST42           ;;EXIT

                                        ;ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                        ;AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                        ;WCS) TO THE BASE MACHINE

020540  022626                  4$      CMP     (SP)+,(SP)+     ;POP THE STACK

020542  012737  003344  000114          MOV     #BADPAR,@#114
020550  012777  000020  162256          MOV     #FARDIS,@WCSST
020556  005077  162252                  CLR     @WCSST
020562  010137  001162                  MOV     R1,$REG0        ;XFC OPCODE
020566  104031                          ERROR   31              ;WCS WATCH DOG TIMER TIMED OUT
                                                                ;UPON TRANSFERRING CONTROL FROM THE
                                                                ;BASE MACHINE TO THE WCS MICO-CODE
                                                                ;NORMALLY, AFTER UCODE EXECUTION
                                                                ;CONTROL SHOULD HAVE RETURNED TO
                                                                ;BASE MACHINE

                                ;;*****************************************************************
                                *TEST 42        CHECK "OTHER USER" DISPATCH TO 6012, XFC=076200-076277
                                        ;THIS TEST CHECKS THE "OTHER USER" DISPATCH OF THE XFC
                                        ;INSTRUCTION TO 6012  THE XFC OPCODE GROUP CHECKED
                                        ;IN THIS TEST IS 076200-076277  WHEN AN XFC
                                        ;OPCODE FROM THIS GROUP IS EXECUTED, THE BASE MACHINE
                                         SHOULD TRANSFER CONTROL TO THE WCS, THE ENTRY
                                        ;POINT IN THE WCS IS 6012 (MICRO-ADDRESS IN
                                        ;PAGE 6
                                         THE TEST SEQUENCE IS AS FOLLOWING

                                         MICRODE IS LOADED INTO THE WCS FOR SERVICING THE DISPATCH
                                        ;AT 6012  THE LOADED MICRO CODES FUNCTION IS TO READ
                                        ;CSP MD  AND WRITE IT IN R3(BOTH A&B SIDE)

                                        ;AN XFC OP-CODE IS EXECUTED
                                        ;THE CONTROL SHOULD TRANSFER TO 6012 IN WCS AND
                                        ;MICRO-CODE GETS EXECUTED  RETURN IS MADE BACK TO
                                         BASE MACHINE

                                        ;UPON RETURN TO THE BASE MACHINE  IT IS CHECKED IF
```

```
                                                  ;THE CORRECT XFC-OPCODE WAS SAVED IN R3
                                                   (FROM CSP MD ) WHILE RUNNING FROM WCS

                                                  ;IF CORRECT OP-CODE WAS NOT SAVED AN ERROR IS REPORTED

                                                  ;THE ABOVE SEQUENCE IS REPEATED FOR ALL THE XFC
                                                  ;OP-CODES IN THE GROUP
                                                  ;THIS TEST USES THE WCS WATCH-DOG-TIMER  IF, AS A RESULT
                                                  ;OF SOME FAULTY CONDITION, THE CONTROL IS NOT
                                                  ;TRANSFERRED BACK TO THE BASE MACHINE THE WATCH-DOG
                                                  ;TIMES OUT AND A TRAP TO 114 OCCURS.


                                                  ;FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                  ;       BASE MACHINE XFC DECODE AND DISPATCH
                                                  ;       TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                                  ;       CONTROL-PATH USED BY THE MICRO-CODE EXECUTING FROM
                                                  ;       THE WCS. (NUA<9 0>, ARRAY ADDRESS MUS-APORT,
                                                  ;       BUS-U MUX-BPORT,BUS-U LINES
                                          ;;*****************************************************************
020570  000004                          TST42.  SCOPE
020572  012737  020740  003056                  MOV     #TST43,NXTST    ;STARTING ADDRESS OF NEXT TEST
020600  012700  000100                          MOV     #100,R0         ;LOAD COUNT
020604  012701  076200                          MOV     #76200,R1       ;INITIALIZE XFC OPCODE
020610  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
020614  006361                                  6361                    ;MAIN-CONTROL-BLOCK LOADED HERE
020616  062044                                  MXFC12                  ;FROM THIS MEMORY LOCATION
020620  006012                                  OTH12                   ;ENTRY POINT INTO WCS

020622  010137  020646                  1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
020626  012737  020710  000114                  MOV     #4$,@#114       ;SET UP SERVICE VECTOR FOR WCS
                                                                        ;WATCH DOG TIMEOUT
020634  012777  001000  162172                  MOV     #MAINT,@WCSST   ;SET MAINTENANCE BIT
020642  005777  162172                          TST     @WCSDR          ;KICK OFF THE WATCH-DOG TIMER

020646  000000                          2$       WORD   0               ;THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                        ;TO BE EXECUTED   AT THIS POINT CONTROL
                                                                        ;IS TRANSFERRED TO THE WCS


                                                                        ;RETURN FROM WCS OCCURS HERE
020650  042777  001000  162156                  BIC     #MAINT,@WCSST    SHUT OFF THE TIMER
020656  012737  003344  000114                  MOV     #BADPAR,@#114
020664  020301                                  CMP     R3,R1           ;WAS CORRECT OPCODE SAVED IN R4,
                                                                        ;WHILE IN WCS?
020666  001405                                  BEQ     3$              ;YES
020670  010137  001162                          MOV     R1,$REG0        ;EXPCTD XFC CODE
020674  010337  001164                          MOV     R3,$REG1        ;CODE RECVD
020700  104030                                  ERROR   30              ;**CORRECT XFC OPCODE WAS NOT SAVED
                                                                        ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                        ;NOTE, THAT XFC OPCODE SHOULD HAVE
                                                                        ;TRANSFERRED CONTROL TO THE WCS


020702  005201                          3$      INC     R1               NEXT XFC OPCODE
020704  077032                                  SOB     R0,1$           ;DONE?
020706  000414                                  BR      TST42           ;;EXIT
```

```
                                        ;ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                        ;AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                        ;WCS) TO THE BASE MACHINE

020710  022626                  4$      CMP     (SP)+,(SP)+     ;POP THE STACK

020712  012737  003344  000114          MOV     #BADPAR,@#114
020720  012777  000020  162106          MOV     #PARDIS,@WCSST
020726  005077  162102                  CLR     @WCSST
020732  010137  001162                  MOV     R1,$REG0
020736  104031                          ERROR   31              ;**WCS WATCH DOG TIMER TIMED OUT


                                ;*****************************************************************
                                *TEST 43        CHECK "OTHER USER" DISPATCH TO 6013, XFC=076300-076377
                                        ;THIS TEST CHECKS THE "OTHER USER" DISPATCH OF THE XFC
                                        ;INSTRUCTION TO 6013  THE XFC OPCODE GROUP CHECKED
                                        ;IN THIS TEST IS 076300-76377  WHEN AN XFC
                                        ;OPCODE FROM THIS GROUP IS EXECUTED, THE BASE MACHINE
                                        ;SHOULD TRANSFER CONTROL TO THE WCS, THE ENTRY
                                        ;POINT IN THE WCS IS 6013 (MICRO-ADDRESS IN
                                        ;PAGE 6
                                        ;THE TEST SEQUENCE IS AS FOLLOWING

                                        ;MICRODE IS LOADED INTO THE WCS FOR SERVICING THE DISPATCH
                                        AT 6013  THE LOADED MICRO CODES FUNCTION IS TO READ
                                        CSP MD  AND WRITE IT IN R3(BOTH A&B SIDE)

                                        ;AN XFC OP-CODE IS EXECUTED
                                        ;THE CONTROL SHOULD TRANSFER TO 6013 IN WCS AND
                                        MICRO-CODE GETS EXECUTED  RETURN IS MADE BACK TO
                                        ;BASE MACHINE

                                        ;UPON RETURN TO THE BASE MACHINE, IT IS CHECKED IF
                                        THE CORRECT XFC-OPCODE WAS SAVED IN R3
                                        (FROM CSP MD  WHILE RUNNING FROM WCS

                                        IF CORRECT OP-CODE WAS NOT SAVED AN ERROR IS REPORTED

                                        ;THE ABOVE SEQUENCE IS REPEATED FOR ALL THE XFC
                                        OP-CODE IN THE GROUP

                                        ;THIS TEST USES THE WCS WATCH-DOG-TIMES  IF, AS A RESULT
                                        OF SOME FAULTY CONDITION, THE CONTROL IS NOT
                                        ;TRANSFERRED BACK TO THE BASE MACHINE THE WATCH-DOG
                                        TIMES OUT AND A TRAP TO 114 OCCURS

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                BASE MACHINE XFC DECODE AND DISPATCH
                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                                CONTROL-PATH USED BY THE MICRO-CODE EXECUTING FROM
                                                THE WCS (NUA<9 0>, ARRAY ADDRESS MUX-APORT,
                                                BUS-U MUX-BPORT,BUS-U LINES
```

```
                                        ;;*****************************************************************
020740  000004                          TST43   SCOPE
020742  012737  021110  003056                  MOV     #TST44,NXTST    ;STARTING ADDRESS OF NEXT TEST
020750  012700  000100                          MOV     #100,R0         ;LOAD COUNT
020754  012701  076300                          MOV     #76300,R1       ;INITIALIZE XFC OPCODE
020760  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
020764  006371                                  6371                    ;MAIN CONTROL BLOCK LOADED HERE
020766  062076                                  MXFC13                  ;FROMTHIS MEMORY ADDRESS
020770  006013                                  OTH13                   ;ENTRY POINT INTO WCS

020772  010137  021016                  1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
020776  012737  021060  000114                  MOV     #4$,@#114       ;SET UP SERVICE VECTOR FOR WCS
                                                                        ;WATCH DOG TIMEOUT
021004  012777  001000  162022                  MOV     #MAINT,@WCSST   ;SET MAINTENANCE BIT
021012  005777  162022                          TST     @WCSDP          ;KICK OFF THE WATCH-DOG TIMER

021016  000000                          2$      WORD    0               ;THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                        ;TO BE EXECUTED   AT THIS POINT CONTROL
                                                                        ;IS TRANSFERRED TO THE WCS


                                                                        ;RETURN FROM WCS OCCURS HERE
021020  042777  001000  162006                  BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
021026  012737  003344  000114                  MOV     #BADPAR,@#114
021034  020301                                  CMP     R3 R1           ;WAS CORRECT OPCODE SAVED IN R4,
                                                                         WHILE IN WCS?

021036  001405                                  BEQ     3$              ;YES
021040  010137  001162                          MOV     R1,$REG0        ;EXPCTD XFC CODE
021044  010337  001164                          MOV     R3,$REG1        ;CODE RECVD
021050  104030                                  ERROR   30              ;CORRECT XFC OPCODE WAS NOT SAVED IN R3
                                                                        ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                        ;NOTE, THAT XFC OPCODE SHOULD HAVE
                                                                        ;TRANSFERRED CONTROL TO THE WCS

021052  005201                          3$      INC     R1              ;NEXT XFC OPCODE
021054  077032                                  SOB     R0,1$           ;DONE?
021056  000414                                  BR      TST44           ;;EXIT

                                                ;ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                                ;AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                                ;WCS) TO THE BASE MACHINE

021060  022626                          4$      CMP     (SP)+,(SP)+     ;POP THE STACK

021062  012737  003344  000114                  MOV     #BADPAR,@#114
021070  012777  000020  161736                  MOV     #PARDIS,@WCSST
021076  005077  161732                          CLR     @WCSST
021102  010137  001162                          MOV     R1,$REG0
021106  104031                                  ERROR   31              **WCS WATCH DOG TIMER TIMED OUT


                                        ;*****************************************************************
                                        *TEST 44        CHECK "OTHER USER" DISPATCH TO 6014, XFC=076400-076477
                                                ;THIS TEST CHECKS THE "OTHER USER" DISPATCH OF THE XFC
```

```
                                        ;INSTRUCTION TO 6014  THE XFC OPCODE GROUP CHECKED
                                        ;IN THIS TEST IS 076400-076477. WHEN AN XFC
                                        ;OPCODE FROM THIS GROUP IS EXECUTED, THE BASE MACHINE
                                        ;SHOULD TRANSFER CONTROL TO THE WCS; THE ENTRY
                                        ;POINT IN THE WCS IS 6014 (MICRO-ADDRESS IN
                                        ;PAGE 6
                                        ;THE TEST SEQUENCE IS AS FOLLOWING

                                        ;MICRODE IS LOADED INTO THE WCS FOR SERVICING THE DISPATCH
                                        ;AT 6014  THE LOADED MICRO CODES FUNCTION IS TO READ
                                        ;CSP MD  AND WRITE IT IN R3(BOTH A&B SIDE)

                                        ;AN XFC OP-CODE IS EXECUTED
                                        ;THE CONTROL SHOULD TRANSFER TO 6014 IN WCS AND
                                        ;MICRO-CODE GETS EXECUTED  RETURN IS MADE BACK TO
                                        ;BASE MACHINE

                                        ;UPON RETURN TO THE BASE MACHINE, IT IS CHECKED IF
                                        ;THE CORRECT XFC-OPCODE WAS SAVED IN R3
                                        ;(FROM CSP MD  WHILE RUNNING FROM WCS

                                        ;IF CORRECT OP-CODE WAS NOT SAVED AN ERROR IS REPORTED

                                        ;THE ABOVE SEQUENCE IS REPEATED FOR ALL THE XFC
                                        ;OP-CODES IN THE GROUP

                                        ;THIS TEST USES THE WCS WATCH-DOG-TIMES  IF, AS A RESLLT
                                        ;OF SOME FAULTY CONDITION, THE CONTROL IS NOT
                                         TRANSFERRED BACK TO THE BASE MACHINE THE WATCH-DOG
                                        ;TIMES OUT AND A TRAP TO 114 OCCURS

                                         FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                BASE MACHINE XFC DECODE AND DISPATCH
                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                                CONTROL-PATH USED BY THE MICRO-CODE EXECUTING FROM
                                                THE WCS (NUA<9 0>, ARRAY ADDRESS MUX-APORT,
                                                BUS-U MUX-BPORT,BUS-U LINES
                                ;;*****************************************************************
021110  006004                  TST44   SCOPE
021112  012737  021260  003056          MOV     #TST45,NXTST    ;STARTING ADDRESS OF NEXT TEST
021120  012700  000100                  MOV     #100,R0         ;LOAD COUNT
021124  012701  076400                  MOV     #76400 R1       ;INITIALIZE XFC OPCODE
021130  004537  037472                  JSR     R5 LDWCS        ;LOAD WCS WITH MICRO-CODE
021134  006401                          6401                    ;MAIN-CONTROL-BLOCK LOADED HERE
021136  062130                          MXFC14                  ;FROM THIS MEMORY ADRES
021140  006014                          OTH14                   ;ENTRY POINT INTO WCS

021142  010137  021166          1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
021146  012737  021230  000114          MOV     #4$,@#114       ;SET UP SERVICE VECTOR FOR WCS
                                                                ;WATCH DOG TIMEOUT
021154  012777  001000  161652          MOV     #MAINT.@WCSST   ;SET MAINTENANCE BIT
021162  005777  161652                  TST     @WCSDR          ;KICK OFF THE WATCH-DOG TIMER

021166  000000                  2$       WORD   0               ;THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                ;TO BE EXECUTED   AT THIS POINT CONTROL
                                                                 IS TRANSFERRED TO THE WCS
```

```
021170  042777  001000  161636          BIC     #MAINT,@WCSST     ;RETURN FROM WCS OCCURS HERE
021176  012737  003344  000114          MOV     #BADPAR,@#114     ;SHUT OFF THE TIMER
021204  020301                          CMP     R3,R1             ;WAS CORRECT OPCODE SAVED IN R4,
                                                                  ;WHILE IN WCS?
021206  001405                          BEQ     3$                ;YES
021210  010137  001162                  MOV     R1,$REG0          ;EXPCTD XFC CODE
021214  010337  001164                  MOV     R3,$REG1          ;CODE RECVD
021220  104030                          ERROR   30                ;CORRECT XFC OPCODE WAS NOT SAVED
                                                                  ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                  ;NOTE, THAT XFC OPCODE SHOULD HAVE
                                                                  ;TRANSFERRED CONTROL TO THE WCS

021222  005201                  3$      INC     R1                ;NEXT XFC OPCODE
021224  077032                          SOB     R0,1$             ;DONE?
021226  000414                          BR      TST45             ;;EXIT

                                        ;ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                        ;AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                        ;WCS) TO THE BASE MACHINE

021230  022626                  4$      CMP     (SP)+,(SP)+       ;POP THE STACK

021232  012737  003344  000114          MOV     #BADPAR,@#114
021240  012777  000020  161566          MOV     #PARDIS,@WCSST
021246  005077  161562                  CLR     @WCSST
021252  010137  001162                  MOV     R1,$REG0          ;XFC OPCODE
021256  104031                          ERROR   31                ;WCS WATCH DOG TIMER TIMED OUT
                                                                  ;UPON TRANSFERRING CONTROL FROM
                                                                  ;BASE MACHINE TO WCS MICROCODE
                                                                  ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                   SHOULD BE RETURNED TO BASE MACHINE


                                ***************************************************************
                                *TEST 45        CHECK "OTHER USER" DISPATCH TO 6015, XFC=076500-076577
                                        ;THIS TEST CHECKS THE "OTHER USER" DISPATCH OF THE XFC
                                        ;INSTRUCTION TO 6015  THE XFC OPCODE GROUP CHECKED
                                        ;IN THIS TEST IS 076500-076577  WHEN AN XFC
                                         OPCODE FROM THIS GROUP IS EXECUTED, THE BASE MACHINE
                                        ;SHOULD TRANSFER CONTROL TO THE WCS, THE ENTRY
                                         POINT IN THE WCS IS 6015 (MICRO-ADDRESS IN
                                        ;PAGE 6
                                         THE TEST SEQUENCE IS AS FOLLOWING

                                        ;MICRODE IS LOADED INTO THE WCS FOR SERVICING THE DISPATCH
                                         AT 6015  THE LOADED MICRO CODES FUNCTION IS TO READ
                                        ;CSP MD  AND WRITE IT IN R3(BOTH A&B SIDE)

                                         AN XFC OP-CODE IS EXECUTED
                                         THE CONTROL SHOULD TRANSFER TO 6015 IN WCS AND
```

```
                                                ;MICRO-CODE GETS EXECUTED  RETURN IS MADE BACK TO
                                                 BASE MACHINE

                                                ;UPON RETURN TO THE BASE MACHINE, IT IS CHECKED IF
                                                ;THE CORRECT XFC-OPCODE WAS SAVED IN R3
                                                ;(FROM CSP MD  WHILE RUNNING FROM WCS

                                                ;IF CORRECT OP-CODE WAS NOT SAVED AN ERROR IS REPORTED

                                                ;THE ABOVE SEQUENCE IS REPEATED FOR ALL THE XFC
                                                 OP-CODES IN THE GROUP

                                                ;THIS TEST USES THE WCS WATCH-DOG-TIMES  IF, AS A RESULT
                                                ;OF SOME FAULTY CONDITION, THE CONTROL IS NOT
                                                ;TRANSFERRED BACK TO THE BASE MACHINE THE WATCH-DOG
                                                 TIMES OUT AND A TRAP TO 114 OCCURS

                                                 FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                ;       BASE MACHINE XFC DECODE AND DISPATCH
                                                ;       TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                                ;       CONTROL-PATH USED BY THE MICRO-CODE EXECUTING FROM
                                                ;       THE WCS (NUA<9 0>, ARRAY ADDRESS MUX-APORT,
                                                ;       BUS-U MUX-BPORT,BUS-U LINES
                                        ;*****************************************************************
021260  000004                  TST45   SCOPE
021262  012737  021430  000056          MOV     #TST46,NXTST    ;STARTING ADDRESS OF NEXT TEST
021270  012700  000100                  MOV     #100,R0         ;LOAD COUNT
021274  012701  076500                  MOV     #76500,R1       ;INITIALIZE XFC OPCODE
021300  004537  037472                  JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
021304  006405                          6405                    ;MAIN-CONTROL-BLOCK LOADED HERE
021306  062162                          MXFC15                  ;FROM THIS MEMORY ADRES
021310  006015                          OTH15                   ;ENTRY POINT INTO WCS

021312  010137  021336          1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
021316  012737  021400  000114          MOV     #4$,@#114        SET UP SERVICE VECTOR FOR WCS
                                                                ;WATCH DOG TIMEOUT
021324  012777  001000  161502          MOV     #MAINT,@WCSST    SET MAINTENANCE BIT
021332  005777  161502                  TST     @WCSDR          ;KICK OFF THE WATCH-DOG T MER

021336  000000                  2$       WORD   0                 THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                 TO BE EXECUTED   AT THIS POINT CONTROL
                                                                 IS TRANSFERRED TO THE WCS

                                                                ;RETURN FROM WCS OCCURS HERE
021340  042777  001000  161466          BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
021346  012737  007344  000114          MOV     #BADPAR,@#114
021354  020301                          CMP     R3,R1           ;WAS CORRECT OPCODE SAVED IN R4
                                                                ;WHILE IN WCS?
021356  001405                          BEQ     3$              ;YES
021360  010137  001162                  MOV     R1,$REG0        ;EXPCTD XFC CODE
021364  010337  001164                  MOV     R3,$REG1        ;CODE RECVD
021370  104030                          ERROR   30              ;CORRECT XFC OPCODE WAS NOT SAVED
                                                                ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                 NOTE  THAT XFC OPCODE SHOULD HAVE
                                                                ;TRANSFERRED CONTROL TO THE WCS
```

```
021372  005201                  3$      INC     R1              ,NEXT XFC OPCODE
021374  077032                          SOB     R0,1$           ,DONE?
021376  000414                          BR      TST46           ,,EXIT

                                        ,ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                        ,AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                        ,WCS) TO THE BASE MACHINE

021400  022626                  4$      CMP     (SP)+,(SP)+     ,POP THE STACK

021402  012737  003344  000114          MOV     #BADPAR,@#114
021410  012777  000020  161416          MOV     #PARDIS,@WCSST
021416  005077  161412                  CLR     @WCSST
021422  010137  001162                  MOV     R1,$REGO        ,XFC OPCODE
021426  104031                          ERROR   31              ,WCS WATCH DOG TIMER TIMED OUT
                                                                ,UPON TRANSFERRING CONTROL FROM
                                                                ,BASE MACHINE TO WCS MICROCODE
                                                                ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                ,SHOULD BE RETURNED TO BASE MACHINE

                                ;;;
```

```
                                                  ;TRANSFERRED BACK TO THE BASE MACHINE THE WATCH-DOG
                                                  ;TIMES OUT AND A TRAP TO 114 OCCURS

                                                  ;FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                                  ;       BASE MACHINE XFC DECODE AND DISPATCH
                                                  ;       TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                                  ;       CONTROL-PATH USED BY THE MICRO-CODE EXECUTING FROM
                                                  ;       THE WCS (NUA<9:0>, ARRAY ADDRESS MUX-APORT,
                                                  ;       BUS-U MUX-BPORT,BUS-U LINES
                                          ;;*****************************************************************
021430  000004                          TST46   SCOPE
021432  012737  021566  003056                  MOV     #TST47,NXTST    ;STARTING ADDRESS OF NEXT TEST
021440  012700  000100                          MOV     #100,R0 ;LOAD COUNT
021444  012701  076700                          MOV     #76700,R1       ;INITIALIZE XFC OPCODE
021450  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
021454  006241                                  6241                    ;MAIN-CONTROL-BLOCK LOADED HERE
021456  061726                                  MXFC2                   ;FROM THIS MEMORY ADDRESS
021460  006002                                  UDISP                   ;ENTRY POINT INTO WCS

021462  010137  021506                  1$      MOV     R1,2$           ;SET UP XFC CODE FOR EXECUTION
021466  012737  021550  000114                  MOV     #4$,@#114       ;SET UP SERVICE VECTOR FOR WCS
                                                                        ;WATCH DOG TIMEOUT
021474  012777  001000  161332                  MOV     #MAINT,@WCSST   ;SET MAINTENANCE BIT
021502  005777  161332                          TST     @WCSDR          ;KICK OFF THE WATCH-DOG TIMER

021506  000000                          2$      WORD    0               THIS WORD WILL CONTAIN THE XFC OPCODE
                                                                        TO BE EXECUTED  AT THIS POINT CONTROL
                                                                        ;IS TRANSFERRED TO THE WCS

                                                                        ;RETURN FROM WCS OCCURS HERE
021510  042777  001000  161316                  BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
021516  012737  003344  000114                  MOV     #BADPAR,@#114
021524  020301                                  CMP     R3,R1           WAS CORRECT OPCODE SAVED IN R4,
                                                                        ;WHILE IN WCS?
021526  001405                                  BEQ     3$              ;YES
021530  010137  001162                          MOV     R1,$REG0        ;EXPCTD XFC CODE
021534  010337  001164                          MOV     R3,$REG1        ;CODE RECVD
021540  104032                                  ERROR   32              ;CORRECT XFC OPCODE WAS NOT SAVED
                                                                        ;BY THE MICRO-CODE WHILE INSIDE WCS
                                                                        NOTE, THAT XFC OPCODE SHOULD HAVE
                                                                        TRANSFERRED CONTROL TO THE WCS

021542  005201                          3$      INC     R1              ;NEXT XFC OPCODE
021544  077032                                  SOB     R0,1$           ;DONE?
021546  000407                                  BR      TST47           ;;EXIT

                                                ENTER HERE IF THE WATCH-DOG TIMER ON THE WCS TIMED OUT BEFORE
                                                AN ORDERLY EXIT AND RETURN OF CONTROL COULD BE DONE (FROM THE
                                                ;WCS) TO THE BASE MACHINE

021550  022626                          4$      CMP     (SP)+,(SP)+     ;POP THE STACK

021552  012737  003344  000114                  MOV     #BADPAR,@#114
021560  010137  001162                          MOV     R1,$REG0
021564  104033                                  ERROR   33              ;WCS WATCH DOG TIMER TIMED OUT
                                                                        UPON TRANSFERRING CONTROL FROM
```

```
                                                        ;BASE MACHINE TO WCS MICROCODE
                                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                        ;SHOULD BE RETURNED TO BASE MACHINE



                                ;;*****************************************************************
                                ;*TEST 47        CHECK "ODD PC" DISPATCH TO WCS AT 6004
                                        ;THIS TEST CHECKS THE "ODD PC" DISPATCH (FROM BASE MACHINE)
                                        ;TO WCS AT 6004 (MICRO-ADDRESS IN PAGE6, WCS)   WHEN
                                        ;A TRAP/INTERRUPT OCCURS AND THE SERVICE VECTOR FOR
                                        ;THAT CONTAINS AN ODD PC, THE BASE MACHINE
                                        ;TRANSFERS CONTROL TO THE WCS (PROVIDED THE WCS
                                        ;IS ENABLED)   THE ENTRY IN WCS IS MADE AT 6004
                                        ;(PAGE 6)
                                        ;THE SEQUENCE OF TESTING IS

                                        ;BPT SERVICE VECTOR (14) IS SET UP TO CONTAIN AN ODD PC
                                        ;THE WCS IS LOADED UP WITH MICRO-CODE TO SERVICE THE
                                        ;DISPATCH AT 6004  THE FUNCTION OF THIS MICRO-CODE
                                        ;IS TO INCR R3 BY 1, WHICH WAS CLEARED PREVIOUSLY

                                        ;BPT INSTRUCTION IS EXECUTED, BPT TRAP SHOULD TAKE PLACE
                                        ;AND CONTROL SHOULD TRANSFER TO WCS AT MICRO-ADDRESS 6004

                                        ;UPON RETURN, THE FLAG (R3) IS CHECKED
                                         IF THE FLAG IS NOT =1 AN  ERROR IS REPORTED

                                        ;IF THE ODD-PC-DISPATCH TO WCS DOES NOT OCCUR,
                                        ;AN ODD-ADDRESS TRAP WILL OCCUR
                                        ;THIS TEST USES THE WCS WATCH-DOG TIMER  IF AS A RESULT
                                        ;SOME FAULT CONDITION, THE CONTROL IS NOT TRANSFERRED BACK
                                        ;TO THE BASE MACHINE, THE WATCH DOG WILL TIME OUT AND A
                                         TRAP TO 114 WILL OCCUR


                                        ;FAILURE OF THIS TEST COULD INDICATE A FAULT IN
                                ;               BASE-MACHINE ODD-PC DISPATCH MICRO-CODE
                                ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                ;               CONTROL-PATH USED BY THE MICRO-CODE EXECUTING
                                ;               FROM THE WCS (NUA<9 0>, ARRAY ADDRESS MUX-A PORT,
                                ;               BUS-U MUX -B PORT, BUS-U LINES
                                ;;*****************************************************************
021566  000004                  TST47   SCOPE
021570  012737  021754  003056          MOV     #TST50,NXTST    ;STARTING ADDRESS OF NEXT TEST
021576  005003                          CLR     R3              ;CLEAR FLAG
021600  012737  021702  000004          MOV     #3$,@#4         ;ODD ADDRESS TRAP VECTOR
021606  012737  001001  000014          MOV     #1001,@#14      ;SET UP ODD PC AT BPT VECTOR
021614  012737  021722  000114          MOV     #2$,@#114       ;SET UP SERVICE VECTOR WCS WATCH-DOG TIMER
021622  004537  037472                  JSR     R5,LDWCS        ;LOAD UP THE WCS
021626  006161                          6161                    ;STARTING AT THIS WCS ADDRESS (IN CONTROL SPACE)
021630  062214                          MODDPC                  ;FROM THIS MEMORY ADDRESS
021632  006004                          ODDPC                   ;ENTRY POINT INTO WCS
021634  012777  001000  161172          MOV     #MAINT,@WCSST   ;INITIATE AND
```

```
021642  005777  161172                  TST     @WCSDR          ;KICK OFF THE TIMER
021646  000003                          BPT                     ;EXECUTE BPT, THE BPT VECTOR CONTAINS
                                                                ;AN ODD PC.  CONTROL SHOULD TRANSFER TO
                                                                ;WCS AT CS ADDRESS = 6004

                                                                ;RETURN HERE FROM WCS
021650  042777  001000  161156          BIC     #MAINT,@WCSST   ;SHUT OFF THE WCS TIMER
021656  012737  003344  000114          MOV     #BADPAR,@#114   ;RESET THE UNEXPECTED PARITY HANDLER
021664  022703  000001                  CMP     #1,R3           ;WAS THE FLAG SET WHILE IN WCS?
021670  001426                          BEQ     4$              ;OK
021672  010337  001162                  MOV     R3,$REG0        ;
021676  104034                          ERROR   34              ;FLAG (IN R3) WAS NOT =1 BY THE MICRO-CODE
                                                                ;IN WCS  AFTER CONTROL WAS TRANSFERRED
                                                                ;TO WCS (6004) USING ODD PC DISPATCH
021700  000422                          BR      4$
021702  012737  003276  000004  3$:     MOV     #BADTMO,@#4
021710  011637  001162                  MOV     (SP),$REG0
021714  022626                          CMP     (SP)+ (SP)+     ;POP THE STACK
021716  104062                          ERROR   62              ;INSTEAD OF "ODD PC" DISPATCH
                                                                ;TO WCS,AN ODD ADDRESS
                                                                ;TRAP OCCURED  FAULT COULD BE
                                                                ;IN ODD-PC DISPATCH IN
                                                                ;BASE MACHINE

021720  000415                          BR      TST50           ;;EXIT

                                        ;ENTER HERE IF WCS WATCH DOG TIMER TIMED OUT FOLLOWING A TRANSFER
                                        ;OF CONTROL TO WCS AT 6004 USING ODD PC DISPATCH

021722  012737  003344  000114  2$      MOV     #BADPAR,@#114
021730  022626                          CMP     (SP)+,(SP)+
021732  012777  000020  161074          MOV     #PARDIS,@WCSST
021740  005077  161070                  CLR     @WCSST
021744  104035                          ERROR   35              ;WCS WATCH DOG TIMER TIMED OUT
                                                                ;UPON TRANSFERRING CONTROL FROM
                                                                ;BASE MACHINE TO WCS MICROCODE
                                                                ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                ;SHOULD BE RETURNED TO BASE MACHINE
021746  012737  003276  000004  4$      MOV     #BADTMO,@#4


                                ;;*****************************************************************
                                ;TEST 50        CHECK "MICRO-BREAK" DISPATCH TO WCS AT 6000
                                        ;THIS TEST CHECKS THE "MICRO-BREAK" DISPATCH (FROM-BASE
                                        ;MACHINE) TO WCS OF 6000 (MICRO-ADDRESS IN PAGE6, WCS)
                                        ;WHEN A MICROBREAK OCCURS (ENABLE MICROBREAK IN FLAG/INT
                                        ;REGISTER, CLEAR MICROBREAK-TRAP IN WHAMI) AND WCS IS
                                        ;PRESENT AND ENABLED, THE BASE MACHINE TRANSFER
                                        ;CONTROL TO THE WCS  THE WCS IS ENTERED AT
                                        ;MICRO-ADDRESS 6000
                                        ;THE SEQUENCE OF TESTING IS=

                                         THE MICRO-BREAK REGISTER IS LOADED WITH MICRO-ADDRES
```

```
                                        ;"SWB01" (IN SWAB MICRO-FLOW), THE MICRO-BREAK
                                        ,TRAP IS DISABLED, THE MICRO-BREAK IS ENABLED)  WCS
                                        ,IS LOADED WITH MICRO-CODE TO SERVICE THE DISPATCH
                                        ,AT 6000  THE FUNCTION OF THIS MICRO-CODE IS TO INCR
                                        ,FLAG R3 BY 1, WHICH WAS CLEARED PREVIOUSLY

                                        ,"SWAB" INSTRUCTION IS EXECUTED, MICRO-BREAK SHOULD TAKE
                                        ,PLACE AND THE BASE MACHINE SHOULD TRANSFER
                                        ,CONTROL TO WCS AT 6000. MICRO-CODE SHOULD
                                        ,GET EXECUTED TO INCR R3 BY 1  RETURN IS MADE
                                        ,TO THE BASE MACHINE

                                        ,UPON RETURN, THE FLAG (R3) IS CHECKED IF IT =1
                                        ,IF NOT AN ERROR IS REPORTED

                                        ,THIS TEST USES THE WCS WATCH-DOG-TIMER.  IF AS A
                                        ,RESULT OF SOME FAULT CONDITION, THE CONTROL IS NOT
                                        ,TRANSFERRED BACK TO THE BASE MACHINE, THE WATCH DOG
                                        ,WILL TIME OUT AND A TRAP TO 114 WILL OCCUR

                                        ,FAILURE OF THIS TEST COULD UNDICATE A FAULT IN =
                                        ,       BASE MACHINE MICRO-BREAK DISPATCH MICRO-CODE
                                        ,       TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                        ,       CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ,       THE WCS  (NUA<9=0>, ARRAY ADDRESS MUX-A PORT,
                                        ,       BUS-U MUX-B PORT, BUS U LINES)
                                ..*****************************************************************
021754  000004                  TST50   SCOPE
021756  012737  022136  003056          MOV     #TST51,NXTST    ,STARTING ADDRESS OF NEXT TEST
021764  005003                          CLR     R3              ,CLEAR FLAG
021766  012737  000071  177770          MOV     #SWB01,@#MBKREG ,LOAD MICRO-BREAK REGISTER
021774  076600                          MED
021776  000022                          RDWHAMI                 ,READ WHAMI
022000  042700  001000                  BIC     #BIT9,R0        ,DISABLE UBREAK TRAP
022004  076600                          MED
022006  000222                          WRWHAMI                 ,WRITE BACK INTO WHAMI
022010  076600                          MED
022012  000144                          RDFLAG                  ,READ FLAG/INT
022014  052700  100000                  BIS     #BIT15,R0       ,ENABLE MICROBREAK IN FLAG/INT
022020  076600                          MED
022022  000344                          WRFLAG                  ,WRITE BACK INTO FLAG REGISTER
022024  012737  022112  000114          MOV     #2$,@#114       ,SET UP SERVICE VECTOR FOR WCS WATCH
                                                                ,DOG TIMER
022032  004537  037472                  JSR     R5,LDWCS        ,LOAD WITH MICRO-CODE WCS
022036  006171                          6171                    ,MAIN CONTROL BLOCK LOADED HERE
022040  062246                          MUBRK                   ,FROM THIS MEMORY LOCATION
022042  006300                          UBRK                    ,ENTRY POINT INTO WCS
022044  012777  001000  160762          MOV     #MAINT,@WCSST   ,SET MAINT  BIT AND
022052  005777  160762                  TST     @WCSDR          ,INITIATE THE WCS TIMER
022056  000300                          SWAB    R0              ,EXECUTE INSTRUCTION LEADING TO
                                                                ,MICRO-BREAK  SINCE THE WCS IS
                                                                ,ENABLED, CONTROL SHOULD TRANSFER
                                                                ,TO WCS (6000) AT THIS POINT

                                                                ,RETURN HERE FROM WCS
022060  042777  001000  160746          BIC     #MAINT,@WCSST   ,SHUT OFF WCS TIMER
```

```
022066  012737  003344  000114          MOV     #BADPAR,@#114   ;REINCR UNEXPECTED PARITY HANDLER
022074  022703  000001                  CMP     #1,R3           ;WAS THE FLAG INCR WHILE IN WCS?
022100  001416                          BEQ     TST51           ;;EXIT
022102  010337  001162                  MOV     R3,$REG0        ;
022106  104036                          ERROR   36              ;FLAG WAS NOT INCR BY THE
                                                                ;MICRO-CODE IN WCS, AFTER CONTROL
                                                                ;WAS TRANSFERRED TO WCS (6000),
                                                                ;USING "MICRO-BREAK" DISPATCH
022110  000412                          BR      TST51           ;;EXIT

                                        ;ENTER HERE IF WCS WATCH DOG TIMER TIMED OUT FOLLOWING A TRANSFER
                                        ;OF CONTROL TO WCS AT 6000 USING MICRO-BREAK DISPATCH

022112  012737  003344  000114  2$      MOV     #BADPAR,@#114
022120  022626                          CMP     (SP)+,(SP)+
022122  012777  000020  160704          MOV     #PARDIS,@WCSST
022130  005077  160700                  CLR     @WCSST
022134  104037                          ERROR   37              ;WCS WATCH DOG TIMER TIMED OUT
                                                                ;UPON TRANSFERRING CONTROL FROM
                                                                ;BASE MACHINE TO WCS MICROCODE
                                                                ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                ;SHOULD BE RETURNED TO BASE MACHINE


                        ***************************************************************
                        *TEST 51        CHECK "FLAG<7> WCS SERVICE" DISPATCH TO WCS AT 6005
                                ;THIS TEST CHECKS THE "FLAG<7> WCS SERVICE" DISPATCH (FROM-BASE
                                ;MACHINE) TO WCS OF 6005 (MICRO-ADDRESS IN PAGE 6, WCS)
                                ;WHEN WCS IS ENABLED, AND FLAG<7> (BIT14) IN FLAG REGISTER IS SET,
                                ;BM SERVICE CODE WILL ENTER WCS AT MICROADDRESS 6005, ASSUMING
                                ;NO OTHER SERVICE CONDITIONS OF HIGHER PRIORITY ARE PENDING
                                ;THE SEQUENCE OF TESTING IS

                                ;THE WCS IS LOADED WITH MICRO-CODE TO SERVICE THE DISPATCH
                                 TO 6005  THE FUNCTION OF THIS MICRO-CODE IS TO INCR
                                ;FLAG R3 BY 1, WHICH WAS CLEARED PREVIOUSLY

                                ;MED INSTRUCTION IS USED TO SET FLAG<7> (BIT14)  THIS FORCES
                                 BM "SERVICE" TO BE SIGNALED, AND THUS CONTROL PASSES TO
                                ;WCS AT 6005  MICRO-CODE SHOULD GET EXECUTED TO INCR R3 BY 1
                                ;RETURN IS MADE TO THE BASE MACHINE AT "FETC1" WITHOUT CHECKING
                                 FOR "SERVICE" AGAIN   THIS ALLOWS NEXT MACRO-INSTRUCTION TO
                                ;BE EXECUTED BEFORE "SERVICE" IS CHECKED AGAIN

                                ;UPON RETURN, THE FLAG (R3) IS CHECKED IF IT =2
                                ;IF NOT AN ERROR IS REPORTED

                                ;THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS A
                                ;RESULT OF SOME FAULT CONDITION, THE CONTROL IS NOT
                                ;TRANSFERRED BACK TO THE BASE MACHINE, THE WATCH DOG
                                ;WILL TIME OUT AND A TRAP TO 114 WILL OCCUR

                                 FAILURE OF THIS TEST COULD INDICATE A FALLT IN -
```

```
                                                ;       BASE MACHINE MICRO-BREAK DISPATCH MICRO-CODE
                                                ;       TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT CIRCUIT
                                                ;       CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                ;       THE WCS. (NUA<9=0>, ARRAY ADDRESS MUX-A PORT,
                                                ;       BUS-U MUX-B PORT, BUS U LINES).
                                        ;;*****************************************************************
022136  000004                          TST51   SCOPE
022140  012737  022304  003056                  MOV     #TST52,NXTST    ;STARTING ADDRESS OF NEXT TEST
022146  005003                                  CLR     R3              ;CLEAR FLAG
022150  012737  022260  000114                  MOV     #2$,@#114       ;SET UP SERVICE VECTOR FOR WCS WATCH DOG TIMER
022156  004537  037472                          JSR     R5,LDWCS        ;LOAD WITH MICRO-CODE WCS
022162  006770                                  6770                    ;MAIN CONTROL BLOCK LOADED HERE
022164  062332                                  MF7SVC                  ;FROM THIS MEMORY LOCATION
022166  006005                                  F7SVC                   ;ENTRY POINT INTO WCS
                                                                        ;
022170  076600  000144                          MED     ;RDFLAG         ;GET FLAGS IN R0
022174  052700  040000                          BIS     #BIT14 R0       ;SET FLAG<7> AT BIT14
022200  012777  001000  160626                  MOV     #MAINT,@WCSST   ;SET MAINT  BIT AND
022206  005777  160626                          TST     @WCSDR          ;INITIATE THE WCS TIMER
                                                                        ;
022212  076600  000344                          MED     ;WRFLAG         ;SET WCS SERVICE FLAG<7>
                                                                        ;SINCE THE WCS IS ENABLED, CONTROL SHOULD
                                                                        ;TRANSFER TO WCS (6005) AT THIS POINT
                                                                        ;WCS DOES R3 <- R3 PLUS 1 SINCE FLAG<7> SET, R3 = 1 AFTER
                                                                        ;
022216  042700  040000                          BIC     #BIT14,R0       ;NOW CLR FLAG<7> AT BIT14
                                                                        ;WCS DOES R3 <- R3 PLUS 1 SINCE FLAG<7> SET, R3 = 2 AFTER
                                                                        ;
022222  076600  000344                          MED     ;WRFLAG         ;NOW CLR WCS SERVICE FLAG<7>
                                                                        ;NO MORE ENTRY TO WCS, FLAG<7> NOW CLEAR
                                                                        ;
022226  042777  001000  160600                  BIC     #MAINT,@WCSST   ;SHUT OFF WCS TIMER
022234  012737  003344  000114                  MOV     #BADPAR,@#114    RESTORE UNEXPECTED PARITY HANDLER
022242  022703  000002                          CMP     #2,R3           ;WAS THE FLAG INCR TWICE WHILE IN WCS?
022246  001416                                  BEQ     TST52           ;;EXIT
022250  010337  001162                          MOV     R3,$REG0        ;
022254  104074                                  ERROR   74              ;FLAG WAS NOT INCR BY THE
                                                                        ;MICRO-CODE IN WCS, AFTER CONTROL
                                                                        ;WAS TRANSFERRED TO WCS (6005),
                                                                        ;USING "FLAG<7> WCS SERVICE" DISPATCH
022256  000412                                  BR      TST52           ;;EXIT

                                                ;ENTER HERE IF WCS WATCH DOG TIMER TIMEL OUT FOLLOWING A TRANSFER
                                                ;OF CONTROL TO WCS AT 6005 USING FLAG<7> WCS SERVICE D SPATCH

022260  012737  003344  000114  2$              MOV     #BADPAR,@#114
022266  022626                                  CMP     (SP)+,(SP)+
022270  012777  000020  160536                  MOV     #PARDIS,@WCSST
022276  005077  160532                          CLR     @WCSST
022302  104075                                  ERROR   75              ;WCS WATCH DOG TIMER TIMED OUT
                                                                        ;UPON TRANSFERRING CONTROL FROM
                                                                        ;BASE MACHINE TO WCS MICROCODE
                                                                         NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                         SHOULD BE RETURNED TO BASE MACHINE
```

```
                                        ;;*****************************************************************
                                        ;*TEST 52        CHECK "RESERVED INSTRUCTION" DISPATCH TO 6003 IN WCS
                                                ;THIS TEST CHECKS "RESERVED INSTRUCTION" DISPATCH
                                                ;FROM THE BASE MACHINE TO THE WCS. THE ENTRY
                                                ;POINT IN WCS IS AT MICRO-ADDRESS  J03 (PAGE 6)
                                                ;IF THE WCS IS ENABLED AND A RESERVED
                                                ;INSTRUCTION IS EXECUTED, THE BASE MACHINE TRANSFERS
                                                ;CONTROL TO THE WCS AT MICRO-ADDRESS 6003

                                                ;THE SEQUENCE OF TESTING IS AS FOLLOWING
                                                ;THE WCS IS LOADED WITH MICRO-CODE TO SERVICE
                                                ;THE "RESERVED INSTRUCTION" DISPATCH.

                                                ;A RESERVED INSTRUCTION IS EXECUTED   SINCE THE
                                                ;WCS IS ENABLED THE BASE MACHINE SHOULD
                                                ;TRANSFER CONTROL TO THE WCS AT 6003

                                                ;THE PREVIOUSLY LOADED MICRO-CODE IN THE WCS
                                                ;SHOULD SAVE RESERVED INSTRUCTION OPCODE IN R3  AND
                                                ;RETURN CONTROL TO THE BASE MACHINE

                                                ;BACK IN BASE MACHINE, IT IS CHECKED IF THE
                                                ;CORRECT OPCODE WAS SAVED IN R3  IF NOT, AN
                                                ;ERROR IS REPORTED

                                                ;THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS A
                                                ;RESULT OF SOME FAULT CONDITION, THE CONTROL IS
                                                 NOT TRANSFERRED BACK TO THE BASE MACHINE, THE
                                                ;WATCH-DOG WILL TIME OUT AND A TRAP TO 114
                                                ;WILL OCCUR

                                                ;FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE =
                                                        RESERVED INSTRUCTION DECODE AND DISPATCH
                                                        IN BASE MACHINE
                                                ;       CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                ;       THE WCS  (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                                ;       BUS-U-MUX-B-PORT,BUS-U-LINES
                                                ;       ENTRY POINT REGISTER IN WCS

                                        ;;*****************************************************************
022304  000004                          TST52:  SCOPE
022306  012737  022502  003056                  MOV     #TST53,NXTST    ;STARTING ADDRESS OF NEXT TEST

022314  012704  177773                          MOV     #-5,R4          ;DONT REPORT MORE THAN
022320  010402                                  MOV     R4,R2           ;5 ERRORS EACH
022322  012737  022470  000010                  MOV     #69,@#10        ;ILLEGAL INST  TRAP
022330  012700  000020                          MOV     #20,R0
022334  012701  000210                          MOV     #210,R1
022340  004537  037472                          JSR     R5,LDWCS
022344  006201                                  6201
022346  062300                                  MRESIN
022350  006003                                  URESIN
```

```
022352  010137  022376          1$      MOV     R1,2$
022356  012737  022436  000114          MOV     #4$,@#114
022364  012777  001000  160442          MOV     #MAINT,@WCSST
022372  005777  160442                  TST     @WCSDR

022376  000000                  2$      .WORD   0
022400  042777  001000  160426          BIC     #MAINT,@WCSST
022406  020301                          CMP     R3,R1
022410  001407                          BEQ     3$
022412  005204                          INC     R4
022414  100032                          BPL     TST53           ;,EXIT
022416  010137  001162                  MOV     R1,$REG0
022422  010337  001164                  MOV     R3,$REG1
022426  104044                          ERROR   44

022430  005201                  3$      INC     R1
022432  077031                          SOB     R0,1$
022434  000422                          BR      TST53           ,,EXIT

022436  022626                  4$      CMP     (SP)+,(SP)+
022440  012737  003344  000114          MOV     #BADPAR,@#114
022446  012777  000020  160360          MOV     #PARDIS,@WCSST
022454  005077  160354                  CLR     @WCSST
022460  005202                          INC     R2
022462  100007                          BPL     TST53           ,,EXIT
022464  104045                          ERROR   45              ,WCS WATCH DOG TIMED OUT
                                                                ,UPON TRANSFERRING CONTROL FROM
                                                                ,BASE MACHINE TO WCS MICROCODE
                                                                ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                ,SHOULD BE RETURNED TO BASE MACHINE

022466  000760                          BR      3$

022470  022626                  6$      CMP     (SP)+,(SP)+
022472  012737  000012  000010          MOV     #12,@#10
022500  104063                          ERROR   63


                                ,*****************************************************************
                                *TEST 53        CHECK THAT XFC TRAPS OUT AS RESVD-INST WHEN WCS IS DISABLED
                                        ,THIS TEST CHECKS THAT THE XFC OPCODES, WHEN EXECUTED
                                        ,WITH THE WCS DISABLED, TRAPS OUT AS RESERVED INSTRUCIONS
                                        ,TO VECTOR 10  THE FOLLOWING XFC OPCODES ARE TESTED
                                        ,       076000-076577
                                                076601-076777
                                        ,       076600 IS MED INSTRUCTION
                                        ,PREVIOUS TESTS HAVE CHECKED OUT THAT THE SAME XFC
                                        ,OP-CODES PROVIDE DISPATCH (AND TRANSFER OF CONTROL) TO
                                        ,WCS, WHEN THE WCS IS ENABLED
                                ,*****************************************************************
022502  000004                  TST53   SCOPE
```

```
022504  012737  023040  003056          MOV     #TST54,NXTST     ;STARTING ADDRESS OF NEXT TEST
022512  005004                          CLR     R4
022514  005000                          CLR     R0               ;COUNT
022516  012705  076000                  MOV     #076000,R5       ;INITIALIZE XFC OP CODE
022522  076600                          MED
022524  000022                          RDWHAMI
022526  042700  000200                  BIC     #BIT7,R0
022532  076600                          MED                      ;DISABLE THE WCS
022534  000222                          WRWHAMI
022536  016001  003124          1$      MOV     WCSENT(R0),R1    ;GET ENTRY POINTER INTO WCS
022542  042701  177000                  BIC     #177000,R1       ;FORM WCS ADDRESS AND DEPOSIT
022546  010177  160264                  MOV     R1,@WCSAR        ;BRANCH ON SELF MICRO-WORD THERE
022552  005101                          COM     R1               ;NUA<8 0> BITS ARE INVERTED
022554  042701  177000                  BIC     #177000,R1
022560  052701  030000                  BIS     #BIT12+BIT13,R1  ;NULL "BUT"
022564  010177  160250                  MOV     R1,@WCSDR

022570  062777  002000  160240          ADD     #2000,@WCSAR
022576  005077  160236                  CLR     @WCSDR
022602  062777  002000  160226          ADD     #2000,@WCSAR
022610  005077  160224                  CLR     @WCSDR

022614  010537  022646          2$      MOV     R5,3$            ;XFC OP-CODE
022620  012737  022746  000114          MOV     #5$,@#114        ;WCS WATCH-DOG TIMEOUT VECTOR
022626  012737  022666  000010          MOV     #4$,@#10         ;RESERVD  INST  TRAP VECT
022634  012777  001000  160172          MOV     #MAINT,@WCSST    ;KICK ON THE WCS TIMER
022642  005777  160172                  TST     @WCSDR

022646  000000                  3$      WORD    0                ;XFC OP-CODE HERE
022650  042777  001000  160156          BIC     #MAINT,@WCSST    ;SHUT OFF TIMER INCASE OF ERROR
022656  010537  001162                  MOV     R5,$REG0
022662  104066                          ERROR   66               ;XFC OF CODE DID NOT TRAP AS RCRVD INSTR
022664  000444                          BR      8$               ;CHECK IF MORE THAN 5 ERRORS
                                                                 ;ENTER HERE IF RESVD  INSTR TRAP
022666  022626                  4$      CMP     (SP)+,(SP)+      ;OCCURED, AS EXPECTED
022670  042777  001000  160136  7$      BIC     #MAINT,@WCSST    ;SHUT OFF TIMER
022676  012737  000012  000010          MOV     #12,@#10         ;NORMAL TRAP-CATCHER
022704  012737  003344  000114          MOV     #BADPAR,@#114
022712  005205                          INC     R5               ;NEXT XFC OP-CODE
022714  032705  000077                  BIT     #77,R5           ;DONE THIS GROUP?
022720  001335                          BNE     2$               ;IF NOT DO IT
022722  062700  000002                  ADD     #2,R0            ;SHIFT POINTER TO NEXT GROUP
022726  020027  000020                  CMP     R0,#20           ;DONE ALL 8 GROUPS?
022732  002026                          BGE     6$               ;YES, EXIT
022734  020027  000014                  CMP     R0,#14           ;IS THIS THE GROUP HAVING "MED"?
022740  001276                          BNE     1$
022742  005205                          INC     R5                IF SO, SKIP THE MED OP-CODE
022744  000723                          BR      2$               ;DO THE REST      .

                                                                 ;ENTER HERE IF THE WCS-WATCH
                                                                 ;DOG TIMED OUT, INDICATING
                                                                 ;THAT THE XFC OP-CODE
                                                                 ;TRANSFERRED CONTROL TO THE
                                                                 ;WCS (INSTEAD OF TRAPPING
                                                                  OUT AS A RESERVED INSTR
```

```
022746  022626                  5$      CMP     (SP)+,(SP)+
022750  012737  003344  000114          MOV     #BADPAR,@#114
022756  012777  000020  160050          MOV     #PARDIS,@WCSST  ,CLEAR ERROR BIT
022764  005077  160044                  CLR     @WCSST
022770  010537  001162                  MOV     R5,$REG0        ,SAVE XFC OP CODE
022774  104066                          ERROR   66              ,XFC OP-CODE DID NOT TRAP
                                                                ,AS A RESERVED INSTR  WHEN
                                                                ,THE WCS WAS DISABLED
                                                                ;INSTEAD THE CONTROL WAS
                                                                ,TRANSFERRED TO THE WCS
                                                                ,(TO A BRANCH-ON-SELF
                                                                ,MICRO-WORD AND THEN THE
                                                                ,WATCH-DOG TIMED OUT FORCING
                                                                ,IT OUT FROM THE LOOP)
022776  005204                  8$      INC     R4              ,KEEP COUNT OF ERRORS
023000  020427  000005                  CMP     R4,#5           ,IF MORE THAN 5 EXIT THE TEST
023004  101001                          BHI     6$              ,EXIT THE TEST
023006  000730                          BR      7$              ,GO,TEST THE REST

023010  012737  000012  000010  6$      MOV     #12,@#10        ,EXIT
023016  012737  003344  000114          MOV     #BADPAR,@#114
023024  076600                          MED                     ;TURN ON THE WCS
023026  000022                          RDWHAMI
023030  052700  000200                  BIS     #BIT7,R0
023034  076600                          MED
023036  000222                          WRWHAMI
                                END OF XFC DISPATCH
```

```
                                        SBTTL  ---CHECK OF TMS ROM FUNCTIONS---
                                 ;;*****************************************************************
                                 ;*TEST 54       CHECK BLOCK MOVE OF GR'S TO WCS
                                 ;       THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS
                                 ;       WHEN THIS FUNCTION IS INITIATED A BLOCK OF GR'S
                                 ;       GET TRANSFERRED FROM THE BASE MACHINE TO THE
                                 ;       WCS  THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER
                                 ;
                                 ;       R7,R6(KERNEL), R6(USER), R5,R4,R3,R2,R1,R0
                                 ;
                                 ;       THE GR'S ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                         UNIQUE DATA PATTERNS IN THEM

                                         THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                         A "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                         TO THE MICRO-CODE IN THE WCS

                                         THE MICRO-CODE SETS UP IN "D" (BASE MACHINE), THE
                                         ADDRESS (WCS) STARTING WHICH THE GR'S SHOULD BE
                                         SAVED IN THE WCS  THEN THIS MICRO-CODE SELECTS THE WCS
                                         HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                         WHICH ACTUALLY DOES THE STORE OF THE GR'S  AFTER THE
                                         GR'S HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                         CONTROL TO THE BASE MACHINE

                                         THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                         DATA FROM THE GR'S WAS STORED CORRECTLY  IF NOT,
                                         AN ERROR IS REPORTED

                                         THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                         A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                         IS NOT TRANSFERRED BACK TO THE BASES MACHINE,
                                         THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                         114 WILL OCCUR

                                         FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                                 TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                 BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                 CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                 THE WCS- (NUA<9=0>,ARRAY ADDRESS MUX-A-PORT,
                                                 BUS-U-MUX-B PORT, BUS-U-LINES)

                                 ;*****************************************************************
023040  000004                   TST54   SCOPE
023042  012737  023450  003056           MOV     #TST55,NXTST    ;STARTING ADDRESS OF NEXT TEST

023050  005000                           CLR     PC              ;INITIALIZE GPR'S 0-5 WITH
023052  012701  000111                   MOV     #111,R1         ;UNIQUE DATA PATTERNS
023056  012702  000222                   MOV     #222,R2
023062  012703  000333                   MOV     #333,R3
```

```
023066  012704  000444                  MOV     #444,R4
023072  012705  000555                  MOV     #555,R5
023076  012737  023424  000114          MOV     #6$,@#114       ;SETUP SERVICE VECTOR FOR WCS WATCH DOG
                                                                ;TIMER
023104  004537  037472                  JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
023110  006026                          6026                    ;CONTROL BLOCK LOADED HERE
023112  060666                          MGRLS                   ;FROM THIS MEMORY LOCAT ON
023114  006002                          UDISP                   ;ENTRY POINT IN WCS
023116  012777  001000  157710          MOV     #MAINT,@WCSST   ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                                ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING
                                                                ;CONTROL TO WCS
023124  012737  140000  177776          MOV     #140000,@#PSW   ;USER MODE
023132  012706  001500                  MOV     #1500,R6        ;INITIALIZE USER STACK
023136  005037  177776                  CLR     @#PSW           ;BACK TO KERNEL MODE
023142  012706  001100                  MOV     #1100,R6        ;INITIALIZE R6-KERNEL

023146  076700                          XFCUDIS                 ;TRANSFER CONTROL TO WCS

023150                          1$                              ;RETURN FROM WCS TO THIS POINT
023150  042777  001000  157656          BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
023156  012737  003344  000114          MOV     #BADPAR,@#114   ;RESET UNEXPECTED PARITY HANDLER
023164  012777  001000  157644          MOV     #1000,@WCSAR    ;ADDRESS THE LOCATION IN WCS
                                                                ;STARTING WHCIH THE GPR'S WERE
                                                                ;SAVED  (LOC 1000 IN WCS)

023172  017700  157642                  MOV     @WCSDR,R0       READ WCS FOR SAVED R7
023176  020027  023150                  CMP     R0,#1$          WAS R7 SAVED CORRECTLY?
023202  001414                          BEQ     2$

023204  017737  157626  001162          MOV     @WCSAR,$REG0
023212  012737  023150  001164          MOV     #1$,$REG1
023220  010037  001166                  MOV     R0,$REG2
023224  012737  000007  001170          MOV     #7,$REG3
023232  104040                          ERROR   40              R7 WAS NOT SAVED CORRECTLY DURING
                                                                BLOCK MOVE OF GR'S TO WCS

023234  005277  157576          2$      INC     @WCSAR
023240  017700  157574                  MOV     @WCSDR,R0
023244  020027  001100                  CMP     R0,#1100
023250  001414                          BEQ     3$
023252  017737  157560  001162          MOV     @WCSAR $REG0
023260  012737  001100  001164          MOV     #1100,$REG1
023266  010037  001166                  MOV     R0,$REG2
023272  012737  000006  001170          MOV     #6,$REG3
023300  104040                          ERROR   40
023302  005277  157530          3$      INC     @WCSAR
023306  017700  157526                  MOV     @WCSDR,R0       ;READ WCS FOR SAVED R6
023312  020027  001500                  CMP     R0,#1500        WAS R6 SAVED CORRECTLY?
023316  001414                          BEQ     4$              ;YES

023320  017737  157512  001162          MOV     @WCSAR,$REG0
023326  012737  001500  001164          MOV     #1500,$REG1
023334  010037  001166                  MOV     R0,$REG2
023340  012737  000016  001170          MOV     #16,$REG3
023346  104040                          ERROR   40              R6 WAS NOT SAVED CORRECTLY DURING
                                                                ;BLOCK MOVE OF GR'S TO WCS

023350  012700  000555          4$      MOV     #555 R0
```

```
023354  005277  157456          7$      INC     @WCSAR
023360  017701  157454                  MOV     @WCSDR,R1
023364  020001                          CMP     R0,R1
023366  001412                          BEQ     5$
023370  017737  157442  001162          MOV     @WCSAR,$REG0
023376  010037  001164                  MOV     R0,$REG1
023402  010137  001166                  MOV     R1,$REG2
023406  010037  001170                  MOV     R0,$REG3

023412  104040                          ERROR   40              ;CORRECT DATA WAS NOT SAVED IN
                                                                ;WCS DURING BLOCK MOVE FUNCTION
                                                                ;(SAVING R0-R7)
023414  162700  000111          5$      SUB     #111,R0
023420  100355                          BPL     7$

023422  000412                          BR      TST55           ;;EXIT

                                .       ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                .       A BLOCK MOVE FUNCTION (GR'S TO WCS) IN THE WCS

023424  012777  000020  157402  6$      MOV     #FARDIS,@WCSST
023432  022626                          CMP     (SP)+,(SP)+
023434  005077  157374                  CLR     @WCSST
023440  012737  076720  001162          MOV     #XFCUDIS $REG0
023446  104041                          ERROR   41              ;WCS WATCH DOG TIMED OUT
                                                                ;UPON TRANSFERRING CONTROL FROM
                                                                ;BASE MACHINE TO WCS MICROCODE
                                                                ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                ; SHOULD BE RETURNED TO BASE MACHINE


                        ***********************************************************
                        *TEST 55        CHECK BLOCK MOVE FROM WCS TO GR'S
                                .       THIS TEST CHECKS THE BLOCK LOAD GR FUNCTION OF THE WCS
                                        WHEN THIS FUNCTION IS INITIATED GR'S IN THE BASE-
                                        MACHINE ARE LOADED FROM THE WCS. THE FOLLOWING REGISTERS
                                        ARE LOADED IN THE GIVEN ORDER=

                                        R7,R6(KERNEL)  R6 (USER), R5,R4,R3,R2 R1,R0

                                        A BLOCK OF NINE LOCATIONS IN THE WCS IS INITIALIZED
                                        TO A KNOWN STATE, BY WRITING UNIQUE DATA PATTERNS
                                        IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        A "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        THE MICRO-CODE SETS UP IN "D" (BASE MACHINE . THE
                                        ADDRESS,(WCS) STARTING WHICH THE WORDS WILL BE
                                        LOADED FROM THE WCS INTO THE GR'S  THEN THIS
                                        MICRO-CODE SELECTS THE WCS HOT BOX AND TRANSFERS
                                        CONTROL TO THE TMS-ROM WHICH ACTUALLY DOES THE
                                        LOAD OF GR'S  AFTER THE GR'S HAVE BEEN LOADED.
                                        THE MICRO-CODE RETURNS CONTROL TO THE BASE MACHINE
```

```
                                        ;       THE GR'S ARE THEN CHECKED TO MAKE SURE THAT THE
                                        ;       CORRECT DATA WAS LOADED FROM THE WCS INTO THE
                                        ;       GR'S  IF NOT AN ERROR IS REPORTED

                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL IS
                                        ;       NOT TRANSFERRED BACK TO THE BASE MACHINE, THE
                                        ;       WATCH-DOG WILL TIME OUT AND A TRAP TO 114 WILL
                                        ;       OCCUR

                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE=
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINTER CIRCUIT
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS  (NUA<9=0>,ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B-PORT, BUS-U LINES)

                                        ;;*****************************************************************
023450  000004                          TST55   SCOPE
023452  012737  024276  000056                  MOV     #TST56,NXTST    ;STARTING ADDRESS OF NEXT TEST
023460  004537  037472                          JSR     R5 LDWCS        ;LOAD WCS WITH MICRO-CODE
023464  006136                                  6136                    ;MAIN CONTROL BLOCK LOADED HERE
023466  060772                                  MLSGR                   ;FROM THIS MEMORY ADDRESS
023470  006002                                  UDISP                   ;ENTRY POINT INTO WCS

023472  013701  003036                          MOV     WCSAR,R1
023476  013700  003040                          MOV     WCSDR,R0
023502  012711  002525                          MOV     #2525,@R1       ;ADDRESS THE WCS
                                                                        ;INITIALIZE A BLOCK (9 WORDS)
023506  012710  023616                          MOV     #15,@R0         ;PC
023512  005211                                  INC     @R1
023514  012710  001070                          MOV     #1070,(R0)      ;R6 (KERNEL)
023520  005211                                  INC     @R1
023522  012710  001060                          MOV     #1060 (R0)      ;R6 (USER)
023526  005211                                  INC     @R1
023530  012710  000015                          MOV     #15,(R0)        ;R5
023534  005211                                  INC     @R1
023536  012710  000014                          MOV     #14,(R0)        ;R4
023542  005211                                  INC     @R1
023544  012710  000013                          MOV     #13 (R0)        ;R3
023550  005211                                  INC     @R1
023552  012710  000012                          MOV     #12,(R0)        ;R2
023556  005211                                  INC     @R1
023560  012710  000011                          MOV     #11,(R0)        ;R1
023564  005211                                  INC     @R1
023566  012710  000010                          MOV     #10,(R0)        ;R0
023572  012737  024252  000114                  MOV     #155,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG
                                                                        ;TIMER

023600  012777  001000  157226                  MOV     #MAINT,@WCSST   ;SETUP MAINT BIT, TIMER WILL START
                                                                        ;WHEN WCS HOT BOX IS SELECTED, UPON
                                                                        ;TRANSFERRING CONTROL TO WCS
023606  012706  001074                          MOV     #1074 R6
023612  076700                                  XFCUDIS                 ;TRANSFER CONTROL TO WCS
023614  000000                                  HALT
023616                                  15                              ;RETURN FROM WCS TO THIS POINT
```

```
023616  042777  001000  157210          BIC     #MAINT,@WCSST   ,SHUT OFF THE TIMER
023624  012737  003344  000114          MOV     #BADPAR,@#114   ,RESET UNEXPECTED BAD PARITY HANDLER
023632  010637  003046                  MOV     R6,TMP0
023636  012706  001100                  MOV     #1100,R6
023642  020027  000010                  CMP     R0,#10          ,CORRECT DATA RESTORED  N R0 FROM WCS?
023646  001414                          BEQ     2$
023650  012737  002535  001170          MOV     #2535,$REG3
023656  012737  000010  001164          MOV     #10,$REG1
023664  010037  001166                  MOV     R0,$REG2
023670  012737  000000  001162          MOV     #0,$REG0
023676  104042                          ERROR   42

023700  020127  000011          2$      CMP     R1,#11  ,CORRECT DATA RESTORED IN R1 FROM WCS?
023704  001414                          BEQ     3$
023706  012737  002534  001170          MOV     #2534,$REG3
023714  012737  000011  001164          MOV     #11,$REG1
023722  010137  001166                  MOV     R1,$REG2
023726  012737  000001  001162          MOV     #1,$REG0
023734  104042                          ERROR   42

023736  020227  000012          3$      CMP     R2,#12          CORRECT DATA RESTORED IN R2 FROM WCS?
023742  001414                          BEQ     4$
023744  012737  002533  001170          MOV     #2533,$REG3
023752  012737  000012  001164          MOV     #12,$REG1
023760  010237  001166                  MOV     R2,$REG2
023764  012737  000002  001162          MOV     #2,$REG0
023772  104042                          ERROR   42

023774  020327  000013          4$      CMP     R3,#13
024000  001414                          BEQ     5$
024002  012737  002532  001170          MOV     #2532,$REG3
024010  012737  000013  001164          MOV     #13,$REG1
024016  010337  001166                  MOV     R3,$REG2
024022  012737  000003  001162          MOV     #3,$REG0
024030  104042                          ERROR   42

024032  020427  000014          5$      CMP     R4,#14
024036  001414                          BEQ     6$
024040  012737  002531  001170          MOV     #2531,$REG3
024046  012737  000014  001164          MOV     #14,$REG1
024054  010437  001166                  MOV     R4,$REG2
024060  012737  000004  001162          MOV     #4,$REG0
024066  104042                          ERROR   42

024070  020527  000015          6$      CMP     R5 #15
024074  001414                          BEQ     7$
024076  012737  002530  001170          MOV     #2530,$REG3
024104  012737  000015  001164          MOV     #15,$REG1
024112  010537  001166                  MOV     R5,$REG2
024116  012737  000005  001162          MOV     #5,$REG0
024124  104042                          ERROR   42

024126  012737  140000  177776  7$      MOV     #140000 @#PSW
024134  010637  003050                  MOV     R6,TMP1
024140  005037  177776                  CLR     @#PSW
```

```
024144  022737  001060  003050          CMP     #1060,TMP1
024152  001415                          BEQ     8$
024154  012737  002527  001170          MOV     #2527,$REG3
024162  012737  001060  001164          MOV     #1060,$REG1
024170  013737  003050  001166          MOV     TMP1,$REG2
024176  012737  000016  001162          MOV     #16,$REG0
024204  104042                          ERROR   42
024206  023727  003046  001070  8$      CMP     TMP0,#1070
024214  001415                          BEQ     9$
024216  012737  002526  001170          MOV     #2526,$REG3
024224  012737  001070  001164          MOV     #1070,$REG1
024232  013737  003046  001166          MOV     TMP0,$REG2
024240  012737  000006  001162          MOV     #6,$REG0
024246  104042                          ERROR   42

024250                          9$
024250  000412                          BR      TST56           ;.EXIT

024252  012777  000020  156554  15$     MOV     #PARDIS,@WCSST
024260  022626                          CMP     (SP)+,(SP)+
024262  005077  156546                  CLR     @WCSST
024266  012737  076700  001162          MOV     #XFCUDIS,$REG0
024274  104043                          ERROR   43              ;WCS WATCH DOG TIMED OUT
                                                                ;UPON TRANSFERRING CONTROL FROM
                                                                ;BASE MACHINE TO WCS MICROCODE
                                                                ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                ;SHOULD BE RETURNED TO BASE MACHINE

                                ;*****************************************************************
                                ;*TEST 56        CHECK BLOCK MOVE OF FLOATING POINT REGISTERS TO WCS
                                        THIS TEST CHECKS THE BLOCK STORE WFP FUNCTION OF THE WCS
                                        WHEN THIS  FUNCTION IS INITIATED A BLOCK OF WARM
                                        FLOATING POINT REGISTERS GET TRANSFERRED FROM THE
                                ;       BASE MACHINE TO THE WCS  THE FOLLOWING WFP REGISTER
                                        ARE STORED IN THE GIVEN ORDER
                                ;       FAC 0 5 ,FAC1  5 , FAC2  5 ,FAC3  5 ,FACO  4 ,   FAC3  0

                                ;       THE WFP REGISTERS ARE INITIALIZED TO A KNOWN STATE,
                                        BY WRITING UNIQUE DATA PATTERNS IN THEM
                                        THE MICRO-CODE IS LOADED IN WCS  USING A "XFC"
                                        DISPATCH INSTRUCTION CONTROL IS TRANSFERRED TO THE
                                        MICRO-CODE IN WCS

                                        THE MICRO-CODE SETS UP IN "D" (BASE-MACHINE), THE
                                        ADDRESS (WCS) STARTING WHICH THE WFP REGISTERS
                                        SHOULD BE STORED IN THE WCS  THEN THE MICRO-CODE
                                        SELECTS THE WCS HOT BOX AND TRANSFERS CONTROL TO THE
                                        TMS-ROM WHICH ACTUALLY DOES THE STORE OF WFP
                                        REGISTERS  CONTROL IS RETURNED TO THE BASE MACHINE

                                        THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE WFP REGISTERS WAS STORED CORRECTLY  IF NOT,
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF
                                        AS A RESULT OF SOME FAULT-CONDITION, THE CONTROL
```

```
                                        ,       IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                        ;       THE WATCH-DOG WILL TIME OUT AND A TRAP TO
                                        ,       114 WILL OCCUR.

                                        ,       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE =
                                        ,               TMS-CROM SECTION OF WCS INCLUDING ENTRY POINTER
                                        ,               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ,               CONTROL PATH USED BY MICRO-CODE EXECUTING
                                        ,               FROM THE WCS. (NUA<9:0>, ARRAY ADDRESS MUX-
                                        .               A-PORT,BUS-U-MUX-B-PORT, BUS-U-LINES.
                                        ,,*****************************************************************
024276  000004                          TST56   SCOPE
024300  012737  024506  003056                  MOV     #TST57,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                        ,       INITIALIZE AND WRITE PATTERNS INTO WFP REGISTERS
024306  012701  000030                          MOV     #24 ,R1         ,COUNT FOR 24 FP REGISTERS
024312  005037  024336                          CLR     2$
024316  012702  003174                          MOV     #FAC05W,R2      ,INITIALIZE POINTER TO WRITE MED CODE
024322  012703  003224                          MOV     #PFAC05,R3      ,INITIALIZE POINTER TO THE PATTERN
                                                                        ;TO BE WRITTEN IN THE FLOATING
                                                                        ,POINT REGISTERS;
024326  112237  024336                  1$      MOVB    (R2)+,2$        ,INSERT THE MED CODE FOR
                                                                        ,WRITING INTO FP REGISTER
024332  112300                                  MOVB    (R3)+,R0        ,WRITE THIS PATTERN

024334  076600                                  MED                     ,WRITE PATTERN INTO THE
024336  000000                          2$       WORD   0               ,FP REGISTER USING THIS MED CODE

024340  077106                                  SOB     R1,1$           ,WRITTEN ALL FP REGISTERS?

                                        ,       LOAD UP WCS WITH MICRO-CODE, WHICH WILL STORE
                                                THE WFP REGISTERS IN WCS

024342  004537  037472                          JSR     R5,LDWCS        ,LOAD WCS WITH MICRO-CODE
024346  006046                                  6046                    ,MAIN CONTROL BLOCK LOADED HERE
024350  061076                                  MFPLS                   ,FROM THIS MEMORY ADDRESS
024352  006002                                  UDISP                   ,ENTRY  POINT INTO WCS
024354  012737  024470  000114                  MOV     #5$,@#114       ,VECTOR FOR WCS WATCH DOG TIMER
024362  012777  001000  156444                  MOV     #MAINT,@WCSST   ,SETUP MAINT  BIT, TIMER WILL
                                                                        ,START WHEN WCS HOT BOX IS SELECTED

024370  076700                                  XFCUDIS                 ,TRANSFER CONTROL TO WCS
                                                                        ,AND STORE FP REGISTERS IN WCS
                                                                        ,STARTING AT WCS LOCATION 1200

                                                                        ,RETURN HERE FROM WCS

024372  042777  001000  156434                  BIC     #MAINT,@WCSST   ,START OFF TIMER
024400  012737  003344  000114                  MOV     #BADPAR,@#114   ,RESET BAD PARITY HANDLER

                                        ,       CHECK IF THE FP REGISTERS WERE STORED CORRECTLY IN WCS

024406  012704  000030                          MOV     #24 ,R4         ,SET COUNT

024412  012700  003224                          MOV     #PFAC05,R0       INITIALIZE POINTER TO THE
                                                                        ,PATTERN THAT WAS WRITTEN
024416  012701  001200                          MOV     #1200,R1        ,INITIALIZE WCSADR
```

```
024422  112002                  3$      MOVB    (R0)+,R2        ;GOOD DATA PATTERN THAT
                                                                ;WAS SAVED
024424  010177  156406                  MOV     R1,@WCSAR       ;WCS READ
024430  017703  156404                  MOV     @WCSDR,R3       ;FROM THIS WCS LOCATION
024434  020203                          CMP     R2,R3           ;WAS THE CORRECT DATA
                                                                ;STORED IN WCS FROM
                                                                ;THE FP REGISTER?
024436  001411                          BEQ     4$              ;YES

024440  010137  001162                  MOV     R1,$REG0        ;WCS LOC THAT WAS READ
024444  010237  001164                  MOV     R2,$REG1        ;EXPECTED DATA
024450  010337  001166                  MOV     R3,$REG2        ;DATA ACTUALLY READ
024454  010237  001170                  MOV     R2,$REG3        ;FAC REGISTER NUMBER
024460  104046                          ERROR   46              ;CORRECT DATA WAS NOT STORED ON BLOCK
                                                                ;MOVE OF WFP REGISTERS TO WCS

024462  005201                  4$      INC     R1              ;NEXT WCS ADDRESS
024464  077422                          SOB     R4,3$           ;DONE?
024466  000407                          BR      6$

                                ;       ENTER HERE IF THE WATCH-DOG TIMED OUT

024470  022626                  5$      CMP     (SP)+,(SP)+     ;POP THE STACK
024472  012777  000020  156334          MOV     #PAPDIS,@WCSST  ;CLEAR PARITY ERROR (BIT 15)
024500  005077  156330                  CLR     @WCSST
024504  104047                          ERROR   47              ;WATCH-DOG TIMED OUT ON STORING OF
                                                                ;WFP REGISTERS IN WCS
024506                          6$                              ;EXIT

                                ;;*****************************************************************
                                ;*TEST 57        CHECK BLOCK MOVE FROM WCS TO WFP REGISTERS
                                ;       THIS TEST CHECKS THE BLOCK LOAD FP FUNCTION OF THE WCS
                                ;       WHEN THIS FUNCTION IS INITIATED WFP REGISTERS IN THE BASE
                                ;       MACHINE ARE LOADED FROM THE WCS  THE FOLLOWING REGISTERS
                                        ARE LOADED IN THE GIVEN ORDER.

                                        FAC0 5  FAC1 5 ,FAC2 5 ,FAC3 5 ,FAC0 4 ,    FAC3 0

                                        A BLOCK OF 24 LOCATIONS IN THE WCS IS INITIALIZED
                                        TO A KNOWN STATE, BY WRITING UNIQUE DATA PATTERNS
                                        IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        A "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        THE MICRO-CODE SETS UP IN "D" (BASE MACHINE), THE
                                        ADDRESS(WCS) STARTING WHICH THE WORDS WILL BE
                                        LOADED FROM THE WCS INTO THE WFP-REGS  THEN THIS
                                        MICRO-CODE SELECTS THE WCS HOT BOX AND TRANSFERS
                                        CONTROL TO THE TMS-ROM WHICH ACTUALLY DOES THE
                                        LOAD OF WFP REGS  AFTER THE WFP REGS HAVE BEEN LOADED
                                        THE MICRO-CODE RETURNS CONTROL TO THE BASE MACHINE

                                        THE WFP REGS ARE THEN CHECKED TO MAKE SURE THAT THE
```

```
                                        ;       CORRECT DATA WAS LOADED FROM  THE WCS INTO THE
                                        ;       WFP REGS  IF NOT AN ERROR IS REPORTED

                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMERS  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL IS
                                        ;       NOT TRANSFERRED BACK TO THE BASE MACHINE, THE
                                        ;       WATCH-DOG WILL TIME OUT AND A TRAP TO 114 WILL
                                        ;       OCCUR

                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINTER CIRCUIT
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS  (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B-PORT, BUS-U LINES)

                                        ;;*****************************************************************
024506  000004                          TST57   SCOPE
024510  012737  024776  003056                  MOV     #TST60,NXTST    ;STARTING ADDRESS OF NEXT TEST

                                        ;       CLEAR OUT THE WFP REGISTEPS IN BASE MACHINE

024516  012702  000030                          MOV     #24 ,R2                 ;INITIALIZE COUNT
024522  012701  003174                          MOV     #FPC05W,R1              ;INITIALIZE POINTER TO WRITE MED CODE
024526  005037  024542                          CLR     3$                      ;FOR WFP REGISTERS
024532  112137  024542          2$              MOVB    (R1)+,3$                ;INSERT MED CODE FOR WRITING INTO
                                                                                ;FP REGISTER
024536  005000                                  CLR     R0                      ;WRITE A 0 PATTERN
024540  076600                                  MED                             ;WRITE A ZERO IN THE FP
024542  000000                  3$               WORD   0                       ;REGISTER POINTED BY THIS CODE

024544  077206                                  SOB     R2,2$                   ;DONE?


                                        ;       LOAD THE WCS WITH MICRO-CODE, WHICH WILL TRANSFER DATA
                                        ;       FROM WCS TO WFP PEGISTERS IN BASE MACHINE

024546  004537  037472                          JSR     R5,LDWCS                ;LOAD WCS WITH MICRO-CODE
024552  006256                                  6256                            ;MAIN CONTROL BLOCK LOADED HERE
024554  061202                                  MLSFP                            FROM THIS MEMORY ADDRESS
024556  006002                                  UDISP                            ENTRY POINT INTO WCS

                                                LOAD THE WCS WITH DATA PATTERNS STARTING AT WCS LOCATION 1100

024560  012700  000030                          MOV     #24  R0                 ;INITIALIZE COUNT
024564  012701  001100                          MOV     #1100,R1                ;INITIALIZE THE WCS ADDRESS STARTING
                                                                                ;WHICH THE PATTERNS WILL BE WRITTEN
024570  012702  003224                          MOV     #PFAC05,R2              ;INITIALIZE POINTER TO THE PATTERN

024574  010177  156236          1$              MOV     R1,@WCSAR               ;ADDRESS THE WCS LOCATION
024600  112203                                  MOVB    (R2)+,R3                ;GET THE PATTERN AND FORM A
024602  052703  000300                          BIS     #300,R3                 ;NEW ONE FOR LOADING INTO WCS
024606  010377  156226                          MOV     R3,@WCSDR               ;WRITE THE PATTERN INTO WCS
024612  005201                                  INC     R1                       NEXT WCS ADDRESS
024614  077011                                  SOB     R0,1$                    DONE?
```

```
024616  012737  024760  000114          MOV     #7$,@#114               ;SETUP VECTOR FOR WCS WATCH-DOG
024624  012777  001000  156202          MOV     #MAINT,@WCSST           ;SET MAINT BIT, TIMER WILL START
                                                                        ;WHEN WCS IS SELECTED

024632  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS AND
                                                                        ;LOAD FP REGISTERS FROM WCS
                                                                        ;STARTING AT LOC 1100


                                                                        ;RETURN HERE FROM WCS

024634  042777  001000  156172          BIC     #MAINT,@WCSST           ;SHUT OFF TIMER
024642  012737  003344  000114          MOV     #BADPAR,@#114           ;RESET BAD PARITY HANDLER

                                ;       CHECK IF THE FLOATING POINT REGISTERS WERE LOADED
                                ;       CORRECTLY FROM WCS

024650  012701  000030                  MOV     #24 ,R1                 ;COUNT FOR 24 REGISTERS
024654  012702  003174                  MOV     #FAC05W,R2              ;INITIALIZE POINTER TO THE MED CODES
024660  012703  003224                  MOV     #PFAC05,R3              ;INITIALIZE POINTER TO THE PATTERNS
024664  005037  024710                  CLR     5$
024670  012705  001100                  MOV     #1100,R5                ;START OF WCS LOC FROM WHICH DATA WAS
                                                                        ;LOADED INTO WFP
024674  112237  024710          4$      MOVB    (R2)+,5$                ;GET THE MED CODE AND
024700  042737  000200  024710          BIC     #200,5$                 ;FORM THE RIGHT CODE FOR READING

024706  076600                          MED                              READ THE WFP REGISTER POINTED
024710  000000                  5$       WORD   0                        ; Y THIS MED CODE

024712  112304                          MOVB    (R3)+,R4                ;GET THE GOOD PATTERN TO BE USED
024714  052704  000300                  BIS     #300,R4                 ;FOR CHECKING (NEW PATTERN IS
                                                                        ;USED BY 'OR'ING BITS 6 8 7

024720  020004                          CMP     R0,R4                    CHECK IF THE PATTERN LOADED INTO
                                                                        ;WFP REGISTER (R0) IS AS EXPECTED (R4)
024722  001413                          BEQ     6$                      ;IF YES, OK
024724  010437  001164                  MOV     R4,$REG1                ;SAVE EXPECTED DATA
024730  042704  000300                  BIC     #300,R4
024734  010437  001162                  MOV     R4,$REG0                ;SAVE FP REGISTER NUMBER WHICH
                                                                        ;DID NOT HAVE THE CORRECT DATA
024740  010037  001166                  MOV     R0,$REG2                ;SAVE DATA RECEIVED
024744  010537  001170                  MOV     R5,$REG3                ;SAVE WCS LOC FROM WHERE THE
                                                                        ;DATA WAS READ
024750  104050                          ERROR   50                      ;CORRECT DATA WAS NOT FOUND
                                                                        ;IN WARM FP REGISTERS IN
                                                                        ;THE BASE MACHINE, AFTER
                                                                        ;HAVING DONE A BLOCK MOVE
                                                                        ;(LOAD) OF WFP REGISTERS FROM
                                                                        ;WCS   THE WFP REGISTER NUMBER IS
                                                                         GIVEN IN THE ERROR MESSAGE
                                                                        ;THE MESSAGE ABS GIVES THE
                                                                        ;WCS LOCATION FROM WHICH THE
                                                                        ;WFP REG WAS LOADED AND
                                                                        ;ALSO THE EXPECTED AND
                                                                        ;RECVD  DATA IN THE
                                                                        ;WFP REGISTER
```

```
024752  005205                  6$      INC     R5                      ,NEXT WCS LOCATION
024754  077131                          SOB     R1,4$                   ,DONE CHECKING?

024756  000407                          BR      TST60           ,,EXIT


                                ,       ENTER HERE, IF THE WCS WATCH DOG TIMER TIMED OUT
                                ,       ON TRANSFERRING CONTROL TO WCS   THE CONTROL WAS
                                ,       TRANSFERRED TO WCS TO LOAD THE WFP REGISTERS
                                ,       FROM THE WCS


024760  022626                  7$      CMP     (SP)+,(SP)+             ,POP THE STACK
024762  012777  000020  156044          MOV     #PARDIS,@WCSST          ,CLEAR OUT ERROR BIT (15)
024770  005077  156040                  CLR     @WCSST
024774  104051                          ERROR   51                      ,WCS WATCH-DOG TIMED OUT
                                                                        ,WHEN CONTROL WAS PASSED TO
                                                                        ,WCS TO LOAD THE WFP
                                                                        ,REGISTERS



                                ,,*****************************************************************
                                *TEST 60        CHECK BLOCK MOVE OF C-SCRATCH PAD REGISTERS TO WCS
                                        THIS TEST CHECKS THE BLOCK STORE CSP FUNCTION OF THE WCS
                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF C-
                                        SCRATCH PAD REGISTERS GET TRANSFERRED FROM THE
                                ,       BASE MACHINE TO THE WCS. THE FOLLOWING CSP REGISTER
                                        ARE STORED IN THE GIVEN ORDER
                                ,       CSP 0 ,CSP 1 ,CSP 2 ,   CSP 11

                                ,       THE CSP REGISTERS ARE INITIALIZED TO A KNOWN STATE,
                                ,       BY WRITING UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS LOADED IN WCS  USING A "XFC"
                                        DISPATCH INSTRUCTION CONTROL IS TRANSFERRED TO THE
                                ,       MICRO-CODE IN WCS

                                        THE MICRO-CODE SETS UP IN "D" (BASE-MACHINE), THE
                                        ADDRESS (WCS) STARTING WHICH THE CSP REGISTERS
                                        SHOULD BE STORED IN THE WCS  THEN THE MICRO-CODE
                                        SELECTS THE WCS HOT BOX AND TRANSFERS CONTROL TO THE
                                        TMS-ROM WHICH ACTUALLY DOES THE STORE OF CSP
                                        REGISTERS  CONTROL IS RETURNED TO THE BASE MACHINE

                                        THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE CSP REGISTERS WAS STORED CORRECTLY  IF NOT
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF
                                        AS A RESULT OF SOME FAULT-CONDITION, THE CONTROL
                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                        THE WATCH-DOG WILL TIME OUT AND A TRAP TO
```

```
                                        ;       114 WILL OCCUR.

                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE =
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY POINTER
                                        ;               BUS-U-MUX-PORT-A,SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING
                                        ;               FROM THE WCS  (NUA<9:0>, ARRAY ADDRESS MUX-
                                        ;               A-PORT, BUS-U-MUX-B-PORT,BUS-U-LINES

                                        ;;*****************************************************************
024776  000004                          TST60   SCOPE
025000  012737  025216  003056                  MOV     #TST61,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                        ;       INITIALIZE AND WRITE PATTERNS INTO CSP REGISTERS
025006  012701  000014                          MOV     #12 ,R1         ;COUNT FOR 24 FP REGISTERS
025012  005037  025036                          CLR     2$
025016  012702  003254                          MOV     #CSP00W,R2      ;INITIALIZE POINTER TO WRITE MED CODE
025022  012703  000200                          MOV     #200,R3         ;INITIALIZE PATTERN TO BE WRITTEN
025026  112237  025036                  1$      MOVB    (R2)+,2$        ;INSERT THE MED CODE FOR
                                                                        ;WRITING INTO CSP REG STER
025032  010300                                  MOV     R3,R0           ;WRITE THIS PATTERN

025034  076600                                  MED                     ;WRITE PATTERN INTO THE
025036  000000                          2$       WORD   0               ;CSP REGISTER USING THIS MED CODE

025040  005203                                  INC     R3
025042  077101                                  SOB     R1,1$           ;WRITTEN ALL CSP REGISTERS?

                                                LOAD UP WCS WITH MICRO-CODE, WHICH WILL STORE
                                                THE CSP REGISTERS IN WCS

025044  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
025050  006066                                  6066                    ;MAIN CONTROL BLOCK LOADED HERE
025052  061306                                  MCSLS                   ;FROM THIS MEMORY ADDRESS
025054  006002                                  UDISP                   ;ENTRY POINT INTO WCS
025056  012737  025200  000114                  MOV     #5$,@#114       ;VECTOR FOR WCS WATCH DOG TIMER
025064  012777  001000  155742                  MOV     #MAINT,@WCSST   ;SETUP MAINT  BIT, TIMER WILL
                                                                        ;START WHEN WCS HOT BOX IS SELECTED

025072  076700                                  XFCUDIS                 ;TRANSFER CONTROL TO WCS
                                                                        ;AND STORE CSP REGISTERS IN WCS
                                                                        ;STARTING AT WCS LOCATION 1200

                                                                        ;RETURN HERE FROM WCS

025074  042777  001000  155732                  BIC     #MAINT,@WCSST   ;START OFF TIMER
025102  012737  003344  000114                  MOV     #BADPAR,@#114   ;RESET BAD PARITY HANDLER

                                                CHECK IF THE CSP REGISTERS WERE STORED CORRECTLY IN WCS

025110  012704  000014                          MOV     #12 ,R4         ;SET COUNT
025114  005005                                  CLR     R5              ;INITIALIZE CSP REGISTER NUMBER

025116  012700  000200                          MOV     #200,R0         ;INITIALIZE PATTERN TTHAT WAS WR TTEN
025122  012701  001040                          MOV     #1040,R1        ;INITIALIZE WCSADR

025126  010002                          3$      MOV     PC,R2   GOOD DATA PATTERN THAT
```

```
                                                                        ,WAS SAVED
025130  010177  155702                  MOV     R1,@WCSAR               ,WCS READ
025134  017703  155700                  MOV     @WCSDR,R3               ,FROM THIS WCS LOCATION
025140  020203                          CMP     R2,R3                   ,WAS THE CORRECT DATA
                                                                        ;STORED IN WCS FROM
                                                                        ,THE FP REGISTER?
025142  001411                          BEQ     4$                      ,YES

025144  010137  001162                  MOV     R1,$REG0                ,WCS LOC THAT WAS READ
025150  010237  001164                  MOV     R2,$REG1                ,EXPECTED DATA
025154  010337  001166                  MOV     R3,$REG2                ,DATA ACTUALLY READ
025160  010537  001170                  MOV     R5,$REG3                ,CSP REGISTER NUMBER
025164  104052                          ERROR   52                      ,CORRECT DATA WAS NOT STORED ON BLOCK
                                                                        ,MOVE OF CSP REGISTERS TO WCS
025166  005200                  4$      INC     R0                      ,NEXT DATA PATTERN
025170  005205                          INC     R5
025172  005201                          INC     R1                      ,NEXT WCS ADDRESS

025174  077424                          SOB     R4,3$                   ,DONE?
025176  000407                          BR      TST61                   ,,EXIT

                                        ENTER HERE IF THE WATCH-DOG TIMED OUT

025200  022626                  5$      CMP     (SP)+,(SP)+             ,POP THE STACK
025202  012777  020000  155624          MOV     #PAPDIS,@WCSST          CLEAR PAR TY ERROR (BIT 15)
025210  005077  155620                  CLR     @WCSST
025214  104053                          ERROR   53                      WATCH-DOG TIMED OUT ON STORING OF
                                                                        ,CSP REGISTERS IN WCS


                        ***************************************************************
                        *TEST 61        CHECK BLOCK MOVE FROM WCS TO C-SCRATCH PAD, CSP
                                THIS TEST CHECKS THE BLOCK LOAD CSP FUNCTION OF THE WCS
                                WHEN THIS FUNCTION IS INITIATED CSP IN THE BASE
                                MACHINE ARE LOADED FROM THE WCS  THE FOLLOWING REGISTER
                                ARE LOADED IN THE GIVEN ORDER

                                CSP 0 ,CSP 1 ,CSP 2     CSP 11

                                A BLOCK OF 12 LOCATIONS IN THE WCS IS INITIALIZED
                                TO A KNOWN STATE, BY WRITING UNIQUE DATA PATTERN
                                IN THEM

                                THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                A "XFC" DISPATCH INSTRUCTION CONTROL  S TRANSFERRED
                                TO THE MICRO-CODE IN THE WCS

                                THE MICRO-CODE SETS UP IN "D" (BASE MACHINE), THE
                                ADDRESS(WCS) STARTING WHICH THE WORDS WILL BE
                                LOADED FROM THE WCS INTO THE CSP  THEN THIS
                                MICRO-CODE SELECTS THE WCS HOT BOX AND TRANSFERS
                                CONTROL TO THE TMS-ROM WHICH ACTUALLY DOES THE
                                LOAD OF CSP  AFTER THE CSP HAVE BEEN LOADED,
                                THE MICRO-CODE RETURNS CONTROL TO THE BASE MACHINE

                                THE CSP ARE THEN CHECKED TO MAKE SURE THAT THE
```

```
                                        ;       CORRECT DATA WAS LOADED FROM THE WCS INTO THE
                                        ;       CSP  IF NOT AN ERROR IS REPORTED.
                                        ;
                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL IS
                                        ;       NOT TRANSFERRED BACK TO THE BASE MACHINE, THE
                                        ;       WATCH-DOG WILL TIME OUT AND A TRAP TO 114 WILL
                                        ;       OCCUR
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINTER CIRCUIT
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS  (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B-PORT,BUS-U LINES)
                                        ;
                                        ;;*****************************************************************
025216  000004                          TST61   SCOPE
025220  012737  025474  007056                  MOV     #TST62,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                        ;
                                        ;
                                        ;       CLEAR OUT CSP 0  TO CSP 12  IN BASE MACHINE
                                        ;
025226  012702  000014                          MOV     #12.,R2                 INITIALIZE COUNT
025232  012701  000254                          MOV     #CSP00W,R1              INITIALIZE POINTER TO WRITE MED CODE
025236  005037  025252                          CLR     2$                      FOR CSP'S
                                        ;
025242  112137  025252          2$              MOVB    (R1)+,2$                INSERT MED CODE FOR WRITING INTO
                                        ;                                       CSP
                                        ;
025246  005000                          ;       CLR     R0                      WRITE A 0 PATTERN
025250  076600                          ;       MEC                             WRITE A 0 IN THE CSP
025252  000000                  2$      ;       WTPL                            POINTED BY THIS CODE
                                        ;
025254  077206                          ;       SOB     R2,2$                   DONE?
                                        ;
                                        ;
                                        ;       LOAD THE WCS WITH MICRO-CODE WHICH WILL TRANSFER DATA
                                        ;       FROM WCS TO CSP REGISTERS IN THE BASE MACHINE
                                        ;
025256  004537  007472                          JSR     R5,LDWCS                LOAD WCS WITH MICRO-CODE
025262  006476                          ;       6476                            MAIN CONTROL BLOCK LOADED HERE
025264  061412                          ;       MLSCS                           FROM THIS MEMORY ADDRESS
025266  006002                          ;       UDISP                           ENTRY POINT INTO WCS
                                        ;
                                        ;       LOAD THE WCS WITH DATA PATTERNS STARTING AT WCS LOCATION 1020
                                        ;
025270  012700  000014                          MOV     #12.,R0                 INITIALIZE COUNT
025274  012701  001020                          MOV     #1020,R1                INITIALIZE THE WCS ADDRESS
                                                                                STARTING WHICH THE PATTERNS WILL BE WRITTEN
025300  012702  000100                          MOV     #100,R2                 INITIALIZE DATA PATTERN TO BE WRITTEN
                                        ;
025304  010177  15.  26         1$              MOV     R1,@WCSAR               ADDRESS THE WCS LOCATION
025310  010277  155524                          MOV     R2,@WCSDR               WRITE THE PATTERN INTO  WCS LOC
025314  005202                          ;       INC     R2
025316  005201                          ;       INC     R1                      NEXT WCS LOCATION
```

```
025320  077007                          SOB     R0,1$                   ;DONE?

025322  012737  025456  000114           MOV     #7$,@#114               ;SETUP VECTOR FOR WCS WATCH-DOG
025330  012777  001000  155476           MOV     #MAINT,@WCSST           ;SET MAINT BIT, TIMER WILL
                                                                         ;START WHEN WCS IS SELECTED
025336  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS AND
                                                                         ;LOAD CSP REGISTERS FROM
                                                                         ;WCS (STARTING AT LOC 1040)


                                                                         ;RETURN HERE FROM WCS

025340  042777  001000  155466           BIC     #MAINT,@WCSST           ;SHUT OFF TIMER
025346  012737  003344  000114           MOV     #BADPAR,@#114           ;RESET BAD PARITY HANDLER

                                        ;CHECK IF THE CSP REGISTERS WERE LOADED CORRECTLY
                                        ;FROM WCS

025354  012701  000014                  MOV     #12.,R1                 ;COUNT FOR 12 REGISTERS
025360  012702  003254                  MOV     #CSP00W,R2              ;INITIALIZE POINTER TO MED CODES
025364  012704  000100                  MOV     #100,R4                 ;INITIALIZE DATA PATTERN
025370  005037  025416                  CLR     5$
025374  005003                          CLR     R3
025376  012705  001040                  MOV     #1040,R5                ;START OF WCS LOC FROM WHICH
                                                                         ;DATA WAS LOADED INTO CSP


025402  112237  025416          4$      MOVB    (R2)+,5$                ;GET THE MED CODE AND FORM
025406  042737  000200  025416          BIC     #200,5$                 ;THE RIGHT CODE FOR READING

025414  076600                          MED                             ;READ THE WFP REGISTER POINTED
025416  000000                  5$      .WORD   0                       ;BY THIS MED CODE

025420  020004                          CMP     R0,R4                   ;CHECK IF THE PATTERN LOADED INTO
                                                                         ;CSP REGISTER IS AS EXPECTED
025422  001411                          BEQ     6$                      ;IF YES, OK
025424  010337  001162                  MOV     R3,$REG0                ;SAVE CSP REGISTER NUMBER WHICH
                                                                         ;DID NOT HAVE THE CORRECT DATA
025430  010437  001164                  MOV     R4,$REG1                ;SAVE EXPECTED DATA
025434  010037  001166                  MOV     R0,$REG2                ;SAVE DATA RECEIVED
025440  010537  001170                  MOV     R5,$REG3                ;SAVE WCS LOC FROM WHERE DATA
                                                                         ;WAS READ
025444  104054                          ERROR   54                      ;CORRECT DATA WAS NOT FOUND
                                                                         ;IN THE BASE MACHINE CSP REGISTERS
                                                                         ;AFTER HAVING DONE A
                                                                         ;BLOCK MOVE (LOAD) OF CSP
                                                                         ;FROM THE WCS  THE CSP REGISTER
                                                                         ;NUMBER IS GIVEN IN THE  ERROR MESSAGE
                                                                         ;THE MESSAGE ALSO GIVES THE WCS LOC
                                                                         ;FROM WHICH THE CSP WAS LOADED
                                                                         ;THE EXPECTED AND RECEIVED DATA
                                                                         ;IN CSP


025446  005205                  6$      INC     R5                      ;NEXT WCS LOCATION
025450  005204                          INC     R4                      ;NEXT DATA PATTERN
025452  077125                          SOB     R1,4$                   ;DONE?
```

```
025454  000407                          BR      TST62           ,,      ,EXIT

                                ,       ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT ON
                                ,       TRANSFERRING CONTROL TO WCS   THE CONTROL WAS TRANSFERRED
                                ,       TO WCS TO LOAD THE CSP REGISTERS FROM THE WCS

025456  022626                  7$      CMP     (SP)+,(SP)+             ,POP THE STACK
025460  012777  000020  155346          MOV     #PARDIS,@WCSST          ,CLEAR OUT ERROR BIT (15)
025466  005077  155342                  CLR     @WCSST

025472  104055                          ERROR   55                      ,WCS WATCH-DOG TIMED OUT
                                                                        ,WHEN CONTROL WAS PASSED
                                                                        ,TO WCS TO LOAD THE CSP
                                                                        ,REGISTERS

[illegible]                     8$

                                ,*****************************************************************
                                #TEST 62        CHECK BLOCK MOVE OF USER-SCRATCH PAD REGISTERS TO WCS
                                        THIS TEST CHECKS THE BLOCK STORE USP FUNCTION OF THE WCS
                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF USER-
                                        SCRATCH PAD REGISTERS GET TRANSFERRED FROM THE
                                        BASE MACHINE TO THE WCS  THE FOLLOWING USP REGISTER
                                        ARE STORED IN THE GIVEN ORDER
                                        WCSA 0 ,WCSB 0 ,WCSB 1

                                        THE USP REGISTERS ARE INITIALIZED TO A KNOWN STATE
                                        BY WRITING UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS LOADED IN WCS  USING A "XFC"
                                        DISPATCH INSTRUCTION CONTROL IS TRANSFERRED TO THE
                                        MICRO-CODE IN WCS

                                        THE MICRO-CODE SETS UP IN "D" (BASE-MACHINE , THE
                                        ADDRESS (WCS) STARTING WHICH THE USP REGISTERS
                                        SHOULD BE STORED IN THE WCS  THEN THE MICRO-CODE
                                        SELECTS THE WCS HOT BOX AND TRANSFERS CONTROL TO THE
                                        TMS-ROM WHICH ACTUALLY DOES THE STORE OF USP
                                        REGISTERS  CONTROL IS RETURNED TO THE BASE MACHINE

                                        THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE USP REGISTERS WAS STORED CORRECTLY  IF NOT
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF
                                        AS A RESULT OF SOME FAULT-CONDITION, THE CONTROL
                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                        THE WATCH-DOG WILL TIME OUT AND A TRAP TO
                                        114 WILL OCCUR

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE =
                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY POINTER
                                                BUS-U-MUX-PORT-A,SUPPLYING TMS CONTROL INFORMATION
                                                CONTROL PATH USED BY MICRO-CODE EXECUTING
                                                FROM THE WCS  (NUA 9 D), ARRAY ADDRESS MUX-
                                                A-PORT  BUS-U-MUX-B-PORT BUS-L-LINES
```

```
                                                  ;*****************************************************************
025474  000004                          TST62   SCOPE
025476  012737  025700  003056                  MOV     #TST63,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                        ;       INITIALIZE AND WRITE PATTERNS INTO USER SCRATCH PAD (USP)
                                        ;        REGISTERS
025504  012701  000003                          MOV     #3 ,R1          ;COUNT FOR 3 USP REGISTERS
025510  012702  003270                          MOV     #WCSADW,R2      ;INITIALIZE POINTER TO WRITE MED CODE
025514  011237  025524                  1$      MOV     (R2),2$         ;INSERT THE MED CODE FOR
                                                                        ;WRITING INTO USP REGISTER
025520  012200                                  MOV     (R2)+,R0        ;FORM THE PATTERN
025522  076600                                  MED                     ;WRITE PATTERN INTO THE
025524  000000                          2$       WORD   0               ;USP REGISTER USING THIS MED CODE
025526  077106                                  SOB     R1,1$           ;WRITTEN ALL USP REGISTERS?
                                                LOAD UP WCS WITH MICRO-CODE, WHICH WILL STORE
                                        ;       THE USP REGISTERS IN WCS
025530  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO-CODE
025534  006106                                  6106                    ;STARTING AT THIS WCS ADDRESS
025536  061516                                  MWSLS
025540  006002                                  UDISP                   ;FROM THIS MEMORY ADDRESS
025542  012737  025662  000114                  MOV     #5$ @#114       ;VECTOR FOR WCS WATCH DOG TIMER
025550  012777  001000  155256                  MOV     #MAINT,@WCSST   ;SETUP MAINT  BIT, TIMER WILL
                                                                        ;START WHEN WCS HOT BOX IS SELECTED
025556  076700                                  XFCUDIS                 ;TRANSFER CONTROL TO WCS
                                                                        ;AND STORE USP REGISTERS IN WCS
                                                                        ;STARTING AT WCS LOCATION 1200
                                                                        ;RETURN HERE FROM WCS
025560  042777  001000  155246                  BIC     #MAINT,@WCSST    START OFF TIMER
025566  012737  003344  000114                  MOV     #BADPAR,@#114   ;RESET BAD PARITY HANDLER
                                        ;       CHECK IF THE USP REGISTERS WERE STORED CORRECTLY IN WCS
025574  012704  000003                          MOV     #3 ,R4          ;SET COUNT
025600  012700  003270                          MOV     #WCSADW,R0      ;INITIALIZE POINTER TO MED WRITE-CODES
025604  012701  001010                          MOV     #1010,R1        ;INITIALIZE WCSADR
025610  012002                          3$      MOV     (R0)+,R2        ;GOOD DATA PATTERN THAT
025612  010177  155220                          MOV     R1,@WCSAR       ;WCS READ
025616  017703  155[illegible]                  MOV     @WCSDR,R3       ;FROM THIS WCS LOCATION
025622  020203                                  CMP     R2,R3           ;WAS THE CORRECT DATA
                                                                         STORED IN WCS FROM
                                                                        ;THE FP REGISTER?
025624  001413                                  BEQ     4$              ;YES
025626  010137  001162                          MOV     R1,$REG0        ;WCS LOC THAT WAS READ
025632  010237  001164                          MOV     R2,$REG1        ;EXPECTED DATA
025636  010337  001166                          MOV     R3,$REG2        ;DATA ACTUALLY READ
025642  042702  177400                          BIC     #177400,R2
025646  010237  001170                          MOV     R2,$REG3        ;USP REGISTER (MED READ) CODE
025652  104056                                  ERROR   56              ;CORRECT DATA WAS NOT STORED IN BLOCK
```

```
                                                                        ;MOVE OF USP REGISTERS TO WCS
025654  005201                  4$      INC     R1                      ;NEXT WCS ADDRESS

025656  077424                          SOB     R4,3$                   ;DONE?
025660  000407                          BR      6$

                                ;       ENTER HERE IF THE WATCH-DOG TIMED OUT

025662  022626                  5$      CMP     (SP)+,(SP)+             ;POP THE STACK
025664  012777  000020  155142          MOV     #PARDIS,@WCSST          ;CLEAR PARITY ERROR (BIT 15)
025672  005077  155136                  CLR     @WCSST
025676  104057                          ERROR   57                      ;WATCH-DOG TIMED OUT ON STORING OF
                                                                        ;USP REGISTERS IN WCS
025700                          6$                                      ;EXIT


                                ;;*****************************************************************
                                ;*TEST 63        CHECK BLOCK MOVE FROM WCS TO USER-SCRATCH PAD,USP
                                ;       THIS TEST CHECKS THE BLOCK LOAD USP FUNCTION OF THE WCS
                                ;       WHEN THIS FUNCTION IS INITIATED USP IN THE BASE
                                        MACHINE ARE LOADED FROM THE WCS  THE FOLLOWING REGISTER
                                        ARE LOADED IN THE GIVEN ORDER

                                        WCSA 0 ,WCSB 0 ,WCSB 1

                                        A BLOCK OF 12 LOCATIONS IN THE WCS IS INITIALIZED
                                        TO A KNOWN STATE, BY WRITING UNIQUE DATA PATTERN
                                        IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        A "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        THE MICRO-CODE SETS UP IN "D" (BASE MACHINE), THE
                                        ADDRESS(WCS) STARTING WHICH THE WORDS WILL BE
                                        LOADED FROM THE WCS INTO THE USP  THEN THIS
                                        MICRO-CODE SELECTS THE WCS HOT BOX AND TRANSFERS
                                        CONTROL TO THE TMS-ROM WHICH ACTUALLY DOES THE
                                        LOAD OF USP  AFTER THE USP HAVE BEEN LOADED,
                                        THE MICRO-CODE RETURNS CONTROL TO THE BASE MACHINE

                                        THE USP ARE THEN CHECKED TO MAKE SURE THAT THE
                                        CORRECT DATA WAS LOADED FROM THE WCS INTO THE
                                        USP  IF NOT AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL  S
                                        NOT TRANSFERRED BACK TO THE BASE MACHINE, THE
                                        WATCH-DOG WILL TIME OUT AND A TRAP TO 114 W LL
                                        OCCUR

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINTER CIRCUIT
                                                BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                THE WCS  (NUA/9 0), ARRAY ADDRESS MUX-A-PORT
```

```
                                        ,               BUS-U-MUX-B-PORT,BUS-U LINES)

                                        ,,*****************************************************************
025700  000004                          TST63   SCOPE
025702  012737  026142  003056                  MOV     #TST64,NXTST    ,STARTING ADDRESS OF NEXT TEST

                                        ;       CLEAR OUT WCSA 0  TO WCSB 1  IN BASE MACHINE

025710  012702  000003                          MOV     #3 ,R2                  ,INITIALIZE COUNT
025714  012701  003270                          MOV     #WCSAOW,R1              ,INITIALIZE POINTER TO WRITE MED CODE

025720  012137  025730                  2$      MOV     (R1)+,3$                ,INSERT MED CODE FOR WRITING INTO
                                                                                ,USP
025724  005000                                  CLR     R0                      ,WRITE A 0 PATTERN
025726  076600                                  MED                             ,WRITE A 0 IN THE USP
025730  000000                          3$       WORD   0                       ,POINTED BY THIS CODE

025732  077206                                  SOB     R2,2$                   ,DONE?


                                        .       LOAD THE WCS WITH MICRO-CODE WHICH WILL TRANSFER DATA
                                                FROM WCS TO USP REGISTERS IN THE BASE MACHINE

025734  004537  037472                          JSR     R5 LDWCS                ,LOAD WCS WITH MICRO-CODE
025740  006716                                  6716                            ,STARTING AT THIS WCS ADDRESS
025742  061622                                  MLSWS                           ,FROM THIS MEMORY ADDRESS
025744  006002                                  UDISP                           ,THIS IS THE ENTRY POINT INTO WCS

                                                LOAD THE WCS WITH DATA PATTERNS STARTING AT WCS LOCATION 1004

025746  012700  000003                          MOV     #3 ,R0                  ,INITIALIZE COUNT
025752  012701  001004                          MOV     #1004,R1                 INIT ALIZE THE WCS ADDRESS
                                                                                 STARTING WHICH THE PATTERNS WILL BE WRITTEN
025756  012702  003270                          MOV     #WCSAOW,R2               INITIALIZE POINTER TO MED WRITE CODES

025762  010177  155050          1$              MOV     R1,@WCSAR               ,ADDRESS THE WCS LOCATION
025766  012277  155046                          MOV     (R2)+,@WCSDR            ,WRITE THE PATTERN INTO  WCS LOC
025772  042777  177600  155040                  BIC     #177600,@WCSDR
026000  005201                                  INC     R1                      ,NEXT WCS LOCATION
026002  077011                                  SOB     R0,1$                    DONE?

026004  012737  026124  000114                  MOV     #7$,@#114               ,SETUP VECTOR FOR WCS WATCH-DOG
026012  012777  001000  155014                  MOV     #MAINT,@WCSST           ,SET MAINT BIT, TIMER WILL
                                                                                ,START WHEN WCS IS SELECTED
026020  076700                                  XFCUDIS                         ,TRANSFER CONTROL TO WCS AND
                                                                                ,LOAD USP REGISTERS FROM
                                                                                ,WCS (STARTING AT LOC 1004)


                                                                                ,RETURN HERE FROM WCS

026022  042777  001000  155004                  BIC     #MAINT,@WCSST           ,SHUT OFF TIMER
026030  012737  003344  000114                  MOV     #BADPAR,@#114            RESET BAD PARITY HANDLER

                                                CHECK IF THE USP REGISTERS WERE LOADED CORRECTLY
                                                FROM WCS
```

```
026036  012701  000003                  MOV     #3 ,R1                  ;COUNT FOR 3 REGISTERS
026042  012702  003270                  MOV     #WCSAOW,R2              ,INITIALIZE POINTER TO MED CODES
026046  012705  001004                  MOV     #1004,R5                ,START OF WCS LOC FROM WHICH
                                                                        ,DATA WAS LOADED INTO USP


026052  012204                  4$      MOV     (R2)+,R4                        ,GET THE MED CODE AND FORM
026054  042704  177600                  BIC     #177600,R4                      ,THE RIGHT CODE FOR READING
026060  010437  026066                  MOV     R4,5$
026064  076600                          MED                             ,READ THE WFP REGISTER POINTED
026066  000000                  5$       WORD   0                       ,BY THIS MED CODE

026070  020004                          CMP     R0,R4                   ;CHECK IF THE PATTERN LOADED INTO
                                                                        ,USP REGISTER IS AS EXPECTED
026072  001411                          BEQ     6$                      ;IF YES, OK
                                                                        ,SAVE USP REG (RD MED CODE)
026074  010437  001170                  MOV     R4,$REG3                ,WHICH DID NOT HAVE THE CORRECT DATA
026100  010437  001164                  MOV     R4,$REG1                ,SAVE EXPECTED DATA
026104  010037  001166                  MOV     R0,$REG2                ,SAVE DATA RECEIVED
026110  010537  001162                  MOV     R5,$REG0                ,SAVE WCS LOC FROM WHERE DATA
                                                                        ,WAS READ
026114  104060                          ERROR   60                      ,CORRECT DATA WAS NOT FOUND
                                                                        ,IN THE BASE
                                                                        ,MACHINE, AFTER HAVING DONE A
                                                                        ,BLOCK MOVE (LOAD) OF USP
                                                                        ,FROM THE WCS   THE USP REGISTER
                                                                        ,NUMBER IS GIVEN IN THE  ERROR MESSAGE
                                                                        ,THE MESSAGE ALSO GIVES THE WCS LOC
                                                                        ,FROM WHICH THE USP WAS LOADED,
                                                                        ,THE EXPECTED AND RECEIVED DATA
                                                                        ,IN USP

026116  005205                  6$      INC     R5                      ,NEXT WCS LOCATION
026120  077124                          SOB     R1 4$                   ,DONE?

026122  000407                          BR      TST64           ,,      ,EXIT

                                .       ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT ON
                                ,       TRANSFERRING CONTROL TO WCS   THE CONTROL WAS TRANSFERRED
                                ,       TO WCS TO LOAD THE USP REGISTERS FROM THE WCS

026124  022626                  7$      CMP     (SP)+,(SP)+             ,POP THE STACK
026126  012777  000020  154700          MOV     #PARDIS,@WCSST          ,CLEAR OUT ERROR BIT (15)
026134  005077  154674                  CLR     @WCSST

026140  104061                          ERROR   61                      ,WCS WATCH-DOG TIMED OUT
                                                                        ,WHEN CONTROL WAS PASSED
                                                                        ,TO WCS TO LOAD THE USP
                                                                        ,REGISTERS


                                ,*****************************************************************
                                *TEST 64        CHECK BLOCK STORE OF LOAD-WRITE-2 TO WCS

                                        THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS
```

```
                                        ;               'LOAD WRITE 2' -> WCS.ARRAY
                                        ;
                                        ;       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        ;       GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS
                                        ;
                                        ;       THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER
                                        ;
                                        ;               R3, R4  (SETUP VIA MICROCODE, ANY INTERNAL
                                        ;                       REGISTERS COULD BE CHOSEN)

                                        ;       THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        ;       UN QUE DATA PATTERNS IN THEM
                                        ;
                                        ;       THE MICRO-CODE IS LOADED INTO THE WCS  US NG
                                        ;       AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        ;       TO THE MICRO-CODE IN THE WCS
                                        ;
                                                FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        ;       THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                                SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                                THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                                REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                                CONTROL TO THE BASE MACHINE

                                                THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                                DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                                AN ERROR IS REPORTED

                                                THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                 S NOT TRANSFERRED BACK TO THE BASE MACHINE
                                                THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        ;       114 WILL OCCUR
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)

                                        ;*****************************************************************
026142  000004                  TST64   SCOPE
026144  012737  026400  003056          MOV     #TST65,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                ;
026152  004537  037472                  JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
026156  006560                          6560                    ;CONTROL BLOCK LOADED HERE
026160  057454                          MLDWR2                  ;FROM THIS MEMORY LOCATION
026162  006002                          UDISP                   ;ENTRY POINT IN WCS
                                                                ;
        101010                          PAT A=  101010  ;DATA PATTERN FOR TEST
        010101                          PAT B=  010101
        001111                          ADDR 1=1111     ;
```

```
026164  012703  101010                  MOV     #PAT A,R3               ;PATTERN # 1
026170  012704  010101                  MOV     #PAT B,R4               ;PATTERN # 2
026174  012702  001111                  MOV     #ADDR 1,R2              ;R2 IS LOCAL STORE ADDRESS HOLDER
026200  005000                          CLR     R0                      ;ZAP ELSE
026202  005001                          CLR     R1                      ;
026204  005005                          CLR     R5                      ;
                                                                        ;
026206  012737  026362  000114          MOV     #39$,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
026214  012777  001000  154612          MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                        ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
026222  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS
026224                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
026224  042777  001000  154602          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
026232  012737  003344  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
                                        ;CHECK FIRST DATA
026240  012777  001111  154570          MOV     #ADDR 1,@WCSAR          ;ADDRESS THE WCS AT EXPEC'D LOC
026246  027727  154566  101010          CMP     @WCSDR,#PAT A           ;IS IT VALUE THAT WAS IN R3 ??
026254  001415                          BEQ     11$                     ;BR IF OK
026256  012737  000003  001162          MOV     #3,$REG0
026264  012737  101010  001164          MOV     #PAT A,$REG1
026272  017737  154542  001166          MOV     @WCSDR,$REG2
026300  017737  154532  001170          MOV     @WCSAR,$REG3
026306  104076                          ERROR   76                      NOPE
                                                                        ;
                                        ;CHECK SECOND DATA
026310  012777  001112  154520  11$     MOV     #ADDR 1+1,@WCSAR        ;ADDRESS THE WCS AT EXPEC'D LOC
026316  027727  154516  010101          CMP     @WCSDR,#PAT B           ;IS IT VALUE THAT WAS IN R4 ??
026324  001415                          BEQ     12$                     ;BR IF OK
026326  012737  000004  001162          MOV     #4,$REG0
026334  012737  010101  001164          MOV     #PAT B,$REG1
026342  017737  154472  001166          MOV     @WCSDR,$REG2
026350  017737  154462  001170          MOV     @WCSAR,$REG3
026356  104076                          ERROR   76                      ;NOPE
                                                                        ;
026360                          12$
026360  000407                          BR      TST65           ; EXIT


                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
026362  012777  000020  154444  39$     MOV     #PARDIS,@WCSST
026370  022626                          CMP     (SP)+,(SP)+             ;
026372  005077  154436                  CLR     @WCSST                  ;
026376  104077                          ERROR   77
                                        ;WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE TO WCS MICROCODE
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                ***********************************************************
                                ;TEST OF        THE W BLOCK LOAD OF LOAD-READ-2 FROM WCS
```

```
                                        ;
                                        ;       THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS
                                        ;
                                        ;               WCS ARRAY -> 'LOAD READ 2'
                                        ;
                                        ;       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        ;       GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS
                                        ;
                                        ;       THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER
                                        ;
                                        ;               R3, R4 (RESULTS STORED HERE)
                                        ;
                                        ;       THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE, BY WRITING
                                        ;       UNIQUE DATA PATTERNS IN IT
                                        ;
                                        ;       THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        ;       AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                                TO THE MICRO-CODE IN THE WCS

                                        ;       FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        ;       THE LOCAL STORE ADDRESS (-1) STARTING FROM WHICH THE REGISTERS
                                                SHOULD BE RESTORED FROM THE WCS.  THEN THIS MICRO-CODE SELECTS
                                                THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS  AFTER THE
                                                REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                                CONTROL TO THE BASE MACHINE

                                                THE REGISTERS ARE THEN CHECKED TO MAKE SURE THAT THE
                                                DATA FROM THE WCS WAS LOADED CORRECTLY  IF NOT,
                                                AN ERROR IS REPORTED

                                                THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        ;       IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                                THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                114 WILL OCCUR

                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9:0>, ARRAY ADDRESS MUX-A-PORT,
                                                        BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
026400  000004                          TST65   SCOPE
026402  012737  026616  003056                  MOV     #TST66.NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
026410  004537  037472                          JSR     R3,LDWCS                ;LOAD WCS WITH MICRO CODE
026414  006570                                  6570                            ;CONTROL BLOCK LOADED HERE
026416  057406                                  MLDRD2                          ;FROM THIS MEMORY LOCATION
026420  006002                                  UDISP                           ;ENTRY POINT IN WCS

        050505                                  PAT A=  050505  ;DATA PATTERN FOR TEST
        105050                                  PAT B=  105050  ;
```

```
          001222                          ADDR 1=1222     ,
                                                          ,
026422    005003                          CLR     R3                      ,ZAP BEFORE TEST
026424    005004                          CLR     R4                      ,
026426    005000                          CLR     R0
026430    005001                          CLR     R1
026432    005005                          CLR     R5
026434    012702    001222                MOV     #ADDR.1,R2              ,R2 IS LOCAL STORE ADDRESS HOLDER
026440    010277    154372                MOV     R2,@WCSAR               ,SETUP LS WITH DATA
026444    012777    050505    154366      MOV     #PAT A,@WCSDR           ,STORE # 1
026452    005277    154360                INC     @WCSAR                  ,
026456    012777    105050    154354      MOV     #PAT.B,@WCSDR           ,STORE # 2
                                                                          ,
026464    012737    026600    000114      MOV     #39$,@#114              ,SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
026472    012777    001000    154334      MOV     #MAINT,@WCSST           ,SET UP MAINT BIT, TIMER WILL START WHEN
                                          ,WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                          ,
026500    076700                          XFCUDIS                         ,TRANSFER CONTROL TO WCS
026502                          1$                                        ,SHOULD RETURN FROM WCS TO THIS POINT
                                                                          ,
026502    042777    001000    154334      BIC     #MAINT @WCSST           ,SHUT OFF THE TIMER
026510    012737    003344    000114      MOV     #BADPAR,@#114           ,RESET UNEXPECTED PARITY HANDLER
                                                                          ,
                                          ;CHECK FIRST DATA
026516    020327    050505                CMP     R3,#PAT A               ,IS IT VALUE THAT WAS IN R3 ??
026522    001411                          BEQ     11$                     ,BR IF OK
026524    012737    000003    001162      MOV     #3,$REG0
026532    012737    050505    001164      MOV     #PAT A,$REG1
026540    010337    001166                MOV     R3,$REG2
026544    104100                          ERROR   100                     ;NOPE
                                                                          ,
                                          ,CHECK SECOND DATA
026546    020427    105050          11$   CMP     R4,#PAT B                IS IT VALUE THAT WAS IN R4 ??
026552    001411                          BEQ     12$                     ,BR IF OK
026554    012737    000004    001162      MOV     #4,$REG0
026562    012737    105050    001164      MOV     #PAT B $REG1
026570    010437    001166                MOV     R4,$REG2
026574    104100                          ERROR   100                      NOPE
                                                                          ,
026576                          12$
026576    000407                          BR      TST66           ,,EXIT
                                                                          ,
                                                                          ,
                                          ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                          ,A BLOCK MOVE FUNCTION IN THE WCS
026600    012777    000020    154226  39$ MOV     #PARDIS,@WCSST          ,
026606    022626                          CMP     (SP)+,(SP)+             ,
026610    005077    154220                CLR     @WCSST                  ;
026614    104101                          ERROR   101                     ,
                                          ,WCS WATCH DOG TIMED OUT
                                          ,UPON TRANSFERRING CONTROL FROM
                                          ,BASE MACHINE TO WCS MICROCODE.
                                          ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                          ,SHOULD BE RETURNED TO BASE MACHINE
```

```
                                        ;;*****************************************************************
                                        ;*TEST 66        CHECK BLOCK STORE OF SET-STORE, WRITE-2 TO WCS
                                        ;
                                        ;       THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS
                                        ;
                                        ;               'SET STORE, WRITE 2' -> WCS ARRAY
                                        ;
                                        ;       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REG STERS
                                        ;       GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        ;       THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER
                                        ;
                                                        R3, R4  (SETUP VIA MICROCODE, ANY INTERNAL
                                        ;                       REGISTERS COULD BE CHOSEN)
                                        ;
                                        ;       THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        ;       UNIQUE DATA PATTERNS IN THEM

                                                THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                                AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                                TO THE MICRO-CODE IN THE WCS

                                                FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                                THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                                SHOULD BE SAVED IN THE WCS.  THEN THIS MICRO-CODE SELECTS
                                                THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                WHICH ACTUALLY DOES THE STORE OF THE REGISTERS  AFTER THE
                                                REG STERS HAVE BEEN SAVED, THE MICRO-CODE RETUPNS
                                                CONTROL TO THE BASE MACHINE

                                                THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                                DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                                AN ERROR IS REPORTED

                                                THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                114 WILL OCCUR

                                                FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                        CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                        THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)

                                        ;*****************************************************************
026616  000004                          TST66   SCOPE
026620  012737  027054  003056                  MOV     #TST67,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
026626  004737  037472                          JSR     R5,LDWCS                ;LOAD WCS WITH MICRO CODE
026632  006430                                  6430                            ;CONTROL BLOCK LOADED HERE
026636  057704                                  MWR2                            ;FROM THIS MEMORY LOCATION
026636  006002                                  UDISP                           ;ENTRY POINT IN WCS
```

```
                                                                  ;
        125252                                    PAT A=  125252  ;DATA PATTERN FOR TEST
        052525                                    PAT B=  052525  ;
        001234                                    ADDR 1= 1234    ;
                                                                  ;
026640  012703  125252                            MOV     #PAT.A,R3          ;PATTERN # 1
026644  012704  052525                            MOV     #PAT B,R4          ;PATTERN # 2
026650  012702  001234                            MOV     #ADDR 1,R2         ;R2 IS LOCAL STORE ADDRESS HOLDER
026654  005000                                    CLR     R0
026656  005001                                    CLR     R1
026660  005005                                    CLR     R5
                                                                  ;
026662  012737  027036  000114                    MOV     #39$,@#114         ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
026670  012777  001000  154136                    MOV     #MAINT,@WCSST      ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                  ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                  ;
026676  076700                                    XFCUDIS                    ;TRANSFER CONTROL TO WCS
026700                                  1$                                   ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                  ;
026700  042777  001000  154126                    BIC     #MAINT,@WCSST      ;SHUT OFF THE TIMER
026706  012737  003344  000114                    MOV     #6ADPAR,@#114      ;RESET UNEXPECTED PARITY HANDLER
                                                                  ;
                                                  ;CHECK FIRST DATA
026714  012777  001234  154114                    MOV     #ADDR 1,@WCSAR     ;ADDRESS THE WCS AT EXPEC'D LOC
026722  027727  154112  125252                    CMP     @WCSDR,#PAT A      ;IS IT VALUE THAR WAS IN R3 ??
026730  001415                                    BEQ     11$                 BR IF OK
026732  012737  000003  001162                    MOV     #3,$REG0
026740  012737  125252  001164                    MOV     #PAT.A,$REG1
026746  017737  154066  001166                    MOV     @WCSDR,$REG2
026754  017737  154056  001170                    MOV     @WCSAR,$REG3
026762  104102                                    ERROR   102                ;NOPE
                                                                  ;
                                                  ;CHECK SECOND DATA
026764  012777  001235  154044          11$       MOV     #ADDR 1+1,@WCSAR    ADDRESS THE WCS AT EXPEC'D LOC
026772  027727  154042  052525                    CMP     @WCSDR,#PAT B      ;IS IT VALUE THAR WAS IN R4 ??
027000  001415                                    BEQ     12$                ;BR IF OK
027002  012737  000004  001162                    MOV     #4,$REG0
027010  012737  052525  001164                    MOV     #PAT B,$REG1
027016  017737  154016  001166                    MOV     @WCSDR,$REG2
027024  017737  154006  001170                    MOV     @WCSAR,$REG3
027032  104102                                    ERROR   102                 NOPE
                                                                  ;
027034                                  12$
027034  000407                                    BR      TST67          ;;EXIT
                                                                  ;


                                                   ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                                  ;A BLOCK MOVE FUNCTION IN THE WCS
027036  012777  000020  153770          39$       MOV     #PARDIS,@WCSST
027044  022626                                    CMP     (SP)+,(SP)+        ;
027046  005077  153762                            CLR     @WCSST             ;
027052  104103                                    ERROR   103                ;
                                                  ;WCS WATCH DOG TIMED OUT
                                                  ;UPON TRANSFERRING CONTROL FROM
                                                  ;BASE MACHINE TO WCS MICROCODE.
                                                   NORMALLY, AFTER UCODE EXECUTION CONTROL
```

```
                                        ;SHOULD BE RETURNED TO BASE MACHINE.


                                ;;*****************************************************************
                                ;*TEST 67        CHECK BLOCK LOAD OF SET-LOAD, INC-READ-2 FROM WCS
                                ;
                                ;       THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS
                                ;
                                ;               WCS.ARRAY -> 'SET LOAD, INC READ 2'

                                ;       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                ;       GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS
                                ;
                                ;       THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER
                                ;
                                ;               R3, R4 (RESULTS STORED HERE)
                                ;
                                        THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN IT

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERPED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL STORE ADDRESS (-1) STARTING FROM WHICH THE REG STERS
                                        SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                        REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                        CONTROL TO THE BASE MACHINE

                                        THE REGISTERS ARE THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE WCS WAS LOADED CORRECTLY  IF NOT,
                                        AN ERROR IS REPORTED

                                ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                ;       IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        114 WILL OCCUR

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                THE WCS- (NUA<9:0>, ARRAY ADDRESS MUX-A-PORT,
                                ;               BUS-U-MUX-B PORT, BUS-U-LINES)

                                ;*****************************************************************
027054  000004                  TST67   SCOPE
027056  012737  027272  000056          MOV     #TST70,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                ;
027064  004537  037472                  JSR     R5,LDWCS                ;LOAD WCS WITH MICRO CODE
027070  006410                          6410                            ;CONTROL BLOCK LOADED HERE
```

```
027072  057614                          MICRD2                          ;FROM THIS MEMORY LOCATION
027074  006002                          UDISP                           ;ENTRY POINT IN WCS
                                                                        ;
        070707                          PAT A=  070707  ;DATA PATTERN FOR TEST
        107070                          PAT B=  107070  ;
        001432                          ADDR 1= 1432    ;
                                                                        ;
027076  005003                          CLR     R3                      ;ZAP BEFORE TEST
027100  005004                          CLR     R4                      ;
027102  005000                          CLR     R0
027104  005001                          CLR     R1
027106  005005                          CLR     R5
027110  012702  001432                  MOV     #ADDR 1,R2              ;R2 IS LOCAL STORE ADDRESS HOLDER
027114  010277  153716                  MOV     R2,@WCSAR               ;SETUP LS WITH DATA
027120  012777  070707  153712          MOV     #PAT A,@WCSDR           ;STORE # 1
027126  005277  153704                  INC     @WCSAR                  ;
027132  012777  107070  153700          MOV     #PAT B,@WCSDR           ;STORE # 2
                                                                        ;
027140  012737  027254  000114          MOV     #399,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
027146  012777  001000  153660          MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                                        ;WCS HOT BOX IS SELECTED. UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
027154  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS
027156                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
027156  042777  001000  153650          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
027164  012737  000344  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER

                                                                        ;CHECK FIRST DATA
027172  020327  070707                  CMP     R3,#PAT A               ;IS IT VALUE THAT WAS IN R3 ??
027176  001411                          BEQ     11$                     ;BR IF OK
027200  012737  000003  001162          MOV     #3,$REG0
027206  012737  070707  001164          MOV     #PAT A,$REG1
027214  010337  001166                  MOV     R3,$REG2
027220  104104                          ERROR   104                     ;NOPE

                                                                        ;CHECK SECOND DATA
027222  020427  107070          11$     CMP     R4,#PAT B               ;IS IT VALUE THAT WAS IN R4 ??
027226  001411                          BEQ     12$                     ;BR IF OK
027230  012737  000004  001162          MOV     #4,$REG0
027236  012737  107070  001164          MOV     #PAT B,$REG1
027244  010437  001166                  MOV     R4,$REG2
027250  104104                          ERROR   104                     ;NOPE

027252                          12$
027252  000407                          BR      TST70           ;EXIT
                                                                        ;
                                                                        ;
                                                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                                                        ;A BLOCK MOVE FUNCTION IN THE WCS
027254  012777  000020  153552  399     MOV     #PARDIS,@WCSST          ;
027262  022626                          CMP     (SP)+,(SP)+             ;
027264  005077  153544                  CLR     @WCSST
027270  104105                          ERROR   105
                                                                        ;WCS WATCH DOG TIMED OUT
                                                                        ;UPON TRANSFERRING CONTROL FROM
```

```
                                        ;BASE MACHINE TO WCS MICROCODE
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                ;;*****************************************************************
                                ;*TEST 70        CHECK BLOCK STORE OF WRITE-INDIRECT TO WCS
                                ;
                                ;       THIS TEST CHECKS THE STORE FUNCTION OF THE WCS
                                ;
                                ;               WRITE-INDIRECT FROM WCSA 0 ' -> WCS ARRAY
                                ;
                                        WHEN THIS FUNCTION IS INITIATED A SINGLE REGISTER
                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        THE FOLLOWING REGISTER IS STORED IN THE GIVEN OPDEF

                                                1   LS ADDR' (FROM R2) IS USED TO FETCH NEW
                                                        LS ADDR'
                                                2  A 'WCSA 0 ' (ALWAYS) IS STORED AT NEW
                                                        'LS ADDR' IN LS

                                        THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS STORED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTER
                                        SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                        REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                        CONTROL TO THE BASE MACHINE

                                        THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                        THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        114 WILL OCCUR

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT
                                                BUS-U-MUX-B PORT, BUS-U-LINES)

                                ;;*****************************************************************
```

```
027272  000004                          TST70   SCOPE
027274  012737  027524  003056                  MOV     #TST71,NXTST        ;STARTING ADDRESS OF NEXT TEST
                                                                            ;
027302  004537  037472                          JSR     R5,LDWCS            ;LOAD WCS WITH MICRO CODE
027306  006540                                  6540                        ;CONTROL BLOCK STORED HERE
027310  057554                                  MWRIND                      ;FROM THIS MEMORY LOCATION
027312  006002                                  UDISP                       ;ENTRY POINT IN WCS
                                                                            ;
        012345                                  PAT A=  012345  ;DATA PATTERN FOR TEST
        001234                                  ADDR 1= 1234    ;FIRST ADDRESS IN LS
        001342                                  ADDR 2= 1342    ;SECOND   "     "  "
                                                                            ;
027314  012700  012345                          MOV     #PAT A,R0           ;GET PATTERN
027320  076600  000220                          MED     ,220                ;INTO WCSA 0
027324  005000                                  CLR     R0                  ;ZAP GPR'S
027326  005001                                  CLR     R1
027330  005003                                  CLR     R3
027332  005004                                  CLR     R4
027334  005005                                  CLR     R5
027336  012702  001234                          MOV     #ADDR 1,R2          ;1ST WCS ADDR POINTS TO SECOND
027342  010277  153470                          MOV     R2,@WCSAR           ;ADDRESS WCS AT 1ST
027346  012777  001342  153464                  MOV     #ADDR 2,@WCSDR      ;STORE 2ND ADDR, DATA GOES AT HERE
027354  005077  153456                          CLR     @WCSAR              ;POINT AWAY
                                                                            ;
027360  012737  027506  000114                  MOV     #39$,@#114          ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
027366  012777  001000  153440                  MOV     #MAINT,@WCSST       ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                ;WCS MOT BOX IS SELECTED  UPON TRANSFERRING CONTROL TO WCS
                                                                            ;
027374  076700                                  XFCUDIS                     ;TRANSFER CONTROL TO WCS
027376                                  1$                                  ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                            ;
027376  042777  001000  153430                  BIC     #MAINT,@WCSST       ;SHUT OFF THE TIMER
027404  012737  003344  000114                  MOV     #BADPAR,@#114       ;RESET UNEXPECTED PARITY HANDLER
                                                                            ;
                                                ;CHECK DATA WAS STORED AT LOCATION ADDR 2, NOT ADDR 1
027412  012777  001342  153416                  MOV     #ADDR 2,@WCSAR      ;ADDR 2ND LOCATION IN LS
027420  027727  153414  012345                  CMP     @WCSDR #PAT A       ;DATA MATCH ??
027426  001426                                  BEQ     12$                 ;BR IF OK
027430  012700  001234                          MOV     #ADDR 1,R0
027434  010037  001162                          MOV     R0,$REG0
027440  010077  153372                          MOV     R0,@WCSAR
027444  017737  153370  001164                  MOV     @WCSDR,$REG1
027452  012701  001342                          MOV     #ADDR 2,R1
027456  010137  001166                          MOV     R1,$REG2
027462  010177  153350                          MOV     R1,@WCSAR
027466  017737  153346  001172                  MOV     @WCSDR,$REG4
027474  012737  012345  001170                  MOV     #PAT A,$REG3
027502  104106                                  ERROR   106                 ;NOFE
                                                                            ;
027504                                  12$
027504  000407                                  BR      TST71               ;EXIT
                                                                            ;
                                                                            ;
                                                ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                                ;A BLOCK MOVE FUNCTION IN THE WCS
027506  012777  000020  153320          39$     MOV     #PARDIS,@WCSST      ;
```

```
027514  022626                          CMP     (SP)+,(SP)+             ;
027516  005077  153312                  CLR     @WCSST                  ;
027522  104107                          ERROR   107                     ;
                                        ;WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE TO WCS MICROCODE
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                ;;*****************************************************************
                                ;*TEST 71        CHECK BLOCK LOAD OF READ-INDIRECT FROM WCS
                                ;
                                ;               THIS TEST CHECKS THE LOAD FUNCTION OF THE WCS
                                ;
                                ;                       WCS ARRAY -> 'READ-INDIRECT TO "D"'
                                ;
                                                        WHEN THIS FUNCTION IS INITIATED A SINGLE REGISTER
                                ;                       GET TRANSFERRED FROM THE WCS TO THE BASE MACHINE
                                                        "D" IS COPIED INTO GPR R3 AFTER THE TMS FUNCTION

                                                        THE FOLLOWING REGISTER IS LOADED IN THE GIVEN ORDER

                                                                1) 'LS ADDR' (FROM R2) IS USED TO FETCH NEW
                                                                        'LS ADDR'
                                                                2) R3 IS LOADED (FROM "D") WITH DATA READ
                                                                        FROM LS AT NEW 'LS ADDR'

                                                        THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                                        UNIQUE DATA PATTERNS IN THEM

                                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                                        TO THE MICRO-CODE IN THE WCS

                                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                                        THE LOCAL SFROMRE ADDRESS (-1) STARTING TO WHICH THE REGISTER
                                                        SHOULD BE LOADED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                        WHICH ACTUALLY DOES THE LOAD OF THE REG STERS   AFTER THE
                                                        REGISTERS HAVE BEEN LOADED, THE MICRO-CODE RETURNS
                                                        CONTROL TO THE BASE MACHINE

                                                        THE REGISTER IS THEN CHECKED TO MAKE SURE THAT THE
                                                        DATA FROM THE WCS WAS LOAD CORRECTLY  IF NOT,
                                                        AN ERROR IS REPORTED

                                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                                        THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                        114 WILL OCCUR

                                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
```

```
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9.0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES).
                                        ;
                                        ;;*****************************************************************
027524  000004                          TST71   SCOPE
027526  012737  027750  003056                  MOV     #TST72,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
027534  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
027540  006550                                  6550                    ;CONTROL BLOCK LOAD HERE
027542  057514                                  MRDIND                  ;FROM THIS MEMORY LOCATION
027544  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
        054321                                  PAT A=  054321  ;DATA PATTERN FOR TEST
        001222                                  ADDR 1= 1222    ;FIRST ADDRESS IN LS
        001333                                  ADDR 2= 1333    ;SECOND   "     "  "
                                                                        ;
027546  005000                                  CLR     R0              ;ZAP GPR'S
027550  005001                                  CLR     R1
027552  005003                                  CLR     R3
027554  005004                                  CLR     R4
027556  005005                                  CLR     R5
027560  012702  001222                          MOV     #ADDR 1,R2      ;1ST WCS ADDR POINTS TO SECOND
027564  010277  153246                          MOV     R2,@WCSAR       ;ADDRESS WCS AT 1ST
027570  012777  001333  153242                  MOV     #ADDR 2,@WCSDR  ;LOAD 2ND ADDR, DATA GOES AT HERE
027576  012777  001333  153232                  MOV     #ADDR 2,@WCSAP  ;2ND WCS ADDR POINTS AT DATA
027604  012777  054321  153226                  MOV     #PAT A,@WCSDR   ;STORE DATA
027612  005077  153220                          CLR     @WCSAR          ;POINT AWAY
                                                                        ;
027616  012737  027732  000114                  MOV     #39$,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
027624  012777  001000  153202                  MOV     #MAINT,@WCSST   ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                ;WCS HOT BOX IS SELECTED  UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
027632  076700                                  XFCUDIS                 ;TRANSFER CONTROL TO WCS
027634                                  1$                              ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
027634  042777  001000  153172                  BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
027642  012737  003344  000114                  MOV     #BADPAR,@#114   ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
                                                CHECK DATA WAS LOADED FROM LOCATION ADDR 2, NOT ADDR 1
027650  020327  054321                          CMP     R3,#PAT A       ;DATA MATCH ??
027654  001425                                  BEQ     12$             ;BR IF OK
027656  012700  001222                          MOV     #ADDR 1,R0
027662  010037  001162                          MOV     R0,$REG0
027666  010077  153144                          MOV     R0,@WCSAR
027672  017737  153142  001164                  MOV     @WCSDR,$REG1
027700  012701  001333                          MOV     #ADDR 2,R1
027704  010137  001166                          MOV     R1,$REG2
027710  010177  153122                          MOV     R1,@WCSAR
027714  017737  153120  001170                  MOV     @WCSDR,$REG3
027722  010337  001172                          MOV     R3,$REG4
027726  104110                                  ERROR   110             ;NOPE
                                                                        ;
027730                                  12$
027730  000407                                  BR      TST72           ;;EXIT
```

```
                                                                ,
                                                                ,
                                        ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ,A BLOCK MOVE FUNCTION IN THE WCS
027732  012777  000020  153074  39$     MOV     #PARDIS,@WCSST          ,
027740  022626                          CMP     (SP)+,(SP)+             ,
027742  005077  153066                  CLR     @WCSST                  ,
027746  104111                          ERROR   111                     ,
                                        ,WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ,BASE MACHINE TO WCS MICROCODE.
                                        ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ,SHOULD BE RETURNED TO BASE MACHINE.

                                ,,*****************************************************************
                                ,*TEST 72        CHECK BLOCK STORE OF WFP AC 0 1  TO  WCS
                                ,
                                ,       THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS
                                ,
                                ,               WFP AC 0 1  -> WCS ARRAY

                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER

                                                WFP AC0 0 , WFP AC1 0 , WFP AC2 0 , WFP AC3 0 ,
                                                  WFP AC0 1 , WFP AC1 1 , WFP AC2 1 , WFP AC3 1

                                        THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                        REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                        CONTROL TO THE BASE MACHINE

                                        THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                        THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        114 WILL OCCUR

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
```

```
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9:0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES).
                                        ;
                                        ;;*****************************************************************
027750  000004                          TST72   SCOPE
027752  012737  030220  003056                  MOV     #TST73,NXTST    ;STARTING ADDRESS OF NEXT TEST
027760  005037  001162                          CLR     $REG0                           ;ZAP FOR PRINTOUT
                                                                                        ;
027764  004537  037472                          JSR     R5,LDWCS                        ;LOAD WCS WITH MICRO CODE
027770  006610                                  6610                                    ;CONTROL BLOCK LOADED HERE
027772  060026                                  MF01LS                                  ;FROM THIS MEMORY LOCATION
027774  006002                                  UDISP                                   ;ENTRY POINT IN WCS
                                                                                        ;
                                                ;CLEAR -ALL- WFP AC'S
027776  012705  003144                          MOV     #FP05XX,R5                      ;TABLE OF MED CODES
030002  012704  000030                          MOV     #24 ,R4                         ;
030006  112537  030024                  11$     MOVB    (R5)+,12$                       ;GET A CODE
030012  152737  000200  030024                  BISB    #200,12$                        ;MAKE IT 'WRITE'
030020  005000                                  CLR     R0                              ;WRITE ZEROES
030022  076600                                  MED                                     ;DO IT
030024  000000                          12$      WORD   0                               ;
030026  077411                                  SOB     R4,11$                          ;LOOP ON ALL
                                                                                        ;
                                                ;SETUP WFP AC'S 0 1 WITH DATA (= MED CODE)
030030  012705  003144                          MOV     #FP01XX,R5                      ;TABLE OF CODES
030034  012704  000010                          MOV     #8 ,R4                          ;
030040  112500                          13$     MOVB    (R5)+,R0                        ;GET MED CODE
030042  052700  125200                          BIS     #125200,R0                      ;DATA = 125MED
030046  110037  030054                          MOVB    R0,14$                          ;STORE WRITE MED CODE
030052  076600                                  MED                                     ;WRITE THE DATA
030054  000000                          14$      WORD   0                               ;
030056  077410                                  SOB     R4,13$                          ;LOOP
                                                                                        ;
030060  012702  001234                          MOV     #1234,R2                        ;R2 IS LOCAL STORE ADDRESS HOLDER
                                                                                        ;
030064  012737  030202  000114                  MOV     #39$,@#114                      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
030072  012777  001000  152734                  MOV     #MAINT,@WCSST                   ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                                        ;
030100  076700                                  XFCUDIS                                 ;TRANSFER CONTROL TO WCS
030102                                  1$                                              ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                                        ;
030102  042777  001000  152724                  BIC     #MAINT,@WCSST                   ;SHUT OFF THE TIMER
030110  012737  003344  000114                  MOV     #BADPAR,@#114                   ;RESET UNEXPECTED PARITY HANDLER
                                                                                        ;
030116  012705  003144                          MOV     #FP01XX,R5                      ;PTR TO MED CODE TABLE, ALSO DATA
030122  012704  000010                          MOV     #8 ,R4                          ;# REGISTERS TO SAVE
                                                                                        ;
030126  010277  152704                  20$     MOV     R2,@WCSAR                       ;POINT AT DATA IN WCS
030132  017703  152702                          MOV     @WCSDR,R3                       ;GET WCS DATA
                                                                                        ;
030136  112501                                  MOVB    (R5)+,R1                        ;GET DATA FROM TABLE
```

```
030140  052701  125200                  BIS     #125200,R1                  ;
                                                                            ,
030144  020103                          CMP     R1,R3                       ;DATA MATCH ???
030146  001412                          BEQ     21$                         ,BR IF OK
030150  116537  177777  001162          MOVB    -1(R5),$REG0                ,WFP AC MED CODE
030156  010237  001164                  MOV     R2,$REG1                    ;LS ADDR
030162  010137  001166                  MOV     R1,$REG2                    ,EXP'D DATA
030166  010337  001170                  MOV     R3,$REG3                    ,RCV'D DATA
030172  104112                          ERROR   112                         ,TELL ABOUT ERROR
                                                                            ,
030174  005202                  21$     INC     R2                          ,NEXT LS ADDR
030176  077425                          SOB     R4,20$                      ,LOOP FOR ALL
                                                                            ,
030200  000407                          BR      TST73           ,,EXIT
                                                                            ,
                                                                            ,
                                                                            ,
                                        ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ,A BLOCK MOVE FUNCTION IN THE WCS
030202  012777  000020  152624  39$     MOV     #PARDIS,@WCSST              ,
030210  022626                          CMP     (SP)+,(SP)+                 ,
030212  005077  152616                  CLR     @WCSST                      ,
030216  104112                          ERROR   113                         ,
                                        ,WCS WATCH DOG TIMED OUT
                                        ,UPON TRANSFERRING CONTROL FROM
                                         BASE MACHINE TO WCS MICROCODE
                                        ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                         SHOULD BE RETURNED TO BASE MACHINE


                                ;*****************************************************
                                ;TEST 72        CHECK BLOCK STORE OF WFP AC 2 3  TO  WCS

                                        THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS

                                                WFP AC 2 3  -> WCS ARRAY

                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER

                                                WFP AC0 2 , WFP AC1 2 , WFP AC2 2 , WFP AC3 2 ,
                                                  WFP AC0 3 , WFP AC1 3 , WFP AC2 3 , WFP AC3 3

                                        THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
```

```
                                        ;       REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                        ;       CONTROL TO THE BASE MACHINE
                                        ;
                                        ;       THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        ;       DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                                AN ERROR IS REPORTED.
                                        ;
                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        ;       IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        ;       114 WILL OCCUR.
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES).
                                        ;
                                        ;;*****************************************************************
030220  000004                          TST73   SCOPE
030222  012737  030464  037056                  MOV     #TST74,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
030230  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
030234  006630                                  6630                    ;CONTROL BLOCK LOADED HERE
030236  060126                                  MF23LS                  ;FROM THIS MEMORY LOCATION
030240  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
                                                ;CLEAR -ALL- WFP AC'S
030242  012705  003144                          MOV     #FP05XX,R5      ;TABLE OF MED CODES
030246  012704  000030                          MOV     #24 ,R4
030252  112537  030270                  11$     MOVB    (R5)+,12$       ;GET A CODE
030256  152737  000200  030270                  BISB    #200,12$        ;MAKE IT  WRITE'
030264  005000                                  CLR     R0              ;WRITE ZEROES
030266  076600                                  MED                     ;DO IT
030270  000000                          12$      WORD   0               ;
030272  077411                                  SOB     R4,11$          ;LOOP ON ALL
                                                                        ;
                                                ;SETUP WFP AC'S 2 3 WITH DATA (= MED CODE)
030274  012705  003154                          MOV     #FP23XX,R5      ;TABLE OF CODES
030300  012704  000010                          MOV     #8 ,R4          ;
030304  112500                          13$     MOVB    (R5)+,R0        ;GET MED CODE
030306  052700  125200                          BIS     #125200,R0      ;DATA = 125MED
030312  110037  030320                          MOVB    R0 14$          ;STORE WRITE MED CODE
030316  076600                                  MED                      WRITE THE DATA
030320  000000                          14$      WORD   0               ;
030322  077410                                  SOB     R4,13$          ;LOOP
                                                                        ;
030324  012702  001222                          MOV     #1222,R2        ;R2 IS LOCAL STORE ADDRESS HOLDER
                                                                        ;
030330  012737  030446  000114                  MOV     #39$,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
030336  012777  001000  152470                  MOV     #MAINT,@WCSST   ;SET UP MAINT BIT  TIMER WILL START WHEN
                                                ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
```

```
030344  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS
030346                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
030346  042777  001000  152460          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
030354  012737  003344  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
030362  012705  003154                  MOV     #FP23XX,R5              ;PTR TO MED CODE TABLE, ALSO DATA
030366  012704  000010                  MOV     #8.,R4                  ;# REGISTERS TO SAVE
                                                                        ;
030372  010277  152440          20$     MOV     R2,@WCSAR               ;POINT AT DATA IN WCS
030376  017703  152436                  MOV     @WCSDR,R3               ;GET WCS DATA
                                                                        ;
030402  112501                          MOVB    (R5)+,R1                ;GET DATA FROM TABLE
030404  052701  125200                  BIS     #125200,R1              ;
                                                                        ;
030410  020103                          CMP     R1,R3                   ;DATA MATCH ???
030412  001412                          BEQ     21$                     ;BR IF OK
030414  116537  177777  001162          MOVB    -1(R5),$REG0            ;WFP AC MED CODE
030422  010237  001164                  MOV     R2,$REG1                ;LS ADDR
030426  010137  001166                  MOV     R1,$REG2                ;EXP'D DATA
030432  010337  001170                  MOV     R3,$REG3                ;RCV'D DATA
030436  104114                          ERROR   114                     ;TELL ABOUT ERROR
                                                                        ;
030440  005202                  21$     INC     R2                      ;NEXT LS ADDR
030442  077425                          SOB     R4,20$                  ;LOOP FOR ALL
                                                                        ;
030444  000407                          BR      TST74           ;,EXIT
                                                                        ;
                                                                        ;
                                                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                                                        ;A BLOCK MOVE FUNCTION IN THE WCS
030446  012777  000020  152360  39$     MOV     #PARDIS,@WCSST          ;
030454  022626                          CMP     (SP)+,(SP)+             ;
030456  005077  152352                  CLR     @WCSST                  ;
030462  104115                          ERROR   115                     ;
                                                                        ;WCS WATCH DOG TIMED OUT
                                                                        ;UPON TRANSFERRING CONTROL FROM
                                                                        ;BASE MACHINE TO WCS MICROCODE
                                                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                        ***************************************************************
                                        *TEST 74        CHECK BLOCK STORE OF WFP AC 4 5  TO  WCS

                                                        THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS

                                                                WFP AC 4 5  -> WCS ARRAY

                                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                                        THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER

                                                                WFP AC0 4   WFP AC1 4   WFP AC2 4   WFP AC3 4
                                                                  WFP AC0 5 , WFP AC1 5 , WFP AC2 5   WFP AC3 5
```

```
                                        ;
                                        ;       THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        ;       UNIQUE DATA PATTERNS IN THEM
                                        ;
                                        ;       THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        ;       AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        ;       TO THE MICRO-CODE IN THE WCS.
                                        ;
                                        ;       FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        ;       THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        ;       SHOULD BE SAVED IN THE WCS.  THEN THIS MICRO-CODE SELECTS
                                        ;       THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        ;       WHICH ACTUALLY DOES THE STORE OF THE REGISTERS  AFTER THE
                                        ;       REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                        ;       CONTROL TO THE BASE MACHINE
                                        ;
                                        ;       THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        ;       DATA FROM THE REGISTERS WAS STORED CORRECTLY  F NOT,
                                        ;       AN ERROR IS REPORTED
                                        ;
                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        ;        S NOT TRANSFERRED BACK TO THE BASE MACHINE.
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        ;       114 WILL OCCUR
                                        ;
                                        ;       FAILURE OF THIS TEST COULD IND CATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
030464  000004                          TST74:  SCOPE
030466  012737  030730  003056                  MOV     #TST75,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
030474  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
030500  006650                                  6650                    ;CONTROL BLOCK LOADED HERE
030502  060226                                  MF45LS                  ;FROM THIS MEMORY LOCATION
030504  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
                                                ;CLEAR -ALL- WFP AC'S
030506  012705  003144                          MOV     #FP05XX,P5      ;TABLE OF MED CODES
030512  012704  000030                          MOV     #24 ,R4         ;
030516  112537  030534                  11$     MOVB    (R5)+,12$       ;GET A CODE
030522  152737  000200  030534                  BISB    #200,12$        ;MAKE IT 'WRITE'
030530  005000                                  CLR     P0              ;WRITE ZEROES
030532  076600                                  MED                     ;DO IT
030534  000000                          12$      WORD   0               ;
030536  077411                                  SOB     R4 11$          ;LOOP ON ALL
                                                                        ;
                                                ;SETUP WFP AC'S 4 5 WITH DATA (= MED CODE)
030540  012705  003164                          MOV     #FP45XX P5      ;TABLE OF CODES
030544  012704  000010                          MOV     #8 ,R4
```

```
030550  112500                  13$     MOVB    (R5)+,R0                ;GET MED CODE
030552  052700  125200                  BIS     #125200,R0              ;DATA = 125MED
030556  110037  030564                  MOVB    R0,14$                  ;STORE WRITE MED CODE
030562  076600                          MED                             ;WRITE THE DATA
030564  000000                  14$     WORD    0                       ;
030566  077410                          SOB     R4,13$                  ;LOOP
                                                                        ;
030570  012702  001432                  MOV     #1432,R2                ;R2 IS LOCAL STORE ADDRESS HOLDER
                                                                        ;
030574  012737  030712  000114          MOV     #39$,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
030602  012777  001000  152224          MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                                        ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
030610  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS
030612                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
030612  042777  001000  152214          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
030620  012737  003344  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
030626  012705  003164                  MOV     #FP45XX,R5              ;PTR TO MED CODE TABLE  ALSO DATA
030632  012704  000010                  MOV     #8 ,R4                  ;# REGISTERS TO SAVE
                                                                        ;
030636  010277  152174          20$     MOV     R2,@WCSAR               ;POINT AT DATA IN WCS
030642  017703  152172                  MOV     @WCSDR,R3               ;GET WCS DATA
                                                                        ;
030646  112501                          MOVB    (R5)+,R1                ;GET DATA FROM TABLE
030650  052701  125200                  BIS     #125200,R1              ;
                                                                        ;
030654  020103                          CMP     R1,R3                   ;DATA MATCH ???
030656  001412                          BEQ     21$                     ;BR IF OK
030660  116537  177777  001162          MOVB    -1(R5),$REG0            ;WFP AC MED CODE
030666  010237  001164                  MOV     R2,$REG1                ;LS ADDR
030672  010137  001166                  MOV     R1,$REG2                ;EXP'D DATA
030676  010337  001170                  MOV     R3,$REG3                ;RCV'D DATA
030702  104116                          ERROR   116                     ;TELL ABOUT ERROR
                                                                        ;
030704  005202                  21$     INC     R2                      ;NEXT LS ADDR
030706  077425                          SOB     R4,20$                  ;LOOP FOR ALL
                                                                        ;
030710  000407                          BR      TST75           ; EXIT
                                                                        ;
                                                                        ;
                                                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                                                        ;A BLOCK MOVE FUNCTION IN THE WCS
030712  012777  000020  152114  39$     MOV     #PARDIS,@WCSST
030720  022626                          CMP     (SP)+,(SP)+             ;
030722  005077  152106                  CLR     @WCSST
030726  104117                          ERROR   117                     ;
                                                                        ;WCS WATCH DOG TIMED OUT
                                                                        ;UPON TRANSFERRING CONTROL FROM
                                                                        ;BASE MACHINE TO WCS MICROCODE
                                                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                .*****************************************************************
```

```
                                        ;*TEST 75       CHECK BLOCK LOAD OF WFP AC 0 1  FROM  WCS
                                        ;
                                        ;       THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS
                                        ;
                                        ;               WCS ARRAY -> WFP AC 0 1
                                        ;
                                        ;       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        ;       GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS
                                        ;
                                                THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER
                                        ;
                                        ;               WFP AC0 0 , WFP AC1 0 , WFP AC2 0 , WFP AC3 0
                                        ;                 WFP AC0 1 , WFP AC1 1 , WFP AC2 1 , WFP AC3 1
                                        ;
                                        ;       THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE  BY WRITING
                                                UN QUE DATA PATTERNS IN IT
                                        ;
                                        ;       THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                                AN "XFC" DISPATCH INSTRUCTION CONTROL  IS TRANSFERRED
                                        ;       TO THE MICRO-CODE IN THE WCS

                                                FROM GPR "R2", THE MICRO-CODE SETS UP IN 'D" (BASE MACHINE),
                                                THE LOCAL LOAD ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                                SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                                THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                                REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                                CONTROL TO THE BASE MACHINE

                                                THE PEGARETERS IS THEN CHECKED TO MAKE SURE THAT THE
                                                DATA FROM THE WCS ARRAY WAS LOADED CORRECTLY  IF NOT,
                                                AN ERROR IS REPORTED

                                                THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                                THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                114 WILL OCCUR

                                                FA LURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                        CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                        THE WCS- (NUA<9.0>, ARRAY ADDRESS MUX-A-PORT,
                                                        BUS-U-MUX-B PORT, BUS-U-LINES)

                                        ; ***********************************************************
030730  000004                          TST75   SCOPE
030732  012737  031176  003056                  MOV     #TST76,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
030740  004537  037472                          JSR     R5,LDWCS                ;LOAD WCS WITH MICRO CODE
030744  006600                                  6600                            ;CONTROL BLOCK LOADED HERE
030746  057766                                  MLSF01                          ;FROM THIS MEMORY LOCATION
030750  006002                                  UDISP                           ;ENTRY POINT IN WCS
```

```
                                                  ;CLEAR -ALL- WFP AC'S
030752  012705  003144                            MOV     #FP05XX,R5              ;TABLE OF MED CODES
030756  012704  000030                            MOV     #24 ,R4                 ;
030762  112537  031000          11$               MOVB    (R5)+,12$               ;GET A CODE
030766  152737  000200  031000                    BISB    #200,12$                ;MAKE IT 'WRITE'
030774  005000                                    CLR     R0                      ;WRITE ZEROES
030776  076600                                    MED                             ;DO IT
031000  000000          12$                        WORD   0                       ;
031002  077411                                    SOB     R4,11$                  ;LOOP ON ALL
                                                                                  ;
                                                  ;SETUP LS ARRAY WITH DATA TO BE LOADED = MED CODE OF WFP REG STER
031004  012705  003144                            MOV     #FP01XX,R5              ;TABLE OF CODES
031010  012704  000010                            MOV     #8 ,R4                  ;
031014  012702  001233                            MOV     #1233,R2                ;LS ARRAY ADDRESS
031020  010277  152012                            MOV     R2,@WCSAR               ;
031024  112500          13$                       MOVB    (R5)+,R0                ;GET MED CODE
031026  052700  052000                            BIS     #052000,R0              ;DATA = 052MED
031032  010077  152002                            MOV     R0,@WCSDR               ;STORE INTO ARRAY
031036  005277  151774                            INC     @WCSAR                  ;NEXT
031042  077410                                    SOB     R4,13$                  ;LOOP
                                                                                  ;
031044  012737  031160  000114                    MOV     #39$,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
031052  012777  001000  151754                    MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                   WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                                  ;
031060  076700                                    XFCUDIS                         ;TRANSFER CONTROL TO WCS
031062                          1$                                                ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                                  ;
031062  042777  001000  151744                    BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
031070  012737  003344  000114                    MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                                  ;
031076  012705  003144                            MOV     #FP01XX,R5               PTR TO MED CODE TABLE, ALSO DATA
031102  012704  000010                            MOV     #8 ,R4                  ;# REGISTERS TO RESTORE
031106  012702  001233                            MOV     #1233,R2                ;LS ARRAY ADDRESS
                                                                                  ;
031112  112501          20$                       MOVB    (R5)+,R1                ;GET DATA FROM TABLE
031114  052701  052000                            BIS     #052000,R1              ;
031120  110137  031126                            MOVB    R1,22$                  ;AS READ MED CODE
031124  076600                                    MED                             ;GET WFP AC DATA
031126  000000          22$                        WORD   0
031130  020100                                    CMP     R1,R0                    DATA MATCH ???
031132  001410                                    BEQ     21$                     ;BR IF OK
031134  116537  177777  001162                    MOVB    -1(R5),$REG0            ;WFP AC MED CODE
031142  010137  001164                            MOV     R1 $REG1                ;EXP'D DATA
031146  010037  001166                            MOV     R0,$REG2                ;RCV'D DATA
031152  104120                                    ERROR   120                     ;TELL ABOUT ERROR
                                                                                  ;
031154  077422          21$                       SOB     R4,20$                  ;LOOP FOR ALL
                                                                                  ;
031156  000407                                    BR      TST76           ;;EXIT
                                                                                  ;
                                                                                  ;
                                                  ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                                  ;A BLOCK MOVE FUNCTION IN THE WCS
031160  012777  000020  151646  39$               MOV     #PARDIS,@WCSST          ;
031166  022626                                    CMP     (SP)+,(SP)+
```

```
031170  005077  151640                    CLR     @WCSST                  ;
031174  104121                            ERROR   121                     ;
                                          ;WCS WATCH DOG TIMED OUT
                                          ;UPON TRANSFERRING CONTROL FROM
                                          ;BASE MACHINE TO WCS MICROCODE
                                          ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                          ;SHOULD BE RETURNED TO BASE MACHINE


                                  ;;*************************************************************
                                  ;*TEST 76        CHECK BLOCK LOAD OF WFP AC 2 3  FROM  WCS
                                  ;
                                  ;               THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS
                                  ;
                                  ;                       WCS ARRAY -> WFP AC 2 3
                                  ;
                                  ;               WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                                  GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS

                                                  THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER

                                                          WFP AC0 2 , WFP AC1 2 , WFP AC2 2 , WFP AC3 2 ,
                                                            WFP AC0 3 , WFP AC1 3 , WFP AC2 3 , WFP AC3 3

                                                  THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE, BY WRITING
                                                  UNIQUE DATA PATTERNS IN IT

                                                  THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                                  AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                                  TO THE MICRO-CODE IN THE WCS

                                                  FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                                  THE LOCAL LOAD ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                                  SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                                  THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                  WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                                  REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                                  CONTROL TO THE BASE MACHINE

                                                  THE REGARETERS IS THEN CHECKED TO MAKE SURE THAT THE
                                                  DATA FROM THE WCS ARRAY WAS LOADED CORRECTLY  IF NOT
                                                  AN ERROR IS REPORTED

                                                  THIS TEST USES THE WCS WATCH-DOG TIMER  IF AS
                                                  A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                  IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                                  THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                  114 WILL OCCUR

                                                  FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                          TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                          BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                          CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                          THE WCS- (NUA<9 0>  ARRAY ADDRESS MUX-A-PORT
                                                          BUS-U-MUX-B PORT  BUS-U-LINES
```

```
                                                  ;
                                                  ;;*****************************************************************
031176  000004                                    TST76   SCOPE
031200  012737  031444  003056                            MOV     #TST77,NXTST    ;STARTING ADDRESS OF NEXT TEST
                                                                                  ;
031206  004537  037472                                    JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
031212  006620                                            6620                    ;CONTROL BLOCK LOADED HERE
031214  060066                                            MLSF23                  ;FROM THIS MEMORY LOCATION
031216  006002                                            UDISP                   ;ENTRY POINT IN WCS
                                                                                  ;
                                                          ;CLEAR -ALL- WFP AC S
031220  012705  003144                                    MOV     #FP05XX,R5      ;TABLE OF MED CODES
031224  012704  000030                                    MOV     #24 ,R4         ;
031230  112537  031246                            11$     MOVB    (R5)+,12$       ;GET A CODE
031234  152737  000200  031246                            BISB    #200,12$        ;MAKE IT 'WRITE'
031242  005000                                            CLR     R0              ;WRITE ZEROES
031244  076600                                            MED                     ;DO IT
031246  000000                                    12$      WORD   0               ;
031250  077411                                            SOB     R4,11$          ;LOOP ON ALL
                                                                                  ;
                                                           SETUP LS ARRAY WITH DATA TO BE LOADED = MED CODE OF WFP REGISTER
031252  012705  003154                                    MOV     #FP23XX,R5      ;TABLE OF CODES
031256  012704  000010                                    MOV     #8 ,R4          ;
031262  012702  001212                                    MOV     #1212,R2        ;LS ARRAY ADDRESS
031266  010277  151544                                    MOV     R2,@WCSAR       ;
031272  112500                                    13$     MOVB    (R5)+,R0        ;GET MED CODE
031274  052700  052000                                    BIS     #052000,R0      ;DATA = 052MED
031300  010077  151534                                    MOV     R0,@WCSDR       ;STORE INTO ARRAY
031304  005277  151526                                    INC     @WCSAR          ;NEXT
031310  077410                                            SOB     R4,13$          ;LOOP
                                                                                  ;
031312  012737  031426  000114                            MOV     #39$,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
031320  012777  001000  151506                            MOV     #MAINT,@WCSST   ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                           WCS HOT BOX IS SELECTED. UPON TRANSFERRING CONTROL TO WCS
                                                                                  ;
031326  076700                                            XFCUDIS                 ;TRANSFER CONTROL TO WCS
031330                                            1$                              ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                                  ;
031330  042777  001000  151476                            BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
031336  012737  003344  000114                            MOV     #BADPAR,@#114    RESET UNEXPECTED PARITY HANDLER
                                                                                  ;
031344  012705  003154                                    MOV     #FP23XX,R5       PTR TO MED CODE TABLE, ALSO DATA
031350  012704  000010                                    MOV     #8 ,R4          ;# REGISTERS TO RESTORE
031354  012702  001212                                    MOV     #1212,R2        ;LS ARRAY ADDRESS
                                                                                  ;
031360  112501                                    20$     MOVB    (R5)+,R1        ;GET DATA FROM TABLE
031362  052701  052000                                    BIS     #052000,R1      ;
031366  110137  031374                                    MOVB    R1,22$          ;AS READ MED CODE
031372  076600                                            MED                      GET WFP AC DATA
031374  000000                                    22$      WORD   0               ;
031376  020100                                            CMP     R1,R0           ;DATA MATCH ???
031400  001410                                            BEQ     21$             ;BR IF OK
031402  116537  177777  001162                            MOVB    -1(R5),$REG0    ;WFP AC MED CODE
031410  010137  001164                                    MOV     R1,$REG1         EXP'D DATA
031414  010037  001166                                    MOV     R0,$REG2         RCV'D DATA
031420  104122                                            ERROR   122             ;TELL ABOUT ERROR
```

```
                                                                        ;
031422  077422                  21$     SOB     R4,20$                  ;LOOP FOR ALL
                                                                        ;
031424  000407                          BR      TST77           ;;EXIT
                                                                        ;
                                                                        ;
                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
031426  012777  000020  151400  39$     MOV     #PARDIS,@WCSST          ;
031434  022626                          CMP     (SP)+,(SP)+             ;
031436  005077  151372                  CLR     @WCSST                  ;
031442  104123                          ERROR   123                     ;
                                        ;WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE TO WCS MICROCODE.
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                ;;*****************************************************************
                                 *TEST 77        CHECK BLOCK LOAD OF WFP AC 4 5  FROM WCS

                                        THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS

                                                WCS ARRAY -> WFP AC 4 5

                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS

                                        THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER

                                                WFP AC0 4 , WFP AC1 4 , WFP AC2 4 , WFP AC3 4 ,
                                                  WFP AC0 5 , WFP AC1 5 , WFP AC2 5   WFP AC3 5

                                        THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN IT

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL  S TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL LOAD ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                        REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                        CONTROL TO THE BASE MACHINE

                                        THE REGARETERS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE WCS ARRAY WAS LOADED CORRECTLY  IF NOT,
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE
```

```
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        ;       114 WILL OCCUR
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9.0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
031444  000004                          TST77   SCOPE
031446  012737  031712  003056                  MOV     #TST100,NXTST   ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
031454  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
031460  006640                                  6640                    ;CONTROL BLOCK LOADED HERE
031462  060166                                  MLSF45                  ;FROM THIS MEMORY LOCATION
031464  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
                                                ;CLEAR -ALL- WFP AC'S
031466  012705  003144                          MOV     #FP05XX,R5      ;TABLE OF MED CODES
031472  012704  000030                          MOV     #24 ,R4         ;
031476  112537  031514                  11$     MOVB    (R5)+,12$       ;GET A CODE
031502  152737  000200  031514                  BISB    #200,12$        ;MAKE IT 'WRITE'
031510  005000                                  CLR     R0              ;WRITE ZEROES
031512  076600                                  MED                     ;DO IT
031514  000000                          12$      WORD   0               ;
031516  077411                                  SOB     R4,11$          ;LOOP ON ALL
                                                                        ;
                                                ;SETUP LS ARRAY WITH DATA TO BE LOADED = MED CODE OF WFP REGISTER
031520  012705  003164                          MOV     #FP45XX,R5      ;TABLE OF CODES
031524  012704  000010                          MOV     #8 ,R4          ;
031530  012702  001414                          MOV     #1414,R2        ;LS ARRAY ADDRESS
031534  010277  151276                          MOV     R2,@WCSAR       ;
031540  112500                          13$     MOVB    (R5)+,R0        ;GET MED CODE
031542  052700  052000                          BIS     #052000,R0      ;DATA = 052MED
031546  010077  151266                          MOV     R0,@WCSDR       ;STORE INTO ARRAY
031552  005277  151260                          INC     @WCSAR          ;NEXT
031556  077410                                  SOB     R4,13$          ;LOOP
                                                                        ;
031560  012737  031674  000114                  MOV     #39$,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
031566  012777  001000  151240                  MOV     #MAINT,@WCSST   ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
031574  076700                                  XFCUDIS                 ;TRANSFER CONTROL TO WCS
031576                                  1$                              ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
031576  042777  001000  151230                  BIC     #MAINT,@WCSST   ;SHUT OFF THE TIMER
031604  012737  003344  000114                  MOV     #BADPAR,@#114   ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
031612  012705  003164                          MOV     #FP45XX,R5      ;PTR TO MED CODE TABLE, ALSO DATA
031616  012704  000010                          MOV     #8 ,R4          ;# REGISTERS TO RESTORE
031622  012702  001414                          MOV     #1414,R2        ;LS ARRAY ADDRESS
                                                                        ;
031626  112501                          20$     MOVB    (R5)+,R1        ;GET DATA FROM TABLE
```

```
031630  052701  052000                  BIS     #052000,R1                  ;
031634  110137  031642                  MOVB    R1,22$                      ;AS READ MED CODE
031640  076600                          MED                                 ;GET WFP AC DATA
031642  000000                  22$      WORD   0                           ;
031644  020100                          CMP     R1,R0                       ;DATA MATCH ???
031646  001410                          BEQ     21$                         ;BR IF OK
031650  116537  177777  001162          MOVB    -1(R5),$REG0                ;WFP AC MED CODE
031656  010137  001164                  MOV     R1,$REG1                    ;EXP'D DATA
031662  010037  001166                  MOV     R0,$REG2                    ;RCV'D DATA
031666  104124                          ERROR   124                         ;TELL ABOUT ERROR
                                                                            ;
031670  077422                  21$     SOB     R4,20$                      ;LOOP FOR ALL
                                                                            ;
031672  000407                          BR      TST100          ;;EXIT
                                                                            ;
                                                                            ;
                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER T MED OUT WH LE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
031674  012777  000020  151132  39$     MOV     #PARDIS,@WCSST              ;
031702  022626                          CMP     (SP)+,(SP)+                 ;
031704  005077  151124                  CLR     @WCSST                      ;
031710  104125                          ERROR   125                         ;
                                        ;WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE TO WCS MICROCODE
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                ;*******************************************************
                                ;*TEST 100      CHECK BLOCK STORE OF ASPAD 00 37  TO WCS
                                ;
                                        TH S TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS

                                ;               ASPAD 00 37  -> WCS ARRAY

                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER

                                                ASPLO 00 17 , ASPHI 00 17

                                        THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
```

```
                                        ;       THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        ;       WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                        ;       REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                        ;       CONTROL TO THE BASE MACHINE.
                                        ;
                                        ;       THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        ;       DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                        ;       AN ERROR IS REPORTED
                                        ;
                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER.  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        ;       IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        ;       114 WILL OCCUR
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9:0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
031712  000004                          TST100  SCOPE
031714  012737  022214  002056                  MOV     #TST101,NXTST   ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
        001234                                  ADDR := 1234            ;LS ADDR FOR ASPAD STORE
        052000                                  PAT A=  052000          ;BASE PATTERN FOR DATA
                                                                        ;
031722  004537  037472                          JSR     P5,LDWCS        ;LOAD WCS WITH MICRO CODE
031726  006670                                  6670                    ;CONTROL BLOCK LOADED HERE
031730  060326                                  MASPLS                  ;FROM THIS MEMORY LOCATION
031732  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
031734  012737  032276  000114                  MOV     #39$,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
031742  012777  001000  151064                  MOV     #MAINT,@WCSST   ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
                                                                        ;
                                                ;INIT ASPAD REGISTERS WITH DATA, DATA = '052MED'
031750  012702  031776                          MOV     #40$,R2         ;PTR TO MED TABLE FOR THIS TEST
031754  112200                          11$     MOVB    (R2)+,R0        ;GET A MED CODE
031756  100425                                  BMI     13$             ;END OF TABLE ??
031760  052700  052200                          BIS     #PAT A+BIT7,R0  ;MAKE DATA & WRITE MED CODE
031764  110037  031772                          MOVB    R0,12$          ;STORE WRITE-MED CODE
031770  076600                                  MED                     ;
031772  000000                          12$      WORD   0               ;
031774  000767                                  BR      11$             ;
                                                                        ;
                                                ;TABLE FOR INIT
031776     001     003     004  40$              BYTE   01,03,04,05      ;EXCLUDE   P0(00),R2(02),KSP(06),PC(07)
032001     005
032002     010     011     012                   BYTE   10,11,12,13,14,15,16,17,
032005     013     014     015
032010     016     017
```

```
032012     020     021     023          BYTE    20,21,23,24,25,27        ;EXCLUDE   WHAM (22), CNSL SW(26)
032015     024     025     027
032020     030     031     032          BYTE    30,31,32,33,34,35,36,37  ;
032023     033     034     035
032026     036     037
032030     377                          BYTE    -1                       ; END
           032032                       EVEN
                                                                         ;
032032  012702  001234          13$.    MOV     #ADDR 1,R2               ;R2 IS LS ADDR PTR
                                                                         ;
032036  010637  032212                  MOV     SP,41$+<2*006>           ;GET KSP INTO RESULT TABLE
                                                                         ;
032042  076600  000022                  MED     ,022                     ;GET WHAMI INTO RESULT TABLE
032046  010037  032242                  MOV     R0,41$+<2*022>           ;
                                                                         ;
032052  076600  000026                  MED     ,026                     ;GET CNSL SW INTO RESULT TABLE
032056  010037  032252                  MOV     R0,41$+<2*026>
                                                                         ;
032062  012700  052200                  MOV     #PAT A+BIT7+00,R0          ETUP R0 W/ 052MED PATTERN
                                                                         ;
032066  076700                          XFCUDIS                          ;TRANSFER CONTROL TO WCS
032070                          1$                                       ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                         ;
032070  042777  001000  150736          BIC     #MAINT,@WCSST            ;SHUT OFF THE TIMER
032076  012737  003344  000114          MOV     #BADPAR,@#114            ;RESET UNEXPECTED PARITY HANDLER
                                                                         ;
                                        ;CHECK RESULTS STORED INTO WCS APPAY
032104  012705  032176                  MOV     #41$,R5                  ;PTR TO RESULT TABLE
032110  012704  000040                  MOV     #32 ,R4                  ;32  REGISTERS SHOULD HAVE BEEN STORED
032114  005037  001162                  CLR     $REG0                    ;HOLDS MED CODE OF ASPAD LOC
032120  012777  001234  150710          MOV     #ADDR 1,@WCSAR           ;POINT TO WHERE DATA SHOULD BE
                                                                         ;
032126  017737  150706  001170  20$     MOV     @WCSDR,$REG3             ;GET DATA FROM LS (RECEIVED)
032134  012537  001166                  MOV     (R5)+,$REG2              ;GET DATA FROM TABLE (EXPECTED)
032140  001410                          BEQ     21$                      ;IF DATA WASNT FILLED IN, ITS INDETERMINATE
032142  023737  001166  001170          CMP     $REG2,$REG3              ;E-DATA = R-DATA ??
032150  001404                          BEQ     21$                      ;BR IF A-OK
032152  017737  150660  001164          MOV     @WCSAR,$REG1             ;GET WCS LOC
032160  104126                          ERROR   126                      ;DATA ERR ? !
                                                                         ;
032162  005237  001162          21$     INC     $REG0                      NEXT MED CODE
032166  005277  150644                  INC     @WCSAR                   ;ADDRESS NEXT LS LOC
032172  077423                          SOB     R4,20$                   ;LOOP
                                                                         ;
032174  000447                          BR      TST101          EXIT
                                                                         ;
                                                                         ;
                                        ;---RESULT TABLE---
032176  052200                  41$      WORD   PAT A+BIT7+00            ;R0
032200  052201                           WORD   PAT A+BIT7+01            ;R1
032202  001234                           WORD   ADDR 1                   ;R2 = LS ADDR
032204  052203                           WORD   PAT A+BIT7+03            ;R3
032206  052204                           WORD   PAT A+BIT7+04            ;R4
032210  052205                           WORD   PAT A+BIT7+05             R5
032212  123456                           WORD   123456                   ;KSP = SP STORED HERE FOR COMPARE
032214  032070                           WORD   1$                       ;PC = RETURN PC HERE
```

```
032216  052210                          WORD    PAT.A+BIT7+10           ;FAC3 0
032220  052211                          WORD    PAT.A+BIT7+11           ,FAC3 1
032222  052212                          WORD    PAT A+BIT7+12           ,FAC3 2
032224  052213                          WORD    PAT.A+BIT7+13           ,FAC3 3
032226  052214                          WORD    PAT.A+BIT7+14           ,FAC3 4
032230  052215                          WORD    PAT.A+BIT7+15           ;FAC3 5
032232  052216                          WORD    PAT.A+BIT7+16           ,USER SP
032234  052217                          WORD    PAT.A+BIT7+17           ,FDST3
032236  052220                          WORD    PAT A+BIT7+20           ,WCSA 0
032240  052221                          WORD    PAT A+BIT7+21           ,WCSA 1
032242  123456                          WORD    123456                  ,WHAMI STORED HERE
032244  052223                          WORD    PAT A+BIT7+23           ,CNSL TMPSW
032246  000000                          WORD    000000                  ,R SRC X,I      **INDETERMINATE**
032250  000000                          WORD    000000                  ,R DST X,I      **INDETERMINATE**
032252  123456                          WORD    123456                  ,CNSL SW STORED HERE
032254  052227                          WORD    PAT A+BIT7+27           ,CNSL CADR
032256  052230                          WORD    PAT A+BIT7+30           ,FAC1 0
032260  052231                          WORD    PAT A+BIT7+31           ,FAC1 1
032262  052232                          WORD    PAT A+BIT7+32           ,FAC1 2
032264  052233                          WORD    PAT A+BIT7+33           ,FAC1 3
032266  052234                          WORD    PAT A+BIT7+34           ,FAC1 4
032270  052235                          WORD    PAT A+BIT7+35           ,FAC1 5
032272  052236                          WORD    PAT A+BIT7+36           ,FPSHI/FEC
032274  052237                          WORD    PAT A+BIT7+37           ,FDST1/R IR
                                       , END OF TABLE
                                                                       ,
                                                                       ,
                                       ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        A BLOCK MOVE FUNCTION IN THE WCS
032276  012777  000020  150530  395    MOV     #PARDIS,@WCSST          ,
032304  022626                         CMP     (SP)+,(SP)+             ,
032306  005077  150522                 CLR     @WCSST                  ,
032312  104127                         ERROR   127                     ; ! WATCH DOG TIMEOUT !!!
                                       ,WCS WATCH DOG TIMED OUT
                                       ,UPON TRANSFERRING CONTROL FROM
                                       ,BASE MACHINE TO WCS MICROCODE
                                        NORMALLY, AFTER UCODE EXECUTION CONTROL
                                       ,SHOULD BE RETURNED TO BASE MACHINE


                                ,,*****************************************************************
                                ,*TEST 101      CHECK BLOCK STORE OF BSPAD 00 37  TO WCS

                                       THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS

                                               BSPAD 00 37  -> WCS ARRAY

                                       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                       GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                       THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER

                                               BSPLO 00 17 , BSPHI 00 17

                                       THE REGISTERS ARE INITIALIZED TO A KNOWN STATE. BY WRITING
                                       UNIQUE DATA PATTERNS IN THEM
```

```
                                        ;
                                        ;       THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        ;       AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        ;       TO THE MICRO-CODE IN THE WCS
                                        ;
                                        ;       FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        ;       THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        ;       SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                        ;       THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        ;       WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                        ;       REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                                CONTROL TO THE BASE MACHINE.

                                        ;       THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        ;       DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                        ;       AN ERROR IS REPORTED
                                        ;
                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        ;       IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                114 WILL OCCUR

                                                FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                        CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)

                                        ;*****************************************************************
032314  000004                          TST101  SCOPE
032316  012737  032710  003056                  MOV     #TST102,NXTST   ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
        001433                                  ADDR 1= 1433            ;LS ADDR FOR BSPAD STORE
        124000                                  PAT B=  124000          ;BASE PATTERN FOR DATA
                                                                        ;
032324  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
032330  006710                                  6710                     CONTROL BLOCK LOADED HERE
032332  060426                                  MBSPLS                   FROM THIS MEMORY LOCATION
032334  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
032336  012737  032672  000114                  MOV     #39$,@#114      ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
032344  012777  001000  150462                  MOV     #MAINT,@WCSST    SET UP MAINT BIT, TIMER WILL START WHEN
                                                ;WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
                                                                        ;
                                                ;INIT BSPAD REGISTERS WITH DATA, DATA = '124MED'
032352  012702  032400                          MOV     #40$,R2         ;PTR TO MED TABLE FOR THIS TEST
032356  112200                          11$     MOVB    (R2)+,R0        ;GET A MED CODE
032360  100425                                  BMI     13$             ;END OF TABLE ??
032362  052700  124200                          BIS     #PAT.B+BIT7,R0  ;MAKE DATA & WRITE MED CODE
032366  110037  032374                          MOVB    R0,12$          ;STORE WRITE-MED CODE
032372  076600                                  MED                     ;
032374  000000                          12$      WORD   0
```

```
032376  000767                          BR      11$                     ;
                                                                        ;
                                        ;TABLE FOR INIT
032400     041     043     044  40$     BYTE    41,43,44,45             ;EXCLUDE   R0(40),R2(42),KSP(46),PC(47)
032403     045
032404     050     051     052          BYTE    50,51,52,53,54,55,56,57 ;
032407     053     054     055
032412     056     057
032414     060     061     062          BYTE    60,61,62,64,65,66       ;EXCLUDE   R ZERO (63), CNSL CNTL(67)
032417     064     065     066
032422     070     071     072          BYTE    70,71,72,73,74,75,76,77 ;
032425     073     074     075
032430     076     077
032432     377                          BYTE    -1                      ; END
        032434                          EVEN
                                                                        ;
032434  012702  001433          13$     MOV     #ADDR 1,R2              ;R2 IS LS ADDR PTR
                                                                        ;
032440  010637  032606                  MOV     SP,41$+<2*006>          ;GET KSP INTO RESULT TABLE
                                                                        ;
032444  076600  000067                  MED     ,067                    ;GET CNSL CNTL INTO RESULT TABLE
032450  010037  032650                  MOV     R0,41$+<2*027>          ;
                                                                        ;
032454  012700  124240                  MOV     #PAT B+BIT7+40,R0       ; SETUP R0 W/ 124MED PATTERN
                                                                        ;
032460  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS
032462                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
032462  042777  001000  150344          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
032470  012737  003344  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
                                        ;CHECK RESULTS STORED INTO WCS ARRAY
032476  012705  032572                  MOV     #41$,R5                 ;PTR TO RESULT TABLE
032502  012704  000040                  MOV     #32 ,R4                 ;32  REGISTERS SHOULD HAVE BEEN STORED
032506  012737  000040  001162          MOV     #040,$REG0              ;HOLDS MED CODE OF BSPAD LOC
032514  012777  001433  150314          MOV     #ADDR 1,@WCSAR          ;POINT TO WHERE DATA SHOULD BE
                                                                        ;
032522  017737  150312  001170  20$     MOV     @WCSDR,$REG3            ;GET DATA FROM LS (RECEIVED)
032530  012537  001166                  MOV     (R5)+,$REG2             ;GET DATA FROM TABLE (EXPECTED)
032534  001410                          BEQ     21$                     ;IF DATA WASNT FILLED IN, ITS INDETERMINATE
032536  023737  001166  001170          CMP     $REG2,$REG3             ;E-DATA = R-DATA ??
032544  001404                          BEQ     21$                     ;BR IF A-OK
032546  017737  150264  001164          MOV     @WCSAP,$REG1            ;GET WCS LOC
032554  104130                          ERROR   130                     ;DATA ERROR !!
                                                                        ;
032556  005237  001162          21$     INC     $REG0                   ;NEXT MED CODE
032562  005277  150250                  INC     @WCSAR                  ;ADDRESS NEXT LS LOC
032566  077423                          SOB     R4,20$                  ; LOOP
                                                                        ;
032570  000447                          BR      TST102          ;;EXIT
                                                                        ;
                                                                        ;
                                        ;---RESULT TABLE---
032572  124240                  41$     WORD    PAT B+BIT7+40           ;R0
032574  124241                          WORD    PAT B+BIT7+41           ; R1
032576  001433                          ;WORD   ADDR 1                  ;R2 = LS ADDR
```

```
032600  124243                          WORD    PAT.B+BIT7+43           ;R3
032602  124244                          WORD    PAT B+BIT7+44           ;R4
032604  124245                          WORD    PAT B+BIT7+45           ;R5
032606  123456                          WORD    123456                  ;KSP = SP STORED HERE FOR COMPARE
032610  032462                          WORD    1$                      ;PC = RETURN PC HERE
032612  124250                          WORD    PAT.B+BIT7+50           ;FAC2 0
032614  124251                          WORD    PAT B+BIT7+51           ;FAC2 1
032616  124252                          WORD    PAT B+BIT7+52           ;FAC2 2
032620  124253                          WORD    PAT B+BIT7+53           ;FAC2 3
032622  124254                          WORD    PAT.B+BIT7+54           ;FAC2 4
032624  124255                          WORD    PAT B+BIT7+55           ;FAC2 5
032626  124256                          WORD    PAT B+BIT7+56           ;USER SP
032630  124257                          WORD    PAT B+BIT7+57           ;FDST2
032632  124260                          WORD    PAT B+BIT7+60           ;WCSB 0
032634  124261                          WORD    PAT B+BIT7+61           ;WCSB 1
032636  124262                          WORD    PAT B+BIT7+62           ;R VECT  HERE - HOPEFULLY NO INTR ??
032640  000000                          WORD    000000                  ;R ZERO
032642  000000                          WORD    000000                  ;R SRC X,I      **INDETERMINATE**
032644  000000                          WORD    000000                  ;R DST X,I      **INDETERMINATE**
032646  124266                          WORD    PAT B+BIT7+66           ;FPA
032650  123456                          WORD    123456                  ;CNSL CNTL STORED HERE
032652  124270                          WORD    PAT B+BIT7+70           ;FAC0 0
032654  124271                          WORD    PAT B+BIT7+71           ;FAC0 1
032656  124272                          WORD    PAT B+BIT7+72           ;FAC0 2
032660  124273                          WORD    PAT B+BIT7+73           ;FAC0 3
032662  124274                          WORD    PAT B+BIT7+74           ;FAC0 4
032664  124275                          WORD    PAT B+BIT7+75           ;FAC0 5
032666  124276                          WORD    PAT B+BIT7+76           ;FEA
032670  124277                          WORD    PAT B+BIT7+77           ;FDST0
                                        ; END OF TABLE
                                                                        ;
                                                                        ;
                                        ; ENTER HERE IF THE WCS WATCH DOG TIMER T MED OUT WHILE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
032672  012777  000020  150134  39$     MOV     #PARDIS,@WCSST          ;
032700  022626                          CMP     (SP)+,(SP)+             ;
032702  005077  150126                  CLR     @WCSST                  ;
032706  104131                          ERROR   131                     ;!!! WATCH DOG TIMEOUT !!!
                                        ;WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE TO WCS MICROCODE
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ; SHOULD BE RETURNED TO BASE MACHINE


                                ;*******************************************************
                                ;TEST 102       CHECK BLOCK STORE OF CSPAD 17 00  TO WCS

                                        THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS

                                                CSPAD 17 00  -> WCS.ARRAY

                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER
```

```
                                        ;
                                        ;               CSP 17 (#1), CSP 16 (#0), CSP 15 (MD), CSP 14 (#2),
                                        ;                       CSP 13 ,     , CSP 00
                                        ;
                                        ;       THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        ;       UNIQUE DATA PATTERNS IN THEM
                                        ;
                                        ;       THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        ;       AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                                TO THE MICRO-CODE IN THE WCS

                                        ;       FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        ;       THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                                SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                        ;       THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                        ;       REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                                CONTROL TO THE BASE MACHINE

                                                THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                                DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT,
                                                AN ERROR IS REPORTED

                                                THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                                THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                114 WILL OCCUR

                                                FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                        CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                        THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                                        BUS-U-MUX-B PORT, BUS-U-LINES)

                                        ;;;
```

```
                                                                                ;
                                                                                ;
                                                  ;INIT CSPAD REGISTERS WITH DATA; DATA = 'O7OMED'
032762  012702  033010                            MOV     #40$,R2               ;PTR TO MED TABLE FOR THIS TEST
032766  112200                          11$       MOVB    (R2)+,R0              ;GET A MED CODE
032770  100416                                    BMI     13$                   ;END OF TABLE ??
032772  052700  070200                            BIS     #PAT C+BIT7,R0        ;MAKE DATA & WRITE MED CODE
032776  110037  033004                            MOVB    R0,12$                ;STORE WRITE-MED CODE
033002  076600                                    MED                           ;
033004  000000                          12$        WORD   0                     ;
033006  000767                                    BR      11$                   ;
                                                                                ;
                                                  ;TABLE FOR INIT
033010     100     101     102  40$                BYTE   100,101,102,103,104,105,106,107
033013     103     104     105
033016     106     107
033020     110     111     112                     BYTE   110,111,112,113        ;EXCLUDE   CSP 14 17  BASE CNST & MD
033023     113
033024     377                                    ;BYTE   -1                     ; END
          033026                                   EVEN
                                                                                ;
033026  012702  001212                  13$       MOV     #ADDR 1,R2            ;R2 IS LS ADDR PTR
                                                                                ;
033032  076700                                    XFCUDIS                       ;TRANSFER CONTROL TO WCS
033034                                  1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                                ;
033034  042777  001000  147772                    BIC     #MAINT,@WCSST         ;SHUT OFF THE TIMER
033042  012737  003344  000114                    MOV     #BADPAR,@#114         ;RESET UNEXPECTED PARITY HANDLER
                                                                                ;
                                                  ;CHECK RESULTS STORED INTO WCS ARRAY
033050  012705  033142                            MOV     #41$,R5               ;PTR TO RESULT TABLE
033054  012704  000020                            MOV     #16 ,R4               ;16  REGISTERS SHOULD HAVE BEEN STORED
033060  012737  000117  001162                    MOV     #117,$PEGO             HOLDS MED CODE OF CSPAD LOC
                                                                                ;NOTE   STORED IN REVERSE ORDER
033066  012777  001212  147742                    MOV     #ADDR 1,@WCSAR        ;POINT TO WHERE DATA SHOULD BE
                                                                                ;
033074  017737  147740  001170  20$               MOV     @WCSDR,$REG3          ;GET DATA FROM LS (RECEIVED)
033102  012537  001166                            MOV     (R5)+,$REG2           ;GET DATA FROM TABLE (EXPECTED)
033106  023737  001166  001170                    CMP     $REG2,$REG3           ;E-DATA - R-DATA ??
033114  001404                                    BEQ     21$                    BR IF A-OK
033116  017737  147714  001164                    MOV     @WCSAR,$REG1           GET WCS LOC
033124  104132                                    ERROR   132                   ;DATA ERROR !!
                                                                                ;
033126  005337  001162                  21$       DEC     $REGO                  NEXT MED CODE
033132  005277  147700                            INC     @WCSAR                 ADDRESS NEXT LS LOC
033136  077422                                    SOB     R4,20$                ;LOOP
                                                                                ;
033140  000427                                    BR      TST103          ;EXIT
                                                                                ;
                                                                                ;
                                                   ---RESULT TABLE---
033142  000001                          41$        WORD   000001                 CSP 17  = # 1
033144  000000                                     WORD   000000                ;CSP 16  = # 0
033146  076700                                     WORD   XFCUDIS               ;CSP 15  = MD
033150  000002                                     WORD   000002                 CSP 14  = # 2
033152  070313                                     WORD   PAT C+BIT7+11C         CSP 13  = PATTERN
```

```
033154  070312                          WORD    PAT C+BIT7+112          ;CSP 12  = PATTERN
033156  070311                          WORD    PAT C+BIT7+111          ;CSP 11  = PATTERN
033160  070310                          WORD    PAT C+BIT7+110          ;CSP 10  = PATTERN
033162  070307                          WORD    PAT C+BIT7+107          ;CSP 07  = PATTERN
033164  070306                          WORD    PAT C+BIT7+106          ;CSP 06  = PATTERN
033166  070305                          WORD    PAT C+BIT7+105          ;CSP 05  = PATTERN
033170  070304                          WORD    PAT C+BIT7+104          ;CSP 04  = PATTERN
033172  070303                          WORD    PAT C+BIT7+103          ;CSP 03  = PATTERN
033174  070302                          WORD    PAT C+BIT7+102          ;CSP 02  = PATTERN
033176  070301                          WORD    PAT C+BIT7+101          ;CSP 01  = PATTERN
033200  070300                          WORD    PAT C+BIT7+100          ;CSP 00  = PATTERN
                                                                        ;
                                                                        ;
                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
033202  012777  000020  147624  396     MOV     #PARDIS,@WCSST          ;
033210  022626                          CMP     (SP)+,(SP)+             ;
033212  005077  147616                  CLR     @WCSST                  ;
033216  104133                          ERROR   133                     ;!!! WATCH DOG TIMEOUT !!!
                                        ;WCS WATCH DOG TIMED OUT
                                         UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE TO WCS MICROCODE
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                         SHOULD BE RETURNED TO BASE MACHINE
```

```
                        ***********************************************************
                        ;TEST 103      CHECK BLOCK LOAD OF ASPAD 00 37  FROM WCS

                                THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS

                                        WCS ARRAY -> ASPAD 00 37

                                WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS

                                THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER

                                        ASPLO 00 17   ASPH  00 17

                                THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE. BY WRITING
                                UNIQUE DATA PATTERNS TO IT

                                THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                TO THE MICRO-CODE IN THE WCS

                                FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                THE LOCAL LOAD ADDRESS (-1) STARTING FROM WHICH THE REGISTERS
                                SHOULD BE RESTORED FROM THE WCS.  THEN THIS MICRO-CODE SELECTS
                                THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMC-ROM
```

```
                                        ;       WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                        ;       REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                        ;       CONTROL TO THE BASE MACHINE
                                        ;
                                        ;       THE REGISTERS ARE THEN CHECKED TO MAKE SURE THAT THE
                                        ;       DATA FROM THE WCS WAS LOADED CORRECTLY  IF NOT,
                                        ;       AN ERROR IS REPORTED
                                        ;
                                        ;       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        ;       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                                IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                                THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                114 WILL OCCUR

                                                FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                        CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                        THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT
                                                        BUS-U-MUX-B PORT, BUS-U-LINES)

                                        ***********************************************************
033220  000004                  TST103  SCOPE
033222  012737  004100  000056          MOV     #TST104,NXTST   ;STARTING ADDRESS OF NEXT TEST

        001555                          ADDR 1= 1555                    ;LS ADDR FOR ASPAD LOAD
        111000                          PAT A-  111000                  ;BASE PATTERN FOR DATA

033230  004537  037472                  JSR     P5,LDWCS                ;LOAD WCS WITH MICRO CODE
033234  006660                          6660                            ;CONTROL BLOCK LOADED HERE
033236  060266                          MLSASP                          ;FROM THIS MEMORY LOCATION
033240  006002                          UDISP                           ;ENTRY POINT IN WCS

                                        ;INIT WCS AREA WITH '111MEC  DATA PATTERN IN ALL LOCN'S
033242  012777  001555  147566          MOV     #ADDR 1,@WCSAR          ;POINT AT AREA
033250  012700  111000                  MOV     #PAT A+000,R0           ;DATA PATTERN BASE
033254  012701  000040                  MOV     #32 ,R1                 ;THIS MANY REGISTERS
                                        ;
033260  010077  147554          3$      MOV     R0,@WCSDR               ;STORE A PATTERN
033264  005277  147546                  INC     @WCSAR                  ;NEXT LOCN
033270  005200                          INC     R0                      ;NEXT PATTERN
033272  077106                          SOB     R1,3$                   ;LOOP

033274  024646                          CMP     -(SP),-(SP)             ;GET SOME STACK

                                        ;INIT SOME SPECIAL LOCN'S
033276  076600  000022                  MED     ,022                    ;GET CURRENT WHAMI
033302  012777  001577  147526          MOV     #ADDR 1+022,@WCSAR      ;FIND WHERE  T GOES
033310  010077  147524                  MOV     R0,@WCSDR               ;STORE IT
033314  010037  033774                  MOV     R0,43$+2                ;ALSO IN TABLE, BELOW
                                        ;
033320  076600  000026                  MED     ,026                    ;GET CURRENT CNSL SW
033324  012777  001603  147504          MOV     #ADDR 1+026,@WCSAR      ;FIND WHERE IT GOES
033332  010077  147502                  MOV     R0,@WCSDR               ;STORE IT
033336  010037  034014                  MOV     R0,44$+2                ;ALSO IN TABLE  BELOW
```

```
033342  012777  001563  147466          MOV     #ADDR 1+006,@WCSAR      ;FIND WHERE KSP GOES
033350  010677  147464                  MOV     SP,@WCSDR               ;STORE IT
033354  010637  033714                  MOV     SP,42$+2                ;ALSO IN TABLE, BELOW
                                                                        ;
033360  012777  001564  147450          MOV     #ADDR 1+007,@WCSAR      ;FIND WHERE PC GOES
033366  012777  033502  147444          MOV     #1$,@WCSDR              ;STORE IT
                                                                        ;
                                        ;INIT ASPAD REGISTERS WITH ALL ZEROES
033374  012702  033424                  MOV     #40$,R2                 ;PTR TO MED TABLE FOR THIS TEST
033400  112200                  11$     MOVB    (R2)+,R0                ;GET A MED CODE
033402  100426                          BMI     13$                     ;END OF TABLE ??
033404  152700  000200                  BISB    #BIT7,R0                ;MAKE DATA & WRITE MED CODE
033410  110037  033420                  MOVB    R0,12$                  ;LOAD WRITE-MED CODE
033414  005000                          CLR     R0                      ;WRITE ZEROES
033416  076600                          MED                             ;
033420  000000                  12$      WORD   0                       ;
033422  000766                          BR      11$                     ;
                                                                        ;
                                        ;TABLE FOR INIT
033424     001     003     004  40$      BYTE   01,03,04,05             ;EXCLUDE   R0(00) R2(02),KSP(06),PC(07)
033427     005
033430     010     011     012           BYTE   10,11,12,13,14,15,16,17
033433     013     014     015
033436     016     017
033440     020     021     023           BYTE   20,21,23,24,25,27        EXCLUDE   WHAMI(22), CNSL SW(26)
033443     024     025     027
033446     030     031     032           BYTE   30,31,32,33,34,35,36,37 ;
033451     033     034     035
033454     036     037
033456     377                          BYTE   -1                      ; END
          033460                        EVEN
                                                                        ;
033460  012702  001555          13$     MOV     #ADDR 1,R2              ;R2 IS LS ADDR PTR
                                                                        ;
033464  012737  034062  000114          MOV     #39$,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
033472  012777  001000  147234          MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                         WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL FROM WCS
                                                                        ;
033500  076700                          XFCUDIS                         ;TRANSFER CONTROL FROM WCS
033502                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
033502  042777  001000  147324          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
033510  012737  007244  000114          MOV     #BADPAR,@#114            RESET UNEXPECTED PARITY HANDLER
                                                                        ;
                                        ;COPY A-SIDE GPR'S TO BOTH A&B-SIDES
033516  010000                          MOV     R0,R0
033520  010101                          MOV     R1,R1                   ;
033522  010202                          MOV     R2,R2
033524  010303                          MOV     R3,R3
033526  010404                          MOV     R4,R4
033530  010505                          MOV     R5,R5                   ;
033532  010606                          MOV     SP,SP                   ;
                                                                        ;
                                         CHECK RESULTS LOADED INTO ASP REGISTERS
033534  012777  033662  001202          MOV     #41$,STMPD              ;PTR TO RESULT TABLE
```

```
033542  012737  000040  001204          MOV     #32.,$TMP1              ;THIS MANY REGISTERS
033550  012737  001555  001164          MOV     #ADDR.1,$REG1           ;WCS LOC USED
                                                                        ;
033556  017737  145420  001162  20$     MOV     @$TMPO,$REGO            ;GET MED/REPD CODE
033564  062737  000002  001202          ADD     #2,$TMPO                ;AUTO-INCR, THE HARD WAY
033572  113737  001162  033624          MOVB    $REGO,21$               ;STORE FOR MED
033600  017737  145376  001166          MOV     @$TMPO,$REG2            ;GET DATA FROM TABLE (EXPECTED)
033606  062737  000002  001202          ADD     #2,$TMPO                ;AUTO-INCR, THE HARD WAY
033614  005737  001162                  TST     $REGO                   ;IGNORE THIS ENTRY ??
033620  100411                          BMI     22$                     ;YES
033622  076600                          MED                             ;GET CSP DATA
033624  000000                  21$     .WORD   0                       ;
                                                                        ;
033626  010037  001170                  MOV     R0,$REG3                ;STORE R-DATA
033632  023737  001170  001166          CMP     $REG3,$REG2             ;E-DATA = R-DATA ??
033640  001401                          BEQ     22$                     ;BR IF A-OK
033642  104134                          ERROR   134                     ;DATA ERROR !!
                                                                        ;
033644  005237  001164          22$     INC     $REG1                   ;BUMP WCS LOC CNTR
033650  005337  001204                  DEC     $TMP1                   ;LOOP
033654  003340                          BGT     20$                     ;
                                                                        ;
033656  022626                          CMP     (SP)+,(SP)+             ;RELEASE EXTRA STACK
033660  000507                          BR      TST104          ;EXIT
                                                                        ;
                                                                        ;
                                        ;---RESULT TABLE---
033662  000000  111000          41$     WORD    000,    PAT A+00        ;R0
033666  000001  111001                  WORD    001,    PAT A+01        ;R1
033672  000002  111002                  WORD    002,    PAT A+02        ;R2
033676  000003  111003                  WORD    003,    PAT A+03        ;R3
033702  000004  111004                  WORD    004,    PAT A+04        ;R4
033706  000005  111005                  WORD    005,    PAT A+05        ;R5
033712  000006  123456          42$     WORD    006,    123456          ;KSP = SP LOADED HERE FOR COMPARE
033716  177777  033502                  WORD    -1,     1$              ;PC = RETURN PC HERE
033722  000010  111010                  WORD    010,    PAT A+10        ;FAC3 0
033726  000011  111011                  WORD    011,    PAT A+11        ;FAC3 1
033732  000012  111012                  WORD    012,    PAT A+12        ;FAC3 2
033736  000013  111013                  WORD    013,    PAT A+13        ;FAC3 3
033742  000014  111014                  WORD    014,    PAT A+14        ;FAC3 4
033746  000015  111015                  WORD    015,    PAT A+15        ;FAC3 5
033752  000016  111016                  WORD    016,    PAT A+16        ;USER SP
033756  000017  111017                  WORD    017,    PAT.A+17        ;FDST3
033762  000020  111020                  WORD    020,    PAT.A+20        ;WCSA 0
033766  000021  111021                  WORD    021,    PAT A+21        ;WCSA 1
033772  000022  123456          43$     WORD    022,    123456          ;WHAMI LOADED HERE
033776  000023  111023                  WORD    023,    PAT A+23        ;CNSL TMPSW
034002  177777  000000                  WORD    -1,     000000          ;R SRC X,!      **INDETERMINATE**
034006  177777  000000                  WORD    -1,     000000          ;R DST X,!      **INDETERM NATE**
034012  000026  123456          44$     WORD    026,    123456          ;CNSL SW LOADED HERE
034016  000027  111027                  WORD    027,    PAT A+27        ;CNSL CADP
034022  000030  111030                  WORD    030,    PAT A+30        ;FAC1 0
034026  000031  111031                  WORD    031,    PAT A+31        ;FAC1 1
034032  000032  111032                  WORD    032,    PAT A+32        ;FAC1 2
034036  000033  111033                  WORD    033,    PAT A+33        ;FAC1 3
034042  000034  111034                  WORD    034,    PAT A+34        ;FAC1 4
```

```
034046  000035  111035                  WORD   035,    PAT A+35        ,FAC1 5
034052  000036  111036                  WORD   036,    PAT A+36        ,FPSHI/FEC
034056  000037  111037                  WORD   037,    PAT A+37        ;FDST1/R IR
                                       ; END OF TABLE
                                                                       ,
                                                                       ;
                                       ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                       ,A BLOCK MOVE FUNCTION IN THE WCS
034062  012777  000020  146744  39$    MOV     #PARDIS,@WCSST          ,
034070  022626                         CMP     (SP)+,(SP)+             ,
034072  005077  146736                 CLR     @WCSST                  ,
034076  104135                         ERROR   135                     ;!!! WATCH DOG TIMEOUT !!!
                                       ,WCS WATCH DOG TIMED OUT
                                       ,UPON TRANSFERRING CONTROL FROM
                                       ,BASE MACHINE FROM WCS MICROCODE.
                                       ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                       ,SHOULD BE RETURNED TO BASE MACHINE


                                 ,,*****************************************************************
                                 ,*TEST 104      CHECK BLOCK LOAD OF BSPAD 00 37  FROM WCS

                                       THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS

                                               WCS ARRAY -> BSPAD 00 37

                                       WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                       GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS

                                       THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER

                                               BSPLO 00 17 , BSPHI 00 17

                                       THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE, BY WRITING
                                       UNIQUE DATA PATTERNS TO IT

                                       THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                       AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                       TO THE MICRO-CODE IN THE WCS

                                       FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                       THE LOCAL LOAD ADDRESS (-1) STARTING FROM WHICH THE REGISTERS
                                       SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                       THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                       WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                       REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                       CONTROL TO THE BASE MACHINE

                                       THE REGISTERS ARE THEN CHECKED TO MAKE SURE THAT THE
                                       DATA FROM THE WCS WAS LOADED CORRECTLY  IF NOT,
                                       AN ERROR IS REPORTED

                                       THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                       A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                       IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                       THE WATCH DOG WILL TIME OUT AND A TRAP TO
```

```
                                        ;       114 WILL OCCUR.
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                        ;               THE WCS- (NUA<9.0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
034100  000004                          TST104  SCOPE
034102  012737  034762  003056                  MOV     #TST105,NXTST   ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
        001232                                  ADDR 1= 1232            ;LS ADDR FOR BSPAD LOAD
        050000                                  PAT B=  050000          ;BASE PATTERN FOR DATA
                                                                        ;
034110  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
034114  006700                                  6700                    ;CONTROL BLOCK LOADED HERE
034116  060366                                  MLSBSP                  ;FROM THIS MEMORY LOCATION
034120  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
034122  024646                                  CMP     -(SP),-(SP)     ;GET SOME STACK
                                                                        ;
                                                ;INIT WCS AREA WITH '050MED' DATA PATTERN IN ALL LOCN'S
034124  012777  001232  146704                  MOV     #ADDR 1,@WCSAR  ;POINT AT AREA
034132  012700  050040                          MOV     #PAT B+040,R0   ;DATA PATTERN BASE
034136  012701  000040                          MOV     #32.,R1         ;THIS MANY REGISTERS
                                                                        ;
034142  010077  146672          30$             MOV     R0,@WCSDR       ;STORE A PATTERN
034146  005277  146664                          INC     @WCSAR          ;NEXT LOCN
034152  005200                                  INC     R0              ;NEXT PATTERN
034154  077106                                  SOB     R1,30$          ;LOOP
                                                                        ;
                                                                        ;
                                                ;INIT SOME SPECIAL LOCN'S
034156  012777  001255  146652                  MOV     #ADDR 1+023 @WCSAR      ;FIND WHERE R ZERO  GOES
034164  005077  146650                          CLR     @WCSDR          ;STORE ZEROES THERE
                                                                        ;
034170  076600  000067                          MED     ,067            ;GET CURRENT CNSL CNTL
034174  012777  001261  146634                  MOV     #ADDR 1+027,@WCSAR      ;FIND WHERE IT GOES
034202  010077  146632                          MOV     R0,@WCSDR       ;STORE IT
034206  010037  034702                          MOV     R0,43$+2        ;ALSO IN TABLE, BELOW
                                                                        ;
034212  012777  001240  146616                  MOV     #ADDR 1+006,@WCSAR      ;FIND WHERE KSP GOES
034220  010677  146614                          MOV     SP,@WCSDR       ;STORE IT
034224  010637  034576                          MOV     SP,42$+2        ;ALSO IN TABLE, BELOW
                                                                        ;
034230  012777  001241  146600                  MOV     #ADDR 1+007,@WCSAR      ;FIND WHERE PC GOES
034236  012777  034352  146574                  MOV     #1$,@WCSDR      ;STORE IT
                                                                        ;
                                                ;INIT BSPAD REGISTERS WITH ALL ZEROES
034244  012702  034274                          MOV     #40$,R2         ;PTR TO MED TABLE FOR THIS TEST
034250  112200                  11$             MOVB    (R2)+,R0        ;GET A MED CODE
034252  100426                                  BMI     13$             ;END OF TABLE ??
034254  152700  000200                          BISB    #BIT7,R0        ;MAKE DATA & WRITE MED CODE
```

```
034260  110037  034270                  MOVB    R0,12$                  ;LOAD WRITE-MED CODE
034264  005000                          CLR     R0                      ;WRITE ZEROES
034266  076600                          MED                             ;
034270  000000                  12$      WORD   0                       ;
034272  000766                          BR      11$                     ;
                                                                        ;
                                        ;TABLE FOR INIT.
034274     041     043     044  40$      BYTE   41,43,44,45             ;EXCLUDE   R0(40),R2(42),KSP(46),PC(47)
034277     045
034300     050     051     052          .BYTE   50,51,52,53,54,55,56,57 ;
034303     053     054     055
034306     056     057
034310     060     061     062           BYTE   60,61,62,64,65,66       ;EXCLUDE   P ZERO (63), CNSL CNTL(67)
034313     064     065     066
034316     070     071     072           BYTE   70,71,72,73,74,75,76,77 ;
034321     073     074     075
034324     076     077
034326     377                           BYTE   -1                      ; END
        034330                          .EVEN
                                                                        ;
034330  012702  001232          13$     MOV     #ADDR 1,R2              ;R2 IS LS ADDR PTR
                                                                        ;
034334  012737  034744  000114          MOV     #39$,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
034342  012777  001000  146464          MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                        ;WCS HOT BOX IS SELECTED. UPON TRANSFERRING CONTROL FROM WCS
                                                                        ;
034350  076700                          XFCUDIS                         ;TRANSFER CONTROL FROM WCS
034352                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
034352  042777  001000  146454          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
034360  012737  003244  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
                                         COPY B-SIDE GPR'S TO BOTH A&B-SIDES
034366  010016                          MOV     R0,(SP)
034370  011600                          MOV     (SP),R0
034372  010116                          MOV     R1,(SP)
034374  011601                          MOV     (SP),R1
034376  010216                          MOV     R2,(SP)
034400  011602                          MOV     (SP),R2
034402  010316                          MOV     R3,(SP)
034404  011603                          MOV     (SP),R3
034406  010416                          MOV     R4,(SP)                 ;
034410  011604                          MOV     (SP),R4                 ;
034412  010516                          MOV     R5,(SP)                 ;
034414  011605                          MOV     (SP),R5                 ;
                                                                        ;
                                         CHECK RESULTS LOADED INTO BSP REGISTERS
034416  012737  034544  001202          MOV     #41$,$TMP0              ;PTR TO RESULT TABLE
034424  012737  000040  001204          MOV     #32 ,$TMP1              ;THIS MANY REGISTERS
034432  012737  001232  001164          MOV     #ADDR. 1,$REG1          ;WCS LOC USED
                                                                        ;
034440  017737  144536  001162  20$     MOV     @$TMP0,$REG0            ;GET MED/READ CODE
034446  062737  000002  001202          ADD     #2,$TMP0                ;AUTO-INCR. THE HARD WAY
034454  113737  001162  034506          MOVB    $REG0,21$               ;STORE FOR MED
034462  017737  144514  001166          MOV     @$TMP0,$REG2            ;GET DATA FROM TABLE (EXPECTED)
034470  062737  000002  001202          ADD     #2,$TMP0                ;AUTO-INCR  THE HARD WAY
```

```
034476  005737  001162                  TST     $REG0                   ;IGNORE THIS ENTRY ??
034502  100411                          BMI     22$                     ;YES
034504  076600                          MED                             ;GET CSP DATA
034506  000000                  21$      WORD   0                       ;
                                                                        ;
034510  010037  001170                  MOV     R0,$REG3                ;STORE R-DATA
034514  023737  001170  001166          CMP     $REG3,$REG2             ;E-DATA = R-DATA ??
034522  001401                          BEQ     22$                     ;BR IF A-OK
034524  104136                          ERROR   136                     ;DATA ERROR !!
                                                                        ;
034526  005237  001164          22$     INC     $REG1                   ;BUMP WCS LOC CNTR
034532  005337  001204                  DEC     $TMP1                   ;LOOP
034536  003340                          BGT     20$                     ;
                                                                        ;
034540  022626                          CMP     (SP)+,(SP)+             ;RELEASE EXTRA STACK
034542  000507                          BR      TST105          ;;EXIT
                                                                        ;
                                                                        ;
                                        ;---RESULT TABLE---
034544  000040  050040          41$      WORD   040,     PAT B+40       ;R0
034550  000041  050041                   WORD   041,     PAT B+41       ;R1
034554  000042  050042                   WORD   042,     PAT B+42       ;R2
034560  000043  050043                   WORD   043,     PAT B+43       ;R3
034564  000044  050044                   WORD   044,     PAT B+44       ;R4
034570  000045  050045                   WORD   045,     PAT B+45       ;R5
034574  000046  123456          42$      WORD   046,     123456         ;KSP = SP LOADED HERE FOR COMPARE
034600  177777  034352                   WORD   -1,      1$             ;PC = RETURN PC HERE
034604  000050  050050                   WORD   050,     PAT B+50       ;FAC2 0
034610  000051  050051                   WORD   051,     PAT B+51        FAC2 1
034614  000052  050052                   WORD   052,     PAT B+52       ;FAC2 2
034620  000053  050053                   WORD   053,     PAT B+53       ;FAC2 3
034624  000054  050054                   WORD   054,     PAT B+54       ;FAC2 4
034630  000055  050055                   WORD   055,     PAT B+55        FAC2 5
034634  000056  050056                   WORD   056,     PAT B+56       ;USER SP
034640  000057  050057                   WORD   057,     PAT B+57       ;FDST2
034644  000060  050060                   WORD   060,     PAT B+60       ;WCSB 0
034650  000061  050061                   WORD   061,     PAT B+61       ;WCSB 1
034654  177777  000000                   WORD   -1,      000000         ;R VECT  HERE **INDETERMINATE**
034660  000063  000000                   WORD   063,     000000         ;R ZERO
034664  177777  000000                   WORD   -1,      000000          R SRC X,Y      **INDETERMINATE**
034670  177777  000000                   WORD   -1,      000000         ;R DST X,Y      **INDETERMINATE**
034674  000066  050066                   WORD   066,     PAT B+66       ;FPA
034700  000067  123456          43$      WORD   067,     123456         ;CNSL CNTL LOADED HERE
034704  000070  050070                   WORD   070,     PAT B+70       ;FACO 0
034710  000071  050071                   WORD   071,     PAT B+71       ;FACO 1
034714  000072  050072                   WORD   072,     PAT B+72       ;FACO 2
034720  000073  050073                   WORD   073,     PAT B+73       ;FACO 3
034724  000074  050074                   WORD   074,     PAT B+74       ;FACO 4
034730  000075  050075                   WORD   075,     PAT B+75       ;FACO 5
034734  000076  050076                   WORD   076,     PAT B+76       ;FEA
034740  000077  050077                   WORD   077,     PAT B+77       ;FDSTO
                                        ; END OF TABLE
                                                                        ;
                                                                        ;
                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
```

```
034744  012777  000020  146062  39$     MOV     #PARDIS,@WCSST          ;
034752  022626                          CMP     (SP)+,(SP)+             ;
034754  005077  146054                  CLR     @WCSST                  ;
034760  104137                          ERROR   137                     ;!!! WATCH DOG TIMEOUT !!!
                                        ;WCS WATCH DOG TIMED OUT
                                        ;UPON TRANSFERRING CONTROL FROM
                                        ;BASE MACHINE FROM WCS MICROCODE.
                                        ;NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ;SHOULD BE RETURNED TO BASE MACHINE


                                ;;*****************************************************************
                                ;*TEST 105       CHECK BLOCK LOAD OF CSPAD 17 00  FROM WCS
                                ;
                                ;       THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS
                                ;
                                ;               WCS BRRAY -> CSPAD 17 40
                                ;
                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS

                                        THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER

                                                CSP 17 (#1), CSP 16 (#0), CSP 15 (MD), CSP 14 (#2),
                                                        CSP 13 ,     , CSP 04

                                        THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE. BY WRITING
                                        UNIQUE DATA PATTERNS TO IT

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL LOAD ADDRESS (-1) STARTING FROM WHICH THE REGISTERS
                                        SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                        REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                        CONTROL TO THE BASE MACHINE

                                        THE REGISTERS ARE THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE WCS HAS LOADED CORRECTLY  IF NOT
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL
                                        IS NOT TRANSFERRED BACK TO THE BASE MACHINE
                                        THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        114 WILL OCCUR

                                        FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                                CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
```

```
                                        ;               THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
034762  000004                          TST105  SCOPE
034764  012737  035440  003056                  MOV     #TST106,NXTST   ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
        001503                                  ADDR 1= 1503            ;LS ADDR FOR CSPAD LOAD
        134000                                  PAT C=  134000          ;BASE PATTERN FOR DATA
                                                                        ;
034772  076600  000144                          MED     ;RDFLAG         ;READ FLAGS
034776  052700  004000                          BIS     #BIT11,R0       ;SET CSP CNST INVALID
035002  076600  000344                          MED     ;WRFLAG         ;
                                                                        ;
035006  004537  037472                          JSR     R5,LDWCS        ;LOAD WCS WITH MICRO CODE
035012  006730                                  6730                    ;CONTROL BLOCK LOADED HERE
035014  060466                                  MLSCSP                  ;FROM THIS MEMORY LOCATION
035016  006002                                  UDISP                   ;ENTRY POINT IN WCS
                                                                        ;
                                                ;INIT WCS LOC'S WITH DATA TO BE LOADED
035020  012777  001503  146010                  MOV     #ADDR 1,@WCSAR  ;POINT TO AREA
035026  012777  000001  146004                  MOV     #000001,@WCSDR  ;CSP 17  = # 1
035034  005277  145776                          INC     @WCSAR          ;NEXT
035040  012777  000000  145772                  MOV     #000000,@WCSDR  ;CSP 16  = # 0
035046  005277  145764                          INC     @WCSAR          ;NEXT
035052  012777  123456  145760                  MOV     #123456,@WCSDR  ;CSP 15  = MD
035060  005277  145752                          INC     @WCSAR          ;NEXT
035064  012777  000002  145746                  MOV     #000002,@WCSDR  ;CSP 14  = # 2
035072  005277  145740                          INC     @WCSAR          ;NEXT
                                                                        ;
035076  012704  000014                          MOV     #12.,R4         ;12  MORE, CSP 13 00
035102  012700  134113                          MOV     #PAT C+113,R0   ;DATA PATTERN
                                                                        ;
035106  010077  145726          10$             MOV     R0,@WCSDR       ;DATA PATTERN
035112  005277  145720                          INC     @WCSAR          ;NEXT LOC
035116  005300                                  DEC     R0              ;NEXT CODE
035120  077406                                  SOB     R4,10$          ;LOOP
                                                                        ;
035122  005077  145710                          CLR     @WCSAR          ;POINT AWAY
                                                                        ;
                                                ;INIT CSPAD REGISTERS WITH ALL ZEROES
035126  012702  035156                          MOV     #40$,R2         ;PTR TO MED TABLE FOR THIS TEST
035132  112200                  11$             MOVB    (R2)+,R0        ;GET A MED CODE
035134  100417                                  BMI     13$             ;END OF TABLE ??
035136  152700  000200                          BISB    #BIT7,R0        ;MAKE DATA & WRITE MED CODE
035142  110037  035152                          MOVB    R0 12$          ;LOAD WRITE-MED CODE
035146  005000                                  CLR     R0              ;WRITE ZEROES
035150  076600                                  MED                     ;
035152  000000                  12$              WORD   0
035154  000766                                  BR      11$             ;
                                                                        ;
                                                 TABLE FOR INIT
035156     100     101     102  40$             BYTE    100,101,102,103,104,105,106,107
035161     103     104     105
035164     106     107
035166     110     111     112                  BYTE    110,111,112,113         EXCLUDE   CSP 14-17  BASE CNST & MD
```

```
035171      113
035172      377                         BYTE    -1                          , END
        035174                          EVEN
                                                                            ,
035174  012702  001503          13$     MOV     #ADDR.1,R2                  ,R2 IS LS ADDR PTR
                                                                            ,
035200  012737  035422  000114          MOV     #39$,@#114                  ,SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
035206  012777  001000  145620          MOV     #MAINT,@WCSST               ,SET UP MAINT BIT, TIMER WILL START WHEN
                                        ,WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL FROM WCS
                                                                            ;
035214  076700                          XFCJDIS                             ,TRANSFER CONTROL FROM WCS
035216                          1$                                          ,SHOULD RETURN FROM WCS TO THIS POINT
                                                                            ,
035216  042777  001000  145610          BIC     #MAINT,@WCSST               ,SHUT OFF THE TIMER
035224  012737  003344  000114          MOV     #BADPAR,@#114               ,RESET UNEXPECTED PARITY HANDLER
                                                                            ,
                                        ,CHECK RESULTS LOADED INTO CSP REGISTERS
035232  012705  035322                  MOV     #41$,R5                     ,PTR TO RESULT TABLE
035236  012704  000020                  MOV     #16 ,R4                     ,THIS MANY REGISTERS
035242  012737  001503  001164          MOV     #ADDR 1,$REG1               ,WCS LOC USED
                                                                            ,
035250  012501                  20$     MOV     (R5)+,R1                    ,GET MED/READ CODE
035252  110137  035266                  MOVB    R1,21$                      ,STORE FOR MED
035256  012502                          MOV     (R5)+,R2                    ,GET DATA FROM TABLE (EXPECTED)
035260  005701                          TST     R1                          ,IGNORE THIS ENTRY ??
035262  100413                          BMI     22$                         ,YES
035264  076600                          MED                                 ,GET CSP DATA
035266  000000                  21$      WORD   0                           ,
                                                                            ,
035270  020002                          CMP     R0,R2                       ,E-DATA = R-DATA ??
035272  001407                          BEQ     22$                         ,BR IF A-OK
035274  010037  001170                  MOV     R0,$REG3                    ,P-DATA
035300  010237  001166                  MOV     R2,$REG2                    ,E-DATA
035304  010137  001162                  MOV     R1,$REG0                    ,MED
035310  104140                          ERROR   140                         ,DATA ERROR !!
                                                                            ,
035312  005237  001164          22$     INC     $REG1                       ,BUMP WCS LOC CNTR
035316  077424                          SOB     R4,20$                      ,LOOP
                                                                            ,
035320  000447                          BR      TST106          EXIT
                                                                            ,
                                        ,---RESULT TABLE---
035322  000117  000001          41$      WORD   117     000001             ,CSP 17  = # 1
035326  000116  000000                   WORD   116,    000000             ,CSP 16  = # 0
035332  177777  000000                   WORD   -1      000000             ,CSP 15  = MD  **IGNORE**
035336  000114  000002                   WORD   114,    000002             ,CSP 14  = # 2
035342  000113  134113                   WORD   113,    PAT C+113          ,CSP 13  = PATTERN
035346  000112  134112                   WORD   112,    PAT C+112          ,CSP 12  = PATTERN
035352  000111  134111                   WORD   111,    PAT C+111          ,CSP 11  = PATTERN
035356  000110  134110                   WORD   110,    PAT C+110          ,CSP 10  = PATTERN
035362  000107  134107                   WORD   107,    PAT C+107          ,CSP 07  = PATTERN
035366  000106  134106                   WORD   106,    PAT C+106          ,CSP 06  = PATTERN
035372  000105  134105                   WORD   105,    PAT C+105          ,CSP 05  = PATTERN
035376  000104  134104                   WORD   104     PAT C+104           CSP 04  = PATTERN
035402  000103  134103                   WORD   103     PAT C+103          ,CSP 03  = PATTERN
```

```
035406  000102  134102                  WORD   102,    PAT C+102       ,CSP 02  = PATTERN
035412  000101  134101                  WORD   101,    PAT C+101       ,CSP 01  = PATTERN
035416  000100  134100                  WORD   100,    PAT C+100       ,CSP 00  = PATTERN
                                                                       ,
                                                                       ;
                                        ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ,A BLOCK MOVE FUNCTION IN THE WCS
035422  012777  000020  145404  395     MOV     #PARDIS,@WCSST          ,
035430  022626                          CMP     (SP)+,(SP)+             ,
035432  005077  145376                  CLR     @WCSST                  ,
035436  104141                          ERROR   141                     ,!!! WATCH DOG TIMEOUT !!!
                                        ,WCS WATCH DOG TIMED OUT
                                        ,UPON TRANSFERRING CONTROL FROM
                                        ,BASE MACHINE FROM WCS MICROCODE.
                                        ,NORMALLY, AFTER UCODE EXECUTION CONTROL
                                        ,SHOULD BE RETURNED TO BASE MACHINE


                                 ;*****************************************************************
                                 ;TEST 106      CHECK BLOCK STORE OF A&BSP TEMPS  TO WCS

                                        THIS TEST CHECKS THE BLOCK STORE FUNCTION OF THE WCS

                                                A&BSP TEMPS  -> WCS ARRAY

                                        WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                        GET TRANSFERRED FROM THE BASE MACHINE TO THE WCS

                                        THE FOLLOWING REGISTERS ARE STORED IN THE GIVEN ORDER

                                                R SRC A, R SRC B  R DST A, R DST B,
                                                        FDST 0 , FDST 1 , FDST 2 , FDST 3

                                        THE REGISTERS ARE INITIALIZED TO A KNOWN STATE, BY WRITING
                                        UNIQUE DATA PATTERNS IN THEM

                                        THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                        AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                        TO THE MICRO-CODE IN THE WCS

                                        FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                        THE LOCAL STORE ADDRESS (-1) STARTING TO WHICH THE REGISTERS
                                        SHOULD BE SAVED IN THE WCS   THEN THIS MICRO-CODE SELECTS
                                        THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                        WHICH ACTUALLY DOES THE STORE OF THE REGISTERS   AFTER THE
                                        REGISTERS HAVE BEEN SAVED, THE MICRO-CODE RETURNS
                                        CONTROL TO THE BASE MACHINE

                                        THE WCS IS THEN CHECKED TO MAKE SURE THAT THE
                                        DATA FROM THE REGISTERS WAS STORED CORRECTLY  IF NOT
                                        AN ERROR IS REPORTED

                                        THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                        A RESULT OF SOME FAULT CONDITION, THE CONTROL
```

```
                                        ;       IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                        ;       THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                        ;       114 WILL OCCUR
                                        ;
                                        ;       FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE
                                        ;
                                        ;               TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                        ;               BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMATION
                                        ;               CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                        THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                        ;               BUS-U-MUX-B PORT, BUS-U-LINES)
                                        ;
                                        ;;*****************************************************************
035440  000004                          TST106  SCOPE
035442  012737  036004  003L56                  MOV     #TST107,NXTST   ;STARTING ADDRESS OF NEXT TEST
                                                                        ;
        001444                                  ADDR 1= 1444                    ;LS ADDR FOR CSPAD STORE
        123000                                  PAT T=  123000                  ;BASE PATTERN FOR DATA
                                                                        ;
035450  004537  037472                          JSR     R5,LDWCS                ;LOAD WCS WITH MICRO CODE
035454  006760                                  6760                            ;CONTROL BLOCK LOADED HERE
035456  060626                                  MTMPLS                          ;FROM THIS MEMORY LOCATION
035460  006002                                  UDISP                           ;ENTRY POINT IN WCS
                                                                        ;
035462  012737  035766  000114                  MOV     #395,@#114              ;SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
035470  012777  001000  145336                  MOV     #MAINT,@WCSST           ;SET UP MAINT BIT, TIMER WILL START WHEN
                                                 WCS HOT BOX IS SELECTED. UPON TRANSFERRING CONTROL TO WCS
                                                                        ;
                                                 INIT TEMPORARY REGISTERS WITH DATA, DATA = '123MED'
035476  012700  123277                          MOV     #PAT T+BIT7+77,R0       ;DATA FOR FDST 0
035502  076600  000277                          MED     ,277                    ;WRITE IT
035506  012700  123237                          MOV     #PAT T+BIT7+37,R0       ;DATA FOR FDST 1
035512  076600  000237                          MED     ,237                    ;WRITE IT
035516  012700  123257                          MOV     #PAT T+BIT7+57,R0       ;DATA FOR FDST 2
035522  076600  000257                          MED     ,257                    ;WRITE IT
035526  012700  123217                          MOV     #PAT T+BIT7+17,R0       ;DATA FOR FDST 3
035532  076600  000217                          MED      217                    ;WRITE IT
                                                                        ;
                                        **** THE FOLLOWING CODE SEQUENCE CAN NEVER BE ALTERED ****
                                                                                GET DATA PATTERNS FOR BELOW
035536  012700  123224                          MOV     #PAT T+BIT7+24,R0       ;R SRC  A
035542  012701  123225                          MOV     #PAT T+BIT7+25,R1       ;R DST  A
035546  012702  001444                          MOV     #ADDR 1,R2              ;R2 IS LS ADDR PTR
035552  012703  123264                          MOV     #PAT T+BIT7+64,R3       ;R SRC  B
035556  012704  123265                          MOV     #PAT T+BIT7+65,R4       ;R DST  B
                                                ;NOTE   MUST USE MACRO INSTR  THAT DON'T REFERENCE R SRC  OR R DST
035562  076600  000224                          MED     ,224                    ;R SRC  A
035566  010100                                  MOV     R1,R0                   ;
035570  076600  000225                          MED     ,225                    ;R DST  A
035574  010300                                  MOV     R3,R0                   ;
035576  076600  000264                          MED     ,264                    ;R SRC  B
035602  010400                                  MOV     R4,R0                   ;
035604  076600  000265                          MED     ,265                    ;R DST  B
035610  005000                                  CLR     R0                      ;
035612  005001                                  CLR     R1
035614  005003                                  CLR     R3
```

```
035616  005004                          CLR     R4                      ;
035620  005005                          CLR     R5                      ;
                                                                        ;
035622  076700                          XFCUDIS                         ;TRANSFER CONTROL TO WCS
                                ;**** END OF UNALTERABLE SEQUENCE ****
035624                          1$                                      ;SHOULD RETURN FROM WCS TO THIS POINT
                                                                        ;
035624  042777  001000  145202          BIC     #MAINT,@WCSST           ;SHUT OFF THE TIMER
035632  012737  003344  000114          MOV     #BADPAR,@#114           ;RESET UNEXPECTED PARITY HANDLER
                                                                        ;
                                        ;CHECK RESULTS STORED INTO WCS ARRAY
035640  012705  035726                  MOV     #41$,R5                 ;PTR TO RESULT TABLE
035644  012704  000010                  MOV     #8 ,R4                  ;8  REGISTERS SHOULD HAVE BEEN STORED
035650  012777  001444  145160          MOV     #ADDR 1,@WCSAR          ;POINT TO WHERE DATA SHOULD BE
                                                                        ;
035656  017737  145156  001170  20$     MOV     @WCSDR,$REG3            ;GET DATA FROM LS (RECEIVED)
035664  012537  001162                  MOV     (R5)+,$REG0             ;GET MED CODE FROM TABLE
035670  012537  001166                  MOV     (R5)+,$REG2             ;GET DATA FROM TABLE (EXPECTED)
                                                                        ;
035674  023737  001166  001170          CMP     $REG2,$REG3             ;E-DATA = R-DATA ??
035702  001404                          BEQ     21$                     ;BR IF A-OK
035704  017737  145126  001164          MOV     @WCSAR,$REG1            ;GET WCS LOC
035712  104144                          ERROR   144                     ;DATA ERROR !!
                                                                        ;
035714  005277  145116          21$     INC     @WCSAP                  ;ADDRESS NEXT LS LOC
035720  005304                          DEC     R4                      ;LOOP
035722  003355                          BGT     20$                     ;
                                                                        ;
035724  000427                          BR      TST107          ; EXIT
                                                                        ;
                                                                        ;
                                        ;---RESULT TABLE---
035726  000024  123224          41$     WORD    024,    PAT T+BIT7+24   R SRC  A
035732  000025  123225                  WORD    025,    PAT T+BIT7+25   ;R DST  A
035736  000064  123264                  WORD    064,    PAT T+BIT7+64   ;R SRC  B
035742  000065  123265                  WORD    065,    PAT T+BIT7+65   ;R DST  B
035746  000077  123277                  WORD    077,    PAT T+BIT7+77   ;FDST 0
035752  000037  123237                  WORD    037,    PAT T+BIT7+37   ;FDST 1
035756  000057  123257                  WORD    057,    PAT T+BIT7+57   ;FDST 2
035762  000017  123217                  WORD    017,    PAT T+BIT7+17   FDST 3
                                                                        ;
                                        ;ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                        ;A BLOCK MOVE FUNCTION IN THE WCS
035766  012777  000020  145040  29$     MOV     #PARDIS,@WCSST
035774  022626                          CMP     (SP)+,(SP)+
035776  005077  145032                  CLR     @WCSST                  ;
036002  104145                          ERROR   145                     ;!! WATCH DOG TIMEOUT !!
                                         WCS WATCH DOG TIMED OUT
                                         UPON TRANSFERRING CONTROL FROM
                                         BASE MACHINE TO WCS MICROCODE
                                         NORMALLY, AFTER UCODE EXECUTION CONTROL
                                         SHOULD BE RETURNED TO BASE MACHINE
```

```
                                                        ;*****************************************************************
                                                        ;*TEST 107      CHECK BLOCK LOAD OF A&BSP TEMPS  FROM WCS
                                                        ;
                                                        ;       THIS TEST CHECKS THE BLOCK LOAD FUNCTION OF THE WCS
                                                        ;
                                                                WCS ARRAY -> A&BSP TEMPS
                                                        ;
                                                                WHEN THIS FUNCTION IS INITIATED A BLOCK OF REGISTERS
                                                                GET TRANSFERRED TO THE BASE MACHINE FROM THE WCS

                                                        ;       THE FOLLOWING REGISTERS ARE LOADED IN THE GIVEN ORDER
                                                        ;
                                                        ;               R SRC A, R SRC B, R DST A, R DST B,
                                                                                FDST 0   FDST 1 , FDST 2 , FDST 3

                                                                THE WCS ARRAY IS INITIALIZED TO A KNOWN STATE, BY WRITING
                                                                UNIQUE DATA PATTERNS TO IT

                                                                THE MICRO-CODE IS LOADED INTO THE WCS  USING
                                                                AN "XFC" DISPATCH INSTRUCTION CONTROL IS TRANSFERRED
                                                                TO THE MICRO-CODE IN THE WCS

                                                                FROM GPR "R2", THE MICRO-CODE SETS UP IN "D" (BASE MACHINE),
                                                                THE LOCAL LOAD ADDRESS (-1) STARTING FROM WHICH THE REGISTERS
                                                                SHOULD BE RESTORED FROM THE WCS   THEN THIS MICRO-CODE SELECTS
                                                                THE WCS HOT BOX AND TRANSFERS CONTROL TO THE TMS-ROM
                                                                WHICH ACTUALLY DOES THE LOAD OF THE REGISTERS   AFTER THE
                                                                REGISTERS HAVE BEEN RESTORED, THE MICRO-CODE RETURNS
                                                                CONTROL TO THE BASE MACHINE

                                                                THE REGISTERS ARE THEN CHECKED TO MAKE SURE THAT THE
                                                                DATA FROM THE WCS WAS LOADED CORRECTLY   F NOT,
                                                                AN ERROR IS REPORTED

                                                                THIS TEST USES THE WCS WATCH-DOG-TIMER  IF AS
                                                                A RESULT OF SOME FAULT CONDIT ON, THE CONTROL
                                                                IS NOT TRANSFERRED BACK TO THE BASE MACHINE,
                                                                THE WATCH DOG WILL TIME OUT AND A TRAP TO
                                                                114 WILL OCCUR

                                                                FAILURE OF THIS TEST COULD INDICATE A FAULT IN THE

                                                                        TMS-CROM SECTION OF WCS INCLUDING ENTRY-POINT  ARRAY
                                                                        BUS-U-MUX-PORT-A, SUPPLYING TMS CONTROL INFORMAT ON
                                                                        CONTROL PATH USED BY MICRO-CODE EXECUTING FROM
                                                                        THE WCS- (NUA<9 0>, ARRAY ADDRESS MUX-A-PORT,
                                                                        BUS-U-MUX-B PORT, BUS-U-LINES)

                                                        ;*****************************************************************
036004  000004                                  TST107  SCOPE
036006  012737  036404  000056                          MOV     #TST110 NXTST   ;STARTING ADDRESS OF NEXT TEST
```

```
          001770                          ADDR 1= 1770                    ,LS ADDR FOR CSPAD LOAD
          076000                          PAT T=  076000                  ,BASE PATTERN FOR DATA
                                                                          ;
036014    004537  037472                  JSR     R5,LDWCS                ,LOAD WCS WITH MICRO CODE
036020    006750                          6750                            ;CONTROL BLOCK LOADED HERE
036022    060566                          MLSTMP                          ,FROM THIS MEMORY LOCATION
036024    006002                          UDISP                           ,ENTRY POINT IN WCS
                                                                          ;
                                          ,INIT WCS LOC'S WITH DATA TO BE LOADED
036026    012777  001770  145002          MOV     #ADDR.1,@WCSAR          ,POINT TO AREA
036034    012705  036132                  MOV     #40$,R5                 ,TABLE PTR TO MED CODES
                                                                          ,
036040    112500                  10$     MOVB    (R5)+,R0                ,GET A MED CODE
036042    100407                          BMI     29$                     ,DONE IF -1
036044    052700  076000                  BIS     #PAT T+000,R0           ,FORM DATA PATTERN = 076MED
036050    010077  144764                  MOV     R0,@WCSDR               ,DATA PATTERN
036054    005277  144756                  INC     @WCSAR                  ,NEXT LOC
036060    000767                          BR      10$                     ,LOOP
                                                                          ,
036062    005077  144750          29$     CLR     @WCSAR                  ,POINT AWAY
                                                                          ,
036066    012737  036366  000114          MOV     #39$,@#114              ,SETUP SERVICE VECTOR FOR WCS WATCH DOG TIMER
036074    012777  001000  144732          MOV     #MAINT,@WCSST           ,SET UP MAINT BIT, TIMER WILL START WHEN
                                          ,WCS HOT BOX IS SELECTED, UPON TRANSFERRING CONTROL FROM WCS
                                                                          ,
                                          ,INIT TEMPORARY REGISTERS WITH ALL ZEROES
036102    012702  036122                  MOV     #40$,R2                 ,PTR TO MED TABLE FOR THIS TEST
036106    112200                  11$     MOVB    (R2)+,R0                ,GET A MED CODE
036110    100415                          BMI     13$                     ,END OF TABLE ??
036112    152700  000200                  BISB    #BIT7,R0                ,MAKE DATA & WRITE MED CODE
036116    110037  036126                  MOVB    R0,12$                  ,LOAD WRITE-MED CODE
036122    005000                          CLR     R0                      ,WRITE ZEROES
036124    076600                          MED
036126    000000                  12$      WORD   0                       ,
036130    000766                          BR      11$
                                                                          ,
                                           TABLE FOR INIT
036132      024     025     064   40$      BYTE   024,025,064,065         ,R SRC A,R DST A,R SRC B,R DST B
036135      065
036136      077     037     057            BYTE   077,037,057,017          FDST 0,1,2,3
036141      017
036142      377                            BYTE   -1                      , END
          036144                           EVEN
                                                                          ,
036144    012702  001770          13$     MOV     #ADDR 1,R2              ,R2 IS LS ADDR PTR
036150    005000                          CLR     R0                      ,
036152    005001                          CLR     R1                      ,
036154    005003                          CLR     R3                      ;
036156    005004                          CLR     R4                      ,
                                                                          ,
                                   **** THE FOLLOWING CODE SEQUENCE CAN NEVER BE ALTERED ****
036160    076700                          XFCUDIS                         ,TRANSFER CONTROL FROM WCS
036162                            1$                                      ,SHOULD RETURN FROM WCS TO THIS POINT
036162    076600  000024                  MED     ,024                    ,GET R SPC  A
036166    010001                          MOV     R0,R1                   ,
036170    076600  000025                  MED      025                     GET R DST  A
```

```
036174  010002                          MOV     R0,R2                   ;
036176  076600  000064                  MED     ,064                    ,GET R SRC  B
036202  010003                          MOV     R0,R3                   ,
036204  076600  000065                  MED     ,065                    ,GET R DST  B
036210  010004                          MOV     R0,R4                   ,
                                                                        ;
036212  042777  001000  144614          BIC     #MAINT,@WCSST           ,SHUT OFF THE TIMER
036220  012737  003344  000114          MOV     #BADPAR,@#114           ,RESET UNEXPECTED PARITY HANDLER
                                ,**** END OF UNALTERABLE SEQUENCE ****
                                                                        ,
                                        ,CHECK RESULTS LOADED INTO TEMP  REGISTERS
036226  012705  036326                  MOV     #41$,R5                 ,PTR TO RESULT TABLE
036232  012737  000010  001202          MOV     #8 ,$TMP0               ,THIS MANY REGISTERS
036240  012737  001770  001164          MOV     #ADDR.1,$REG1           ,WCS LOC USED
                                                                        ,
036246  012537  036260          20$     MOV     (R5)+,21$               ,GET MED/READ CODE
036252  012537  001166                  MOV     (R5)+,$REG2             ,GET DATA FROM TABLE (EXPECTED)
036256  076600                          MED                             ,GET REGISTER DATA
036260  000000                  21$     .WORD   0                       .
                                                                        ,
036262  020037  001166                  CMP     R0,$REG2                ,E-DATA = R-DATA ??
036266  001411                          BEQ     22$                     ,BR IF A-OK
036270  010037  001170                  MOV     R0,$REG3                ,R-DATA
036274  013737  001166  001162          MOV     $REG2,$REG0             ,MED
036302  042737  177700  001162          BIC     # C(77),$PEG0           ,FIX CODE
036310  104142                          ERROR   142                     ,DATA ERROR !!
                                                                        ,
036312  005237  001164          22$     INC     $REG1                   ,BUMP WCS LOC CNTP
036316  005337  001202                  DEC     $TMP0                   ,LOOP
036322  003351                          BGT     20$                     ;
                                                                        ,
036324  000427                          BR      TST110          ,EXIT

                                        ,---RESULT TABLE---
036326  000001  076024          41$      WORD   001,     PAT T+24        ;R SRC  A  (FROM GPR R1)
036332  000002  076025                   WORD   002,     PAT T+25        ,R DST  A  (FROM GPR R2)
036336  000003  076064                   WORD   003,     PAT T+64        ,R SRC  B  (FROM GPR R3)
036342  000004  076065                   WORD   004,     PAT T+65         R DST  B  (FROM GPR R4)
036346  000077  076077                   WORD   077,     PAT T+77         FDST 0
036352  000037  076037                   WORD   037,     PAT T+37         FDST 1
036356  000057  076057                   WORD   057,     PAT T+57        ,FDST 2
036362  000017  076017                   WORD   017      PAT T+17        ,FDST 3
                                                                        .
                                        ,ENTER HERE IF THE WCS WATCH DOG TIMER TIMED OUT WHILE EXECUTING
                                         A BLOCK MOVE FUNCTION IN THE WCS
036366  012777  000020  144440  39$     MOV     #PARDIS,@WCSST          ,
036374  022626                          CMP     (SP)+,(SP)+
036376  005077  144432                  CLR     @WCSST
036402  104143                          ERROR   143                     ,!!! WATCH DOG TIMEOUT !!!
                                        ,WCS WATCH DOG TIMED OUT
                                        ,UPON TRANSFERRING CONTROL FROM
                                        ,BASE MACHINE FROM WCS MICROCODE
                                         NORMALLY, AFTER UCODE EXECUTION CONTROL
                                         SHOULD BE RETURNED TO BASE MACHINE
```

```
                                ;;*****************************************************
                                ;*TEST 110        . .END..
                                ;;*****************************************************
036404  000004                  TST110  SCOPE
                                                        ;
036406  005037  001222                  CLR     $TIMES          ;NO ITER
036412  105037  001103                  CLRB    $ERFLG          ;OR ERRORS
                                                        ;
036416  012700  015507                  MOV     #015507,R0      ;CNST FOR 'INIT' ROUTINE
036422  076600  000352                  MED     ,352            ;GO INIT THE MACHINE
                                                        ;
                                ; END OF TMS TESTS
```

```
                                        SBTTL  END OF PASS ROUTINE

                                        ;;*****************************************************************
                                        ;*INCREMENT THE PASS NUMBER ($PASS)
                                        ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                        ;*IF THERES A MONITOR GO TO IT
                                        ;*IF THERE ISN'T JUMP TO NEWPAS

036426                                  $EOP
036426  000004                                  SCOPE
036430  005037  001102                          CLR     $TSTNM          ;;ZERO THE TEST NUMBER
036434  005037  001222                          CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
036440  005237  001244                          INC     $PASS           ;;INCREMENT THE PASS NUMBER
036444  042737  100000  001244                  BIC     #100000,$PASS   ;;DON'T ALLOW A NEG  NUMBER
036452  005327                                  DEC     (PC)+           ;;LOOP?
036454  000001                          $EOPCT   WORD   1
036456  003022                                  BGT     $DOAGN          ;;YES
036460  012737                                  MOV     (PC)+,@(PC)+     ;RESTORE COUNTER
036462  000001                          $ENDCT   WORD   1
036464  036454                                  $EOPCT
036466  104401  036533                          TYPE    ,$ENDMG         ;;TYPE "END PASS #"
036472  013746  001244                          MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
036476  104405                                  TYPDS                   ;;GO TYPE--DECIMAL ASCII W TH SIGN
036500  104401  036520                          TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
036504  013700  000042                  $GET42  MOV     @#42,R0         ;;GET MONITOR ADDRESS
036510  001405                                  BEQ     $DOAGN           ;BRANCH IF NO MONITOR
036512  000005                                  RESET                    ;CLEAR THE WORLD
036514  004710                          $ENDAD  JSR     PC,(R0)         ;;GO TO MONITOR
036516  000240                                  NOP                     ;;SAVE ROOM
036520  000240                                  NOP                     ;;FOR
036522  000240                                  NOP                      ;ACT11
036524                                  $DOAGN
036524  000137                                  JMP     @(PC)+           ;RETURN
036526  004054                          $RTNAD   WORD   NEWPAS
036530     377     377     000          $ENULL   BYTE   -1,-1,0         ;;NULL CHARACTER STRING
036533     015  042412  042116          $ENDMG   ASCIZ  <15><12>END PASS #
036540  050040  051501  020123
036546  000043
```

```
                                                ;VECTRS

036550  012737  003276  000004  VECTRS.  MOV     #BADTMO,@#4
036556  012737  003344  000114          MOV     #BADPAR,@#114
036564  012737  000012  000010          MOV     #12,@#10
036572  000207                          RTS     PC


                                        ;TYPMSG
                                        ;THIS ROUTINE IS USED FOR TYPING OUT ASCII MESSAGES   BEFORE THE
                                        ;MESSAGE IS TYPED OUT SW13 IS CHECKED & IF SET THE TYPEOUT IS
                                        ;INHIBITED, AND AN EXIT IS MADE
                                        ;CALL   TYPMSG
                                                MSGPOINTER

036574  032777  020000  142336  TY MSG  BIT     #SW13,@SWR              ;INHIBIT TYPEOUT?
036602  001005                          BNE     2$                      ;YES, EXIT
036604  017637  000000  036614          MOV     @(SP),1$                ;GET POOINTER TO ASCII MESSAGE
036612  104401                          TYPE                            ;TYPE THE ASCII STRING
036614  000000                  1$      0
036616  062716  000002          2$      ADD     #2,(SP)                 ;ADJUST RETURN ADDRESS, SKIP
036622  000002                          RTI                             ;OVER POINTER ON RETURN


                                        CLRWCS

036624  010046                  CLRWCS  MOV     R0,-(SP)
036626  012777  000020  144200          MOV     #PARDIS,@WCSST
036634  005000                          CLR     R0
036636  010077  144174          1$      MOV     R0,@WCSAR
036642  005077  144172                  CLR     @WCSDR
036646  005200                          INC     R0
036650  020027  006000                  CMP     R0,#6000
036654  001370                          BNE     1$
036656  005077  144152                  CLR     @WCSST
036662  012600                          MOV     (SP)+,R0
036664  000207                          RTS     PC


                                        ;GENPAR
                                        ;THIS ROUTINE GENERATES EVEN PARITY FOR GIVEN 16 BIT PATTERN
                                        ;GENWPAR
                                        ;THIS ROUTINE GENERATES ODD PARITY FOR GIVEN 16 BIT PATTERN.
                                        ;ON ENTRY, R4 CONTAINS THE PATTERN FOR WHICH THE PARITY IS TO BE
                                        ;GENERATED  ON EXIT, R2 CONTAINS THE PARITY BIT GENERATED, IT IS
                                        ;PLACED IN BIT POSITION 7 (SAME AS 'PARGEN' OF WCSST)
                                        ;CALL:  JSR     PC,PARGEN       ;R4 CONTAINS THE PATTERN
                                        ;                               ;R2 CONTAINS PARITY BIT  ON RETURN
                                        ;THIS ROUTINE USES R2

036666  010346                  GENWPAR         MOV     R3,-(SP)
036670  012703  000001                  MOV     #1,R3
036674  000402                          BR      GENP1
```

```
036676  010346                  GENPAR  MOV     R3,-(SP)        ,SAVE R3,R4
036700  005003                          CLR     R3
036702                          GENP1                           ,
036702  010446                          MOV     R4,-(SP)
036704  012702  000020                  MOV     #16 ,R2
036710  006104                  1$      ROL     R4
036712  005503                          ADC     R3              ,KEEP COUNT OF 1'S
036714  077203                          SOB     R2,1$           ,DONE?
036716  006003                          ROR     R3              ,ODD OR EVEN?
036720  103002                          BCC     3$              ,EVEN, PARITY BIT=0
036722  012702  000200                  MOV     #200,R2         ,ODD, PARITY BIT=1
036726  012604                  3$      MOV     (SP)+,R4
036730  012603                          MOV     (SP)+,R3
036732  000207                          RTS     PC              ,EXIT


                                        ,XFRPGN
                                        ,THIS ROUTINE TRANSFORMS THE PATTERN (CONTAINED IN R4) TO A
                                        ,PATTERN COMPATIBLE WITH THE PARITY GENERATOR CHIPS
                                        ,THE INPUTS TO THE TWO PARITY GENERATOR CHIPS ARE
                                        ,       <----- HI BYTE---->     <-- LO BYTE-->
                                        ,DB     15 14 13 12 11 10 1 0   9 8 7 6 5 4 3 2

                                        ,THE PATTERN GENERATED AT THE MACRO LEVEL HAS A DIFFERENT BIT CONFIGURATION

                                        ,       15 14 13 12 11 10 9 8   7 6 5 4 3 2 1 0

                                        ,THUS THE NORMAL MACRO LEVEL COUNT PATTERN (USED FOR EACH OF THE TWO PARITY
                                        ,CHIPS) HAS TO BE TRANSFORMED, SO THAT AT MACHINE LEVEL THE
                                        ,PARITY CHIPS SEE THE RIGHT COUNT PATTERN

                                        ,CALL   MOV R0,R4       ,R4 CONTAINS PATTERN TO BE TRANSFORMED
                                        ,       JSR PC,XFRPGN   ,ON EXIT, R4 CONTAINS THE TRANSFORMED PATTERN

036734  010546                  XFRPGN  MOV     R5,-(SP)        ,SAVE R5,R3
036736  010346                          MOV     R3,-(SP)
036740  010405                          MOV     R4,R5           ,COPY R4 INTO R5 AND
036742  000305                          SWAB    R5              ,MAP BITS 9-8 TO 1 0
036744  042705  177774                  BIC     #177774,R5
036750  010403                          MOV     R4,R3           ,COPY R4 INTO R3 AND
036752  006303                          ASL     R3              ,MAP BITS 7,6 5,4,3,2,1,0 TO
036754  006303                          ASL     R3              ,9,8,7,6,5,4,3,2 RESPECTIVELY
036756  042703  176000                  BIC     #176000,R3
036762  042704  001777                  BIC     #1777,R4        ,BITS 15-10 MAP INTO SAME 15-10
036766  050504                          BIS     R5 R4           ,CONSTRUCT THE TRANSFORMED PATTERN
036770  050304                          BIS     R3,R4
036772  012603                          MOV     (SP)+,R3        ,RESTORE R3 R5
036774  012605                          MOV     (SP)+,R5
036776  000207                          RTS     PC              ,EXIT
                                 TRPMSG
                                ,ROUTINE TO TYPE OUT THE PC AT WHICH PARITY ERROR TRAP TOOK PLACE
                                ,ON ENTRY, 'TRAPC' CONTAINS THE PC ON THE STACK AFTER THE TRAP
                                ,TOOK PLACE

037000  032777  020000  142132  TRPMSG  BIT     #SW13,@SWR      ,INHIBIT TYPING?
```

```
 9999  037006  001011                          BNE     1$                  ,YES, SKIP
10000
10001  037010  104401  042520                  TYPE,   MSG12               ,REPORT UNEXPECTED PARITY ERROR
10002  037014  104401  043233                  TYPE,   MSG31               ,TRAP
10003  037020  013746  037034                  MOV     TRAPC,-(SP)
10004  037024  162716  000002                  SUB     #2,(SP)
10005  037030  104402                          TYPOC                       ,PC AT WHICH TRAP OCCURRED
10006  037032  000207                  1$      RTS     PC
10007
10008  037034  000000                  TRAPC    WORD   0                   ,CONTAINS PC AT WHICH TRAP OCCURRED
10009
10010                                  ,BITERR
10011                                  ,THIS ROUTINE IS ENTERED UPON AN ERROR IN THE CONTENTS OF STATUS REGISTER
10012                                  ,IT PRINTS OUT INFORMATION ABOUT THE BIT/S THAT WAS/WERE
10013                                  ,EITHER NOT SET OR NOT CLEAR (AS THE CASE MAY BE)  ON ENTRY
10014                                  ,'CRSTAT' CONTAINS THE STATUS  REGISTER CONTENTS (DONT CARE BITS (CMASK)
10015                                  ,HAVE BEEN MASKED)   'CESTAT' CONTAINS THE EXPECTED CONTENTS OF THE
10016                                  ,STATUS REGISTER
10017
10018  037036  010046                  BITERR  MOV     R0,-(SP)            ,SAVE R0,R1,R2,R3 ON STACK
10019  037040  010146                          MOV     R1,-(SP)
10020  037042  010246                          MOV     R2,-(SP)
10021  037044  010346                          MOV     R3,-(SP)
10022
10023  037046  013701  037254                  MOV     CRSTAT,R1            GET RECEIVED STATUS (BAD)
10024  037052  013702  037252                  MOV     CESTAT,R2            GET EXPECTED STATUS (GOOD)
10025
10026  037056  074201                          XOR     R2,R1               ,FIND WHICH BITS ARE IN ERROR?
10027  037060  012703  177777                  MOV     #-1,R3
10028  037064  005000                          CLR     R0
10029  037066  000261                          SEC
10030  037070  006100                  1$      ROL     R0                   FIND OUT THE BIT POSITION IN ERROR
10031  037072  001422                          BEQ     5$                   EXIT IF DONE
10032  037074  005203                          INC     R3
10033  037076  030001                          BIT     R0,R1               ,THIS BIT?
10034  037100  001773                          BEQ     1$                  ,NO
10035  037102  006303                          ASL     R3                  ,YES, FORM POINTER TO MESSAGE
10036  037104  016337  003066  037116          MOV      MSG2(R3) 3$        ,TYPE OUT THE BIT DESCRIPTION
10037  037112  006203                          ASR     R3
10038  037114  104406                          TYPMSG
10039  037116  000000                  3$       WORD   0
10040  037120  030002                          BIT     R0,R2               ,WAS THAT BIT DROPPED OR PICKED
10041  037122  001003                          BNE     2$                  ,DROPPED
10042                                                                      ,BIT WAS PICKED UP  HENCE
10043  037124  104406  042470                  TYPMSG  ,MSG10              ,TYPE OUY 'NOT CLEAR'
10044  037130  000757                          BR      1$
10045                                                                       THE BIT WAS DROPPED  HENCE
10046  037132  104406  042505          2$      TYPMSG  ,MSG11              ,TYPE OUT 'NOT SET'
10047
10048  037136  000754                          BR      1$                  ;CHECK REST OF THE BITS
10049
10050  037140  012603                  5$      MOV     (SP)+,R3            ,RESTORE R0,R1 R2,R3
10051  037142  012602                          MOV     (SP)+,R2
10052  037144  012601                          MOV     (SP)+,R1
10053  037146  012600                          MOV     (SP)+,R0
10054  037150  000207                          RTS     PC                  ,RETURN
```

```
                                        ;CHKSTAT
                                        ;THIS ROUTINE CHECKS THAT THE CONTENTS OF THE WCS STATUS REGISTER
                                        ;ARE CORRECT (AS EXPECTED). UPON ENTRY, 'CESTAT' CONTAINS THE
                                        ;EXPECTED STATUS REGISTER CONTENTS, 'CMASK' CONTAINS THE BITS THAT
                                        ;HAVE TO BE MASKED OUT (NOT TO BE COMPARED)
                                        ;ON COMPARISON OF THE STATUS REGISTER, IF AN ERROR IS FOUND THE
                                        ;ROUTINE 'BITERR' IS ENTERED   THIS ROUTINE TYPES OUT WHICH BIT
                                        ;OF THE STATUS REGISTER WAS IN ERROR AND WHETHER IT WAS NOT SET
                                        ;OR NOT CLEAR, AS THE CASE MAY BE
                                        ;UPON RETURN, '$REG0' CONTAINS THE EXPECTED STATUS REGISTER CONTENTS
                                        ;AND '$REG1' CONTAINS THE RECEIVED CONTENTS

037152  010146                          CHKSTAT  MOV     R1,-(SP)        ;SAVE R1,R5 ON STACK
037154  010546                                   MOV     R5,-(SP)

037156  017701  143652                           MOV     @WCSST,R1       ;READ STATUS REGISTER
037162  010137  001164                           MOV     R1,$REG1        ;SAVE A COPY FOR ERROR REPORTING
037166  043701  037256                           BIC     CMASK,R1        ;MASK OUT 'DONT CARE' BITS
037172  010137  037254                           MOV     R1,CRSTAT       ;SAVE THE RESULT (RECORD STATUS)
037176  023701  037252                           CMP     CESTAT R1       ;CONTENTS OF STATUS REGISTER OK?
037202  001415                                   BEQ     1$              ;YES
                                                                         ;NO, TYPE OUT WHICH BIT WAS
037204  004737  037036                           JSR     PC BITERR       ;NOT SET OR NOT CLEAR?

037210  013701  037256                           MOV     CMASK,R1        ;GET THE MASK BITS
037214  005101                                   COM     R1
037216  013705  001164                           MOV     $REG1,R5        ;FORM THE EXPECTED STATUS REGISTER
037222  040105                                   BIC     R1,R5           ;CONTENTS, CORRESPONDING TO THE
037224  053705  037252                           BIS     CESTAT,R5       ;MASK BITS
037230  010537  001162                           MOV     R5,$REG0         SAVE FOR ERROR REPORTING
037234  000403                                   BR      2$
037236  013766  037260  000004  1$               MOV     CRETRN,4(SP)     RETURN TO SKIP OVER ERROR MESSAGE
037244  012605                  2$               MOV     (SP)+,R5        ;RESTORE R1,R5
037246  012601                                   MOV     (SP)+,R1
037250  000207                                   RTS     PC

037252  000000                          CESTAT   WORD    0
037254  000000                          CRSTAT   WORD    0
037256  000000                          CMASK    WORD    0
037260  000000                          CRETRN   WORD    0
                                                 XFRCHK
                                                ;THIS ROUTINE REMAPS THE MACRO-LEVEL PATTERN USED FOR THE
                                                ;PARITY CHECKERS CORRESPONDING TO PAR1, WP1 (DATA BITS D<16 31>
                                                 OF THE DATA ARRAY D<47:0>)   THE INPUTS TO THE ABOVE TWO
                                                ;PARITY CHECKERS ARE AS FOLLOWING

                                                                 HI BYTE                 LO BYTE
                                                 DOUT   31 30 29 28 27 26 19 16     25 24 23 22 21 20 18 17

                                                ;WHEREAS THE MACRO-LEVEL BIT CONFIGURATION IS:
                                                                 HI BYTE                 LO BYTE
                                                        31 30 29 28 27 26 25 24      23 22 21 20 19 18 17 16

                                                 THE MAPPING IS DONE SO THAT THE SAME (MACRO-LEVEL)
                                                 PATTERN APPEARS AT THE INPUTS OF THE TWO PARITY CHIPS
```

```
                                        ;CALL    MOV     PATRN,R4        ;PATTERN TO BE MAPPED
                                        ;        JSR     PC,XFRCHK       ;ON EXIT THE MAPPED PATTERN
                                        ;                                ;IS IN R4

037262  010346                  XFRCHK  MOV     R3,-(SP)        ;SAVE R3,R5
037264  010546                          MOV     R5,-(SP)
037266  010403                          MOV     R4,R3
037270  006303                          ASL     R3              ;MAP BITS 17, 18
037272  010305                          MOV     R3,R5
037274  042703  177771                  BIC     #177771,R3
037300  006305                          ASL     R5
037302  042705  176017                  BIC     #176017,R5      ;MAP BITS <25-20>
037306  050503                          BIS     R5,R3
037310  032704  000400                  BIT     #BIT8,R4        ;MAP BIT 16
037314  001402                          BEQ     1$
037316  052703  000001                  BIS     #BIT0,R3
037322  032704  001000          1$      BIT     #BIT9,R4        ;MAP BIT 19
037326  001402                          BEQ     2$
037330  052703  000010                  BIS     #BIT3,R3
037334  042704  001777          2$      BIC     #1777,R4        ;MAP BITS <31-26>
037340  050304                          BIS     R3,R4
037342  012605                          MOV     (SP)+,R5        ;RESTORE R5 R3
037344  012603                          MOV     (SP)+,R3
037346  000207                          RTS     PC
                                        ;FAULT ANALYZER
                                        ;THIS FAULT ANALYZER ATTEMPTS TO ANALYZE THE ERRORS THAT
                                        ;HAVE OCCURED IN THE ADDRESSING TESTS AND INDICATE WHICH ADDRESS
                                        ;LINE/S WERE FAULTY   NOTE THAT THIS ANALYZER IS BASED ON
                                         SINGLE FAULT CONCEPT AND GIVES A HIGH PROBABILITY
                                        ;ANALYSIS (NOT A 100% TRUE ANALYSIS)
                                        ;'TMP0' CONTAINS LOGICAL 'OR' OF ALL THE DATA PATTERNS THAT FAILED
                                         'TMP1' CONTAINS LOGICAL 'AND' OF ALL THE DATA PATTERNS THAT FAILED
                                        ;LOGICAL 'XOR' OF 'TMP0' AND 'TMP1' IS DONE   THE RESULT
                                        ;IS THEN COMPLEMENTED
                                         THE FINAL RESULT WILL BE A WORD
                                         IN WHICH ONE OR MORE BITS MAY BE SET   ADDRESS LINES
                                         CORRESPONDING TO THESE BIT POSITIONS ARE PROBABLY FAULTY

                                        ;THIS ROUTINE ALSO TYPES OUT TWO OCTAL NUMBERS, CONTENTS
                                        ;OF 'TMP0' (OR), 'TMP1' (AND).  THIS MAY BE INTERPRETED
                                         AS FOLLOWING
                                        ;CASE 1
                                        ;OR = ALL 1'S, AND IS NOT = 0
                                        ;ADDRESS LINES CORRESPONDING TO THE BIT POSITIONS THAT
                                        ;ARE SET IN 'AND' ARE EITHER OPEN OR STUCK HIGH
                                        ;CASE 2
                                        ;OR IS NOT = 0, AND = 0
                                        ;ADDRESS LINES CORRESPONDING TO THE BIT POSITIONS THAT ARE
                                        ;CLEAR IN 'OR' ARE STUCK TO 0
                                        ;CASE 3
                                        ;'AND' IS GREATER THAN 0, 'OR' IS LESS THAN 177777
                                        ;NON-PREDICTABLE CASE   THERE COULD BE MULTIPLE FAULTS, NON-
                                        ;CONSISTENT SOFT FAILURES, MIXED DATA AND ADDRESS
                                        ;FAILURES
                                         AT THE POINT OF ENTRY, 'TMP0' CONTAINS THE LOGICAL 'OR'
                                         'TMP1' CONTAINS THE LOGICAL 'AND'  R0, R1 CONTAIN THE
```

```
                                        ;LOGICAL 'OR' AND 'AND' SHIFTED TO COVER THE ADDRESS BITS
                                        ;THAT ARE BEING CHECKED
                                        ;CALL   MOV     #MSG,-(SP)      ;MESSAGE POINTER
                                        ;       MOV     #BITMASK,-(SP)  ;MASK TO BE USED
                                        ;       JSR     PC,ANLYSO

037350  010004                  ANLYSO  MOV     R0,R4           ;XOR (OR,AND) ---> R4
037352  074104                          XOR     R1,R4
037354  005104                          COM     R4              ;COM (XOR) ---> R4
037356  046604  000002                  BIC     2(SP),R4        ;USE THE BIT MASK TO CLEAR OUT
                                                                ;UNUSED BITS
037362  010405                          MOV     R4,R5           ;BITS (POSITIONS) SET IN R4
                                                                ;GIVE ADDRESS LINES THAT ARE
                                                                ;FAULTY
037364  016637  000004  037400          MOV     4(SP),1$        ;GET MESSAGE POINTER
037372  104406  042701                  TYPMSG  MSG21           ;TYPE - FAULTY ADDRESS LINES
037376  104406                          TYPMSG
037400  000000                  1$       WORD   0
                                                                ;TYPE OUT THE ADDRESS LINES
037402  012702  177777                  MOV     #-1,R2          ;CORRESPONDING TO BITS THAT
037406  005202                  2$      INC     R2              ;ARE SET
037410  006005                          ROR     R5
037412  103002                          BCC     3$
037414  010246                          MOV     R2,-(SP)
037416  104405                          TYPDS
037420  020227  000011          3$      CMP     R2,#9
037424  101770                          BLOS    2$

037426  104406  042757                  TYPMSG  MSG23           ;AND =
037432  010146                          MOV     R1,-(SP)        ;TYPE OUT CONTENTS OF TMP1
037434  046616  000004                  BIC     4(SP),(SP)      ;FAKE OUT BITS CORRESPONDING TO THE MASK
037440  104403                          TYPOS
037442     004                           BYTE   4
037443     001                           BYTE   1

037444  104406  042766                  TYPMSG  MSG24           ;OR =
037450  010046                          MOV     R0,-(SP)         TYPE OUT CONTENTS OF TMP0
037452  056616  000004                  BIS     4(SP),(SP)       FAKE OUT BITS CORRESPONDING TO THE MASK
037456  104403                          TYPOS
037460     004                           BYTE   4
037461     001                           BYTE   1

037462  011666  000004                  MOV     (SP),4(SP)       ADJUST RETURN ADDRESS
037466  022626                          CMP     (SP)+,(SP)+

037470  000207                          RTS     PC              ;RETURN


                                WCS LOADER, LDWCS
                                .
                                ;CALL   JSR     R5,LDWCS
                                        BGNCB           ;STARTING ADDRESS OF CONTROL BLOCK
                                .                       ;IN WCS
```

```
                                        ;       MEMLOC          ;STARTING ADDRESS IN MEMORY FROM
                                        ;                       ;WHICH THE WCS IS TO BE LOADED
                                        ;       ENTRY           ;ENTRY POINT INTO THE WCS

                                        ;FORMAT OF THE MICRO-CODE (CONTROL) BLOCK TO BE LOADED
                                        ;INTO THE WCS

                                        ;       ENTRYWRD0       ;THIS IS THE MICRO-WORD TO BE LOADED
                                        ;       ENTRYWRD1       ;INTO THE WCS AT THE ENTRY POINT
                                        ;       ENTRWRD2        ;'ENTRY' - 'WRD0' (16 BITS) GOES INTO
                                        ;                       ;SEGMENT 0, 'WRD1' IN SEGMENT 1,
                                        ;                       ;'WRD2' IN SEGMENT 2 OF WCS
                                        ;       CBWRD0          ;
                                        ;       CBWRD1          ;3 16-BIT WORDS MAKE UP THE MICRO-WORDS
                                                CBWRD2          ;WHICH ARE TO BE LOADED INTO WCS STARTING
                                                                ;AT 'BGNCB'
                                        ;       UWDEND          ;END OF BLOCK, TERMMINATOR

                                        ;NOTE THE WCS OPERATES IN PAGES 6-7.  THUS THE ADDRESSES
                                        ;ARE FROM 6000 - 7777.  WCS ARRAY IS MADE UP OF 3 16-BIT
                                         SEGMENTS.  THE FIRST SEGMENT CONTAINS BITS (15 0), SECOND ONE IS
                                         BITS (31 16), THIRD IS BITS (47 32)

                                         THE ROUTINE INITIALLY LOADS UP THE ENTIRE WCS WITH NULL (BRANCH ON
                                        ;SELF) MICROWORDS.  THIS IS DONE TO PROTECT THE BASE MACHINE, IN CASE OF
                                        ;A FAULT INSIDE THE WCS (IF THE CONTROL PASSES TO ANY MICRO-WORD INSIDE
                                         THE WCS, TO WHICH IT SHOULD NOT HAVE PASSED, THE "BRANCH ON SELF" MICRO
                                         WORD WILL BE EXECUTED AND THE MACHINE WILL LOOP ON IT )

                                         AFTER LOADING EACH MICROWORD INSIDE THE WCS THE LOADER CHECKS IF THE WORD
                                         WAS LOADED CORRECTLY.  IF IT WAS INCORRECT AN ERROR IS REPORTED AND THE
                                         TEST IS ABORTED.


037472  010046                          LDWCS   MOV     R0,-(SP)        SAVE R0 R1,R2,R3
037474  010146                                  MOV     R1,-(SP)
037476  010246                                  MOV     R2,-(SP)
037500  010346                                  MOV     R3,-(SP)

                                                ;INITIALIZE THE WCS WITH NULL (BRANCH ON SELF) MICRO-WORDS
037502  005001                                  CLR     R1
037504  010100                          4$      MOV     R1,R0
037506  010177  143324                          MOV     R1,@WCSAR
037512  005100                                  COM     R0              ;NUA<8 0> BITS ARE INVERTED
037514  042700  147000                          BIC     #147000,R0      ;BIT12,13 ARE SET, NULL BUT
037520  010077  147314                          MOV     R0,@WCSDR       ;LOAD SEGMENT 0
037524  005201                                  INC     R1
037526  020127  002000                          CMP     R1,#1024        ;DONE?
037532  001364                                  BNE     4$
037534  010177  143276                  5$      MOV     R1,@WCSAR       ;CLEAR OUT SEGMENT 1,2
037540  005077  143274                          CLR     @WCSDR
037544  005201                                  INC     R1
037546  020127  006000                          CMP     R1,#3072        DONE?
037552  001370                                  BNE     5$

                                                NOW  LOAD THE MICRO-TEST
```

```
037554  012501                          MOV     (R5)+,R1        ;WCS ADDRESS WHERE MICRO-CODE
                                                                ;IS TO BE LOADED
037556  012502                          MOV     (R5)+,R2        ;MEMORY ADDRESS FROM WHICH
                                                                ;MICRO-CODE IS TO BE LOADED
037560  012577  143252                  MOV     (R5)+,@WCSAR    ;ENTRY POINT INTO WCS
037564  012700  177777                  MOV     #-1,R0
037570  042777  176000  143240  2$      BIC     #176000,@WCSAR  ;CONVERT MICRO-ADDRESS TO
                                                                ;ARRAY ADDRESS

037576  012737  000777  001164  1$      MOV     #777,$REG1      ;LOAD FIRST SEGMENT OF UWORD
037604  012203                          MOV     (R2)+,R3
037606  074337  001164                  XOR     R3,$REG1        ;COMPLEMENT BITS<8 0>, THAT IS
037612  013777  001164  143220          MOV     $REG1,@WCSDR    ;NUA<8 0>
037620  027737  143214  001164          CMP     @WCSDR,$REG1    ;LOADED CORRECTLY?
037626  001040                          BNE     6$              ;NO, ERROR
037630  062777  002000  143200          ADD     #2000,@WCSAR    ;ADDRESS THE MIDDLE SEGMENT
037636  011277  143176                  MOV     (R2),@WCSDR     ;LOAD SECOND SEGMENT OF UWORD
037642  022277  143172                  CMP     (R2)+,@WCSDR    ;LOADED CORRECTLY?
037646  001030                          BNE     6$              ;NO, ERROR
037650  062777  002000  143160          ADD     #2000,@WCSAR    ;ADDRESS THE THIRD SEGMENT
037656  011277  143156                  MOV     (R2),@WCSDR     ;LOAD 3RD SEGMENT OF UWORD
037662  022277  143152                  CMP     (R2)+,@WCSDR    ;LOADED CORRECTLY?
037666  001020                          BNE     6$              ;NO, ERROR
037670  022712  105252                  CMP     #UWDEND,(R2)    ;END OF BLOCK?
037674  001410                          BEQ     3$              ;YES,EXIT

037676  162777  000777  143122          SUB     #3777,@WCSAR    ;ADDRESS THE NEXT FIRST SEGMENT
037704  005200                          INC     R0              ;IF THE ENTRY POINT MICRO-WORD
037706  001333                          BNE     1$              ;HAS BEEN LOADED, CHANGE THE
037710  010177  143122                  MOV     R1,@WCSAR       ;WCSADR TO THE CONTROL BLOCK
037714  000725                          BR      2$              ;LOAD REST OF THE MICRO-CODE

037716  012603                  3$      MOV     (SP)+,R3
037720  012602                          MOV     (SP)+,R2        ;RESTORE R0,R1,R2,R3
037722  012601                          MOV     (SP)+,R1
037724  012600                          MOV     (SP)+,R0


037726  000205                          RTS     R5              ;EXIT
                                        ;IF MICRO-CODE WAS LOADED INCORRECTLY ENTER HERE  REPORT
                                        ;AN ERROR  THEN ABORT THE TEST

037730  017737  143102  001162  6$      MOV     @WCSAR,$REG0    ;GET WCS ADDRESS
037736  032777  006000  143072          BIT     #BIT10+BIT11,@WCSAR     ;SEGMENT 0?
037744  001403                          BEQ     7$              ;YES
037746  016237  177776  001164          MOV     -2(R2),$REG1    ;CORRECT WORD THAT SHOULD HAVE BEEN LOADED
037754  017737  143060  001166  7$      MOV     @WCSDR,$REG2    ;INCORRECT WORD READ BACK
037762  104070                          ERROR   70              ;MICRO-WORD WAS LOADED IN THE WCS
                                                                ;INCORRECTLY  ERROR MESSAGE INDICATES
                                                                ;THE WCS ADDRESS WHERE THE MICRO-WORD SEGMENT
                                                                ;WAS LOADED, THE EXPCTD CORRECT WORD
                                                                ;AND THE WORD THAT WAS READ BACK
```

```
037764  104401  042652          TYPE,   MSG17           ,ABORT TEST
037770  013746  001102          MOV     $TSTNM,-(SP)    ,TEST NO
037774  104402                  TYPOC
037776  013705  003056          MOV     NXTST,R5        ,SET UP RETURN ADDRESS TO BEGINING
040002  000745                  BR      3$              ,OF NEXT TEST
```

```
                                        SBTTL  SCOPE HANDLER ROUTINE

                                ;;*****************************************************************
                                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS  IT WILL INCREMENT
                                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG (DISPLAY<7 0>)
                                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15 08>
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE
                                ;*SW14=1          LOOP ON TEST
                                ;*SW11=1          INHIBIT ITERATIONS
                                ;*SW09=1          LOOP ON ERROR
                                ;*SW08=1          LOOP ON TEST IN SWR<7 0>
                                ;*CALL
                                ;*      SCOPE           ;;SCOPE=IOT

040004                          $SCOPE
040004  032777  040000  141126  1$      BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
040012  001114                          BNE     $OVER           ;;YES IF SW14=1
                                ;#####START OF CODE FOR THE XOR TESTER#####
040014  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
040016  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
040022  012737  040042  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
040030  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
040034  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
040040  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
040042  022626                  5$      CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
040044  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
040050  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
040052                          6$  #####END OF CODE FOR THE XOR TESTER#####
040052  032777  000400  141060          BIT     #BIT08,@SWR     ;;LOOP ON SPEC  TEST?
040060  001404                          BEQ     2$              ;;BR IF NO
040062  127737  141052  001102          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7 0>
040070  001465                          BEQ     $OVER           ;;BR IF YES
040072  105737  001103          2$      TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
040076  001421                          BEQ     3$              ;;BR IF NO
040100  123737  001115  001103          CMPB    $ERMAX,$ERFLG   ;;MAX  ERRORS FOR THIS TEST OCCURRED?
040106  101015                          BHI     3$              ;;BR IF NO
040110  032777  001000  141022          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
040116  001404                          BEQ     4$              ;;BR IF NO
040120  013737  001110  001106  7$      MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
040126  000446                          BR      $OVER
040130  105037  001103          4$      CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
040134  005037  001222                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
040140  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
040142  032777  004000  140770  3$      BIT     #BIT11 @SWR     ;;INHIBIT ITERATIONS?
040150  001011                          BNE     1$              ;;BR IF YES
040152  005737  001244                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
040156  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
040160  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
040164  023737  001222  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
040172  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
040174  012737  000001  001104  1$      MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
040202  013737  040260  001222          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
040210  105237  001102          $SVLAD  INCB    $TSTNM          ;;COUNT TEST NUMBERS
040214  113737  001102  001242          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
040222  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
```

```
040226  011637  001110                  MOV     (SP),$LPERR      ;;SAVE ERROR LOOP ADDRESS
040232  005037  001224                  CLR     $ESCAPE          ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
040236  112737  000001  001115          MOVB    #1,$ERMAX        ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
040244  013777  001102  140670  $OVER   MOV     $TSTNM,@DISPLAY  ;;DISPLAY TEST NUMBER
040252  013716  001106                  MOV     $LPADR,(SP)      ;;FUDGE RETURN ADDRESS
040256  000002                          RTI                      ;;FIXES PS
040260  000010                  $MXCNT  10                       ;;MAX  NUMBER OF ITERATIONS
                                 SBTTL  ERROR HANDLER ROUTINE

                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                ;*AND GO TO $ERRTYP ON ERROR
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE
                                ;*SW15=1          HALT ON ERROR
                                ;*SW13=1          INHIBIT ERROR TYPEOUTS
                                ;*SW10=1          BELL ON ERROR
                                ;*SW09=1          LOOP ON ERROR
                                ;*CALL
                                ;*      ERROR   N        ;;ERROR=EMT AND N=ERROR ITEM NUMBER

040262                          $EPROR
040262  105237  001103          7$      INCB    $ERFLG           ;;SET THE ERROR FLAG
040266  001775                          BEQ     7$               ;;DON'T LET THE FLAG GO TO ZERO
040270  013777  001102  140644          MOV     $TSTNM,@DISPLAY  ;;DISPLAY TEST NUMBER AND ERROR FLAG
040276  032777  002000  140634          BIT     #BIT10,@SWR      ;;BELL ON ERROR?
040304  001402                          BEQ     1$               ;;NO - SKIP
040306  104401  001226                  TYPE    ,$BELL           ;;RING BELL
040312  005237  001112          1$      INC     $ERTTL           ;;COUNT THE NUMBER OF ERRORS
040316  011637  001116                  MOV     (SP),$ERRPC      ;;GET ADDRESS OF ERROR INSTPUCTION
040322  162737  000002  001116          SUB     #2,$ERRPC
040330  117737  140562  001114          MOVB    @$ERRPC,$ITEMB   ;;STRIP AND SAVE THE ERROR ITEM CODE
040336  032777  020000  140574          BIT     #BIT13,@SWR      ;;SKIP TYPEOUT IF SET
040344  001004                          BNE     20$              ;;SKIP TYPEOUTS
040346  004737  040456                  JSR     PC,$ERRTYP       ;;GO TO USER ERROR ROUTINE
040352  104401  001233                  TYPE    ,$CRLF
040356                          20$
040356  122737  000001  001256          CMPB    #APTENV,$ENV     ;;RUNNING IN APT MODE
040364  001007                          BNE     2$               ;;NO,SKIP APT ERROR REPORT
040366  113737  001114  040400          MOVB    $ITEMB,21$       ;;SET ITEM NUMBER AS ERROR NUMBER
040374  004737  041564                  JSR     PC,$ATY4         ;;REPORT FATAL ERROR TO APT
040400     000                  21$     BYTE    0
040401     000                          BYTE    0
040402  000777                  22$     BR      22$              ;;APT ERROR LOOP
040404  005777  140530          2$      TST     @SWR             ;;HALT ON ERROR
040410  100001                          BPL     3$               ;;SKIP IF CONTINUE
040412  000000                          HALT                     ;HALT ON ERROR!
040414  032777  001000  140516  3$      BIT     #BIT09,@SWR      ;;LOOP ON ERROR SWITCH SET?
040422  001402                          BEQ     4$               ;;BR IF NO
040424  013716  001110                  MOV     $LPERR,(SP)      ;;FUDGE RETURN FOR LOOPING
040430  005737  001224          4$      TST     $ESCAPE          ;;CHECK FOR AN ESCAPE ADDRESS
040434  001402                          BEQ     5$               ;;BR IF NONE
040436  013716  001224                  MOV     $ESCAPE,(SP)     ;;FUDGE RETURN ADDRESS FOR ESCAPE
040442                          5$
040442  022737  036514  000042          CMP     #$ENDAD,@#42     ;;ACT-11 AUTO-ACCEPT?
040450  001001                          BNE     6$               ;BRANCH IF NO
```

```
040452  000000                          HALT                    ;;YES
040454                          6$
040454  000002                          RTI                     ;;RETURN
                                 SBTTL  ERROR MESSAGE TYPEOUT ROUTINE

                                ;;*****************************************************************
                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                                ;*ERROR IS TO BE REPORTED  IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB)
                                ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR

040456                          $ERRTYP
040456  104401  001233                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & 'LINE FEED'
040462  010046                          MOV     R0,-(SP)        ;;SAVE R0
040464  005000                          CLR     R0              ;;PICKUP THE ITEM INDEX
040466  153700  001114                  BISB    @#$ITEMB R0
040472  001004                          BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                                ;;TYPE THE PC OF THE ERROR
040474  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                                ;;ERROR ADDRESS
040500  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
040502  000426                          BR      6$              ;;GET OUT
040504  005300                  1$      DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
040506  006300                          ASL     R0              ;;      WORK FOR THE ERROR TABLE
040510  006300                          ASL     R0
040512  006300                          ASL     R0
040514  062700  001362                  ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
040520  012037  040530                  MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
040524  001404                          BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
040526  104401                          TYPE                    ;;TYPE THE "ERROR MESSAGE"
040530  000000                  2$       WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
040532  104401  001233                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
040536  012037  040546          3$      MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
040542  001404                          BEQ     5$              ;SKIP TYPEOUT IF 0
040544  104401                          TYPE                    ;;TYPE THE "DATA HEADER"
040546  000000                  4$       WORD   0               ;;"DATA HEADER" POINTER GOES HERE
040550  104401  001233                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
040554  011000                  5$      MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
040556  001000                          BNE     7$              ;;GO TYPE THE DATA
040560  012600                  6$      MOV     (SP)+,R0        ; RESTORE R0
040562  104401  001233                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
040566  000207                          RTS     PC              ;;RETURN
040570                          7$
040570  013046                          MOV     @(R0)+ -(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
040572  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
040574  005710                          TST     (R0)            ;;IS THERE ANOTHER NUMBER?
040576  001770                          BEQ     6$              ;;BR IF NO
040600  104401  040606                  TYPE    ,8$             ;;TYPE TWO(2) SPACES
040604  000771                          BR      7$              ;;LOOP
040606  020040     000          8$       ASCIZ  /  /            ;;TWO(2) SPACES
        040612                           EVEN
                                 SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                                 ;*****************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                ;*OCTAL (ASCII) NUMBER AND TYPE IT
                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
```

```
                                        ;*CALL
                                        ;*      MOV     NUM -(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                        ;*       BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                        ;*       BYTE   M               ;;M=1 OR 0
                                        ;*                                      ;;1=TYPE LEADING ZEROS
                                        ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                        ;*
                                        ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                        ;*$TYPOS OR $TYPOC
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPON                   ;;CALL FOR TYPEOUT
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL.
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT

040612  017646  000000          $TYPOS  MOV     @(SP),-(SP)     ;;PICKUP THE MODE
040616  116637  000001  041035          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
040624  112637  041037                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
040630  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
040634  000406                          BR      $TYPON
040636  112737  000001  041035  $TYPOC  MOVB    #1,$OFILL       ;SET THE ZERO FILL SWITCH
040644  112737  000006  041037          MOVB    #6,$OMODE+1     ;SET FOR SIX(6) DIGITS
040652  112737  000005  041034  $TYPON  MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
040660  010346                          MOV     R3,-(SP)        ;;SAVE R3
040662  010446                          MOV     R4,-(SP)        ;;SAVE R4
040664  010546                          MOV     R5,-(SP)        ;;SAVE R5
040666  113704  041037                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
040672  005404                          NEG     R4
040674  062704  000006                  ADD     #6,R4           ;SUBTRACT IT FOR MAX  ALLOWED
040700  110437  041036                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
040704  113704  041035                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
040710  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
040714  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
040716  006105                  1$      ROL     R5              ;;ROTATE MSB INTO 'C'
040720  000404                          BR      3$              ;;GO DO MSB
040722  006105                  2$      ROL     R5              ;;FORM THIS DIGIT
040724  006105                          ROL     R5
040726  006105                          ROL     R5
040730  010503                          MOV     R5,R3
040732  006103                  3$      ROL     R3              ;;GET LSB OF THIS DIGIT
040734  105337  041036                  DECB    $OMODE          ;;TYPE THIS DIGIT?
040740  100016                          BPL     7$              ;BR IF NO
040742  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
040746  001002                          BNE     4$              ;;TEST FOR 0
040750  005704                          TST     R4              ;;SUPPRESS THIS 0?
040752  001403                          BEQ     5$              ;;BR IF YES
040754  005204                  4$      INC     R4              ;;DON'T SUPPRESS ANY MORE 0'S
040756  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
040762  052703  000040          5$      BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
040766  110337  041032                  MOVB    R3,8$           ;;SAVE FOR TYPING
040772  104401  041032                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
040776  105337  041034          7$      DECB    $OCNT           ;;COUNT BY 1
```

```
041002  003347                          BGT     2$              ;;BR IF MORE TO DO
041004  002402                          BLT     6$              ;;BR IF DONE
041006  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
041010  000744                          BR      2$              ;;GO DO THE LAST DIGIT
041012  012605                  6$      MOV     (SP)+,R5        ;;RESTORE R5
041014  012604                          MOV     (SP)+,R4        ;;RESTORE R4
041016  012603                          MOV     (SP)+,R3        ;;RESTORE R3
041020  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURN NG
041026  012616                          MOV     (SP)+,(SP)
041030  000002                          RTI                     ;;RETURN
041032     000                  8$      BYTE    0               ;;STORAGE FOR ASCII DIGIT
041033     000                          BYTE    0               ;;TERMINATOR FOR TYPE ROUTINE
041034     000                  $OCNT.  BYTE    0               ;;OCTAL DIGIT COUNTER
041035     000                  $OFILL  .BYTE   0               ;;ZERO FILL SWITCH
041036  000000                  $OMODE  .WORD   0               ;;NUMBER OF DIGITS TO TYPE
                                 SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

                                ;;*****************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT  DEPENDING ON WHETHER THE
                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER  LEADING ZEROS WILL ALWAYS BE
                                ;*REPLACED WITH SPACES
                                ;*CALL
                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                                ;*      TYPDS                   ;;GO TO THE ROUTINE

041040                          $TYPDS
041040  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
041042  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
041044  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
041046  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
041050  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
041052  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
041056  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
041062  100004                          BPL     1$              ;;BR IF INPUT IS POS.
041064  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS
041066  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG
041074  005000                  1$      CLR     R0              ;;ZERO THE CONSTANTS INDEX
041076  012703  041254                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
041102  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
041106  005002                  2$      CLR     R2              ;;CLEAR THE BCD NUMBER
041110  016001  041244                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
041114  160105                  3$      SUB     R1,R5           ;;FORM THIS BCD DIGIT
041116  002402                          BLT     4$              ;;BR IF DONE
041120  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
041122  000774                          BR      3$
041124  060105                  4$      ADD     R1,R5           ;;ADD BACK THE CONSTANT
041126  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
041130  001002                          BNE     5$              ;;FALL THROUGH IF 0
041132  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
041134  100407                          BMI     7$              ;;BR IF YES
041136  106316                  5$      ASLB    (SP)            ;;MSD?
041140  103003                          BCC     6$              ;;BR IF NO
041142  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
041150  052702  000060          6$      BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
```

```
041154  052702  000040          7$      BIS     #' ,R2          ;,MAKE IT A SPACE IF NOT ALREADY A DIGIT
041160  110223                          MOVB    R2,(R3)+        ;,PUT THIS CHARACTER IN THE OUTPUT BUFFER
041162  005720                          TST     (R0)+           ;;JUST INCREMENTING
041164  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
041170  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
041172  003002                          BGT     8$              ;;GO TO EXIT
041174  010502                          MOV     R5,R2           ;;GET THE LSD
041176  000764                          BR      6$              ;,GO CHANGE TO ASCII
041200  105726                  8$      TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
041202  100003                          BPL     9$              ;;BR IF NO
041204  116663  177777  177776          MOVB    -1(SP),-2(R3)   ,;YES--SET THE SIGN FOR TYPING
041212  105013                  9$      CLRB    (R3)            ;;SET THE TERMINATOR
041214  012605                          MOV     (SP)+,R5        ,,POP STACK INTO R5
041216  012603                          MOV     (SP)+,R3        ,,POP STACK INTO R3
041220  012602                          MOV     (SP)+,R2        ,,POP STACK INTO R2
041222  012601                          MOV     (SP)+,R1        ,,POP STACK INTO R1
041224  012600                          MOV     (SP)+,R0        ,,POP STACK INTO R0
041226  104401  041254                  TYPE    ,$DBLK          ,,NOW TYPE THE NUMBER
041232  016666  000002  000004          MOV     2(SP),4(SP)     ,,ADJUST THE STACK
041240  012616                          MOV     (SP)+,(SP)
041242  000002                          RTI                     ,,RETURN TO USER
041244  023420                  $DTBL   10000
041246  001750                          1000
041250  000144                          100
041252  000012                          10
041254  000004                  $DBLK   .BLKW   4
                                 SBTTL  TYPE ROUTINE

                                ,,*****************************************************************
                                ,*ROUTINE TO TYPE ASCIZ MESSAGE  MESSAGE MUST TERMINATE WITH A 0 BYTE
                                ,*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED
                                ,*NOTE1         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER
                                ,*NOTE2         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED
                                ,*NOTE3         $FILLC CONTAINS THE CHARACTER TO FILL AFTER
                                ,*
                                ,*CALL:
                                ;*1) USING A TRAP INSTRUCTION
                                ,*      TYPE    ,MESADR         ,,MESADR IS F PST ADDRESS OF AN ASCIZ STRING
                                ,*OR
                                ,*      TYPE
                                ,*      MESADR
                                ,*

041264  105737  001157          $TYPE   TSTB    $TPFLG          ,,IS THERE A TERMINAL?
041270  100002                          BPL     1$              ,,BR IF YES
041272  000000                          HALT                    ,,HALT HERE IF NO TERMINAL
041274  000430                          BR      3$              ,,LEAVE
041276  010046                  1$      MOV     R0,-(SP)        ,,SAVE R0
041300  017600  000002                  MOV     @2(SP),R0       ,,GET ADDRESS OF ASCIZ STRING
041304  122737  000001  001256          CMPB    #APTENV,$ENV    ;,RUNNING IN APT MODE
041312  001011                          BNE     62$             ,,NO,GO CHECK FOR APT CONSOLE
041314  132737  000100  001257          BITB    #APTSPOOL,$ENVM ,,SPOOL MESSAGE TO APT
041322  001405                          BEQ     62$             ,;NO,GO CHECK FOR CONSOLE
041324  010037  041334                  MOV     R0,61$          ,,SETUP MESSAGE ADDRESS FOR APT
041330  004737  041554                  JSR     PC,$ATY3        ;,SPOOL MESSAGE TO APT
041334  000000                  61$      WORD   0               ;,MESSAGE ADDRESS
```

```
041336  132737  000040  001257  62$     BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
041344  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
041346  112046                  2$      MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
041350  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
041352  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
041354  012600                  60$     MOV     (SP)+,R0        ;;RESTORE R0
041356  062716  000002          3$      ADD     #2,(SP)         ;;ADJUST RETURN PC
041362  000002                          RTI                     ;;RETURN
041364  122716  000011          4$      CMPB    #HT,(SP)        ;;BRANCH IF <HT>
041370  001430                          BEQ     8$
041372  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
041376  001006                          BNE     5$
041400  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
041402  104401                          TYPE                    ;;TYPE A CR AND LF
041404  001233                          $CRLF
041406  105037  041542                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
041412  000755                          BR      2$              ;;GET NEXT CHARACTER
041414  004737  041476          5$      JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
041420  123726  001156          6$      CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS ?
041424  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR
041426  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR
041432  105366  000001          7$      DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
041436  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
041440  004737  041476                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
041444  105337  041542                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
041450  000770                          BR      7$              ;;LOOP

                                ;HORIZONTAL TAB PROCESSOR

041452  112716  000040          8$      MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
041456  004737  041476          9$      JSR     PC,$TYPEC       ;;TYPE A SPACE
041462  132737  000007  041542          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
041470  001372                          BNE     9$              ;;TAB STOP
041472  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
041474  000724                          BR      2$              ;;GET NEXT CHARACTER
041476  105777  137446          $TYPEC  TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
041502  100375                          BPL     $TYPEC
041504  116677  000002  137440          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG
041512  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
041520  001003                          BNE     1$              ;;BRANCH IF NO
041522  105037  041542                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
041526  000406                          BR      $TYPEX          ;;EXIT
041530  122766  000012  000002  1$      CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
041536  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
041540  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
041542  000000                  $CHARCNT WORD   0               ;;CHARACTER COUNT STORAGE
041544  000207                  $TYPEX  RTS     PC

                                 SBTTL  APT COMMUNICATIONS ROUTINE

                                ;;*****************************************************************
041546  112737  000001  042012  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
041554  112737  000001  042010  $ATY3   MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
041562  000403                          BR      $ATYC
041564  112737  000001  042012  $ATY4   MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
```

```
041572                          $ATYC
041572  010046                          MOV     R0,-(SP)          ;;PUSH R0 ON STACK
041574  010146                          MOV     R1,-(SP)          ;;PUSH R1 ON STACK
041576  105737  042010                  TSTB    $MFLG             ;;SHOULD TYPE A MESSAGE?
041602  001450                          BEQ     5$                ;;IF NOT:  BR
041604  122737  000001  001256          CMPB    #APTENV,$ENV      ;;OPERATING UNDER APT?
041612  001031                          BNE     3$                ;;IF NOT:  BR
041614  132737  000100  001257          BITB    #APTSPOOL,$ENVM   ;;SHOULD SPOOL MESSAGES?
041622  001425                          BEQ     3$                ;;IF NOT:  BR
041624  017600  000004                  MOV     @4(SP),R0         ;;GET MESSAGE ADDR.
041630  062766  000002  000004          ADD     #2,4(SP)                  ;;BUMP RETURN ADDR
041636  005737  001236          1$      TST     $MSGTYPE          ;;SEE IF DONE W/ LAST XMISSION?
041642  001375                          BNE     1$                ;;IF NOT.  WAIT
041644  010037  001252                  MOV     R0,$MSGAD         ;;PUT ADDR IN MAILBOX
041650  105720                  2$      TSTB    (R0)+             ;;FIND END OF MESSAGE
041652  001376                          BNE     2$
041654  163700  001252                  SUB     $MSGAD,R0         ;;SUB START OF MESSAGE
041660  006200                          ASR     R0                ;;GET MESSAGE LNGTH IN WORDS
041662  010037  001254                  MOV     R0,$MSGLGT        ;;PUT LENGTH IN MAILBOX
041666  012737  000004  001236          MOV     #4,$MSGTYPE       ;;TELL APT TO TAKE MSG
041674  000413                          BR      5$
041676  017637  000004  041722  3$      MOV     @4(SP),4$         ;;PUT MSG ADDR IN JSR LINKAGE
041704  062766  000002  000004          ADD     #2,4(SP)                  ;;BUMP RETURN ADDRESS
041712  013746  177776                  MOV     177776,-(SP)      ;;PUSH 177776 ON STACK
041716  004737  041264                  JSR     PC,$TYPE          ;;CALL TYPE MACRO
041722  000000                  4$       WORD   0
041724                          5$
041724  105737  042012          10$     TSTB    $FFLG             ;;SHOULD REPORT FATAL ERROR?
041730  001416                          BEQ     12$               ;;IF NOT:  BR
041732  005737  001256                  TST     $ENV              ;;RUNNING UNDER APT?
041736  001413                          BEQ     12$               ;;IF NOT   BR
041740  005737  001236          11$     TST     $MSGTYPE          ;;FINISHED LAST MESSAGE?
041744  001375                          BNE     11$               ;;IF NOT:  WAIT
041746  017637  000004  001240          MOV     @4(SP),$FATAL     ;;GET ERROR #
041754  062766  000002  000004          ADD     #2,4(SP)                  ;;BUMP RETURN ADDR
041762  005237  001236                  INC     $MSGTYPE          ;;TELL APT TO TAKE ERROR
041766  105037  042012          12$     CLRB    $FFLG             ;;CLEAR FATAL FLAG
041772  105037  042011                  CLRB    $LFLG             ;;CLEAR LOG FLAG
041776  105037  042010                  CLRB    $MFLG             ;;CLEAR MESSAGE FLAG
042002  012601                          MOV     (SP)+,R1          ;;POP STACK INTO R1
042004  012600                          MOV     (SP)+,R0          ;;POP STACK INTO R0
042006  000207                          RTS     PC                ;;RETURN
042010     000                  $MFLG:   BYTE   0                 ;;MESSG  FLAG
042011     000                  $LFLG    BYTE   0                 ;;LOG FLAG
042012     000                  $FFLG.   BYTE   0                 ;;FATAL FLAG
           042014                           EVEN
           000200               APTSIZE=200
           000001               APTENV=001
           000100               APTSPOOL=100
           000040               APTCSUP=040
                                 SBTTL  TRAP DECODER

                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DES'RED ROUTINE  THEN USING THE ADDRESS OBTAINED IT WILL
```

```
                                        ;*GO TO THAT ROUTINE

042014  010046                          $TRAP   MOV     R0,-(SP)        ;,SAVE R0
042016  016600  000002                          MOV     2(SP),R0        ;;GET TRAP ADDRESS
042022  005740                                  TST     -(R0)           ;;BACKUP BY 2
042024  111000                                  MOVB    (R0),R0         ;,GET RIGHT BYTE OF TRAP
042026  006300                                  ASL     R0              ;;POSITION FOR INDEXING
042030  016000  042050                          MOV     $TRPAD(R0),R0   ;,INDEX TO TABLE
042034  000200                                  RTS     R0              ;,GO TO ROUTINE


                                        ,,THIS IS USE TO HANDLE THE "GETPRI" MACRO

042036  011646                          $TRAP2  MOV     (SP),-(SP)      ;,MOVE THE PC DOWN
042040  016666  000004  000002                  MOV     4(SP),2(SP)     ,,MOVE THE PSW DOWN
042046  000002                                  RTI                     ,,RESTORE THE PSW

                                         SBTTL  TRAP TABLE

                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ,*BY THE "TRAP" INSTRUCTION

                                        ,       ROUTINE
                                        ,       -------
042050  042036                          $TRPAD   WORD   $TRAP2
042052  041264                                  $TYPE   ,,CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
042054  040636                                  $TYPOC  ,;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
042056  040612                                  $TYPOS  ;,CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
042060  040652                                  $TYPON  ,,CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
042062  041040                                  $TYPDS  ,,CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)


042064  036574                                  TY.MSG  ,,CALL=TYPMSG   TRAP+6(104406)  TYPE ROUTINE WITH SW13 FOR INHIBIT
                                         SBTTL  POWER DOWN AND UP ROUTINES

                                        ,,*****************************************************************
                                        ,POWER DOWN ROUTINE
042066  012737  042246  000024          $PWRDN  MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
042074  012737  000340  000026                  MOV     #340,@#PWRVEC+2 ,;PRIO 7
042102  010046                                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
042104  010146                                  MOV     R1,-(SP)        ,,PUSH R1 ON STACK
042106  010246                                  MOV     R2,-(SP)        ,;PUSH R2 ON STACK
042110  010346                                  MOV     R3,-(SP)        ,,PUSH R3 ON STACK
042112  010446                                  MOV     R4,-(SP)        ,,PUSH R4 ON STACK
042114  010546                                  MOV     R5,-(SP)        ,,PUSH R5 ON STACK
042116  017746  137016                          MOV     @SWR,-(SP)      ;,PUSH @SWR ON STACK
042122  010637  042252                          MOV     SP,$SAVR6       ,,SAVE SP
042126  012737  042140  000024                  MOV     #$PWRUP,@#PWRVEC ,,SET UP VECTOR
042134  000000                                  HALT
042136  000776                                  BR       -2             ;,HANG UP

                                        ,,*****************************************************************
                                        ,POWER UP ROUTINE
042140  012737  042246  000024          $PWRUP  MOV     #$ILLUP,@#PWRVEC ,,SET FOR FAST DOWN
042146  013706  042252                          MOV     $SAVR6,SP       ,,GET SP
042152  005037  042252                          CLR     $SAVR6          ,,WAIT LOOP FOR THE TTY
```

```
042156  005237  042252          1$      INC     $SAVR6          ;,WAIT FOR THE INC
042162  001375                          BNE     1$              ;;OF  WORD
042164  011600                          MOV     (SP),R0         ;GET SAVED SWR OFF STACK
042166  076600  000226                  MED     ,226            ;AND RESTORE AS 'CNSL.SW'
042172  012737  003344  000114          MOV     #BADPAR,@#114   ;POINT PARITY-ERR-HNDLER AT GENERAL ROUTINE

042200  012677  136734                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
042204  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
042206  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
042210  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
042212  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
042214  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
042216  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
042220  012737  042066  000024          MOV     #$PWRDN,@#PWRVEC ,;SET UP THE POWER DOWN VECTOR
042226  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
042234  104401                          TYPE                    ;REPORT THE POWER FAILURE
042236  042254          $PWRMG:         WORD    $POWER          ,;POWER FAIL MESSAGE POINTER
042240  012716                          MOV     (PC)+,(SP)      ;,RESTART AT RESTART
042242  004006          $PWRAD          .WORD   RESTART         ,;RESTART ADDRESS
042244  000002                          RTI
042246  000000          $ILLUP:         HALT                    ,,THE POWER UP SEQUENCE WAS STARTED
042250  000776                          BR      -2              ,; BEFORE THE POWER DOWN WAS COMPLETE
042252  000000          $SAVR6          0                       ,,PUT THE SP HERE
042254  005015  047520  042527  $POWER  .ASCIZ  <15><12>"POWER"
042262  000122
                                        EVEN
```

```
                                                .SBTTL  MESSAGES

042264  040520  030122     000  MSG2:   .ASCIZ  "PAR0"
042271     120  051101  000061  MSG3:   .ASCIZ  "PAR1"
042276  040520  031122     000  MSG4:   .ASCIZ  "PAR2"
042303     120  051101  052111  MSG5:   .ASCIZ  "PARITY DISABLE"
042310  020131  044504  040523
042316  046102  000105
042322  051127  052111  020105  MSG6:   .ASCIZ  "WRITE WRONG PARITY"
042330  051127  047117  020107
042336  040520  044522  054524
042344     000
042345     127  044522  042524  MSG7    ASCIZ  "WRITE ENABLE"
042352  042440  040516  046102
042360  000105
042362  040520  044522  054524  MSG8    ASCIZ  "PARITY GENERATED"
042370  043440  047105  051105
042376  052101  042105     000
042403     102  052111  000070  MSG80:  .ASCIZ  "BIT8"
042410  044502  034524     000  MSG81:  .ASCIZ  "BIT9"
042415     102  052111  030061  MSG82:  .ASCIZ  "BIT10"
042422     000
042423     102  052111  030461  MSG83:  .ASCIZ  "BIT11"
042430     000
042431     102  052111  031061  MSG84.  .ASCIZ  "BIT12"
042436     000
042437     102  052111  031461  MSG85   .ASCIZ  "BIT13"
042444     000
042445     102  052111  032061  MSG86:  .ASCIZ  "BIT14"
042452     000
042453     120  051101  052111  MSG9    .ASCIZ  "PARITY ERROR"
042460  020131  051105  047522
042466  000122
042470  047040  052117  041440  MSG10   ASCIZ  " NOT CLEAR"<CR><LF>
042476  042514  051101  005015
042504     000
042505     040  047516  020124  MSG11.  .ASCIZ  " NOT SET"<CR><LF>
042512  042523  006524  000012
042520  005015  047125  054105  MSG12   .ASCIZ  <CR><LF>"UNEXPECTED PARITY EPROR"
042526  042520  052103  042105
042534  050040  051101  052111
042542  020131  051105  047522
042550  000122
042552  005015  047125  054105  MSG13:  .ASCIZ  <CR><LF>"UNEXPECTED CPU EPPOR TPAP, CPUERR="
042560  042520  052103  042105
042566  041440  052520  042440
042574  051122  051117  052040
042602  040522  026120  041440
042610  052520  051105  036522
042616     000
042617     015  044412  046114  MSG14   .ASCIZ  <CR><LF>"ILLEGAL INSTRUCTION TRAP"
042624  043505  046101  044440
042632  051516  051124  041525
042640  044524  047117  052040
042646  040522  000120
042652  052040  051505  020124  MSG17    ASCIZ  " TEST ABORTED"
```

```
042660  041101  051117  042524
042666  000104
042670  051440  043505  042515  MSG20.  .ASCII  " SEGMENT "
042676  052116     040
042701     106  052501  052114  MSG21:  .ASCII  "FAULTY ADDRESS LINE "
042706  020131  042101  051104
042714  051505  020123  044514
042722  042516     072
042725     040  047506  020122  MSG22.   ASCIZ  " FOR DATA ARRAY <11:00>"<CR><LF>
042732  040504  040524  040440
042740  051122  054501  036040
042746  030461  030072  037060
042754  005015     000
042757     015  040412  042116  MSG23.   ASCIZ  <CR><LF>"AND="
042764  000075
042766  005015  051117  000075  MSG24    ASCIZ  <CR><LF>"OR="
042774  043040  051117  042040  MSG25    ASCIZ  " FOR DATA ARRAY <23:12>"<CR><LF>
043002  052101  020101  051101
043010  040522  020131  031074
043016  035063  031061  006476
043024  000012
043026  043040  051117  042040  MSG26    ASCIZ  " FOR DATA ARRAY <35:24>"<CR><LF>
043034  052101  020101  051101
043042  040522  020131  031474
043050  035065  032062  006476
043056  000012
043060  043040  051117  042040  MSG27    ASCIZ  " FOR DATA ARRAY <47:36>"<CR><LF>
043066  052101  020101  051101
043074  040522  020131  032074
043102  035067  033063  006476
043110  000012
043112  005015  051120  043517  MSG28    ASCIZ  <CR><LF>"PROGRAM ABORTED"
043120  040522  020115  041101
043126  051117  042524  000104
043134  005015  047125  054105  MSG29    ASCIZ  <CR><LF>"UNEXPECTED WCS PARITY ERROR"
043142  042520  052103  042105
043150  053440  051503  050040
043156  051101  052111  020131
043164  051105  047522  000122
043172  005015  047125  054105  MSG30   .ASCIZ  <CR><LF>"UNEXPECTED MEMORY PARITY ERROR"
043200  042520  052103  042105
043206  046440  046505  051117
043214  020131  040520  044522
043222  054524  042440  051122
043230  051117     000
043233     040  041520  000075  MSG31   .ASCIZ  " PC="


                                          SBTTL ERROR MESSAGES

043240  044524  042515  052517  EM1     .ASCIZ  "TIMEOUT ON REFERENCING WCS REGISTER"
043246  020124  047117  051040
043254  043105  051105  047105
043262  044503  043516  053440
043270  051503  051040  043505
043276  051511  042524  000122
```

```
10985  043304  053447  051503  050040  EM2.     ASCIZ  "'WCS PRESENT' BIT NOT SET IN WHAMI"
10986  043312  042522  042523  052116
10987  043320  020047  044502  020124
10988  043326  047516  020124  042523
10989  043334  020124  047111  053440
10990  043342  040510  044515     000
10991  043347     047  051127  052111  EM3      ASCIZ  "'WRITE ENABLE' BIT NOT SET"
10992  043354  020105  047105  041101
10993  043362  042514  020047  044502
10994  043370  020124  047516  020124
10995  043376  042523  000124
10996  043402  050047  051101  052111  EM4      ASCIZ  "'PARITY DISABLE' BIT NOT CLEAR"
10997  043410  020131  044504  040523
10998  043416  046102  023505  041040
10999  043424  052111  047040  052117
11000  043432  041440  042514  051101
11001  043440     000
11002  043441     047  051127  052111  EM5      ASCIZ  "'WRITE WRONG PARITY' BIT NOT CLEAR"
11003  043446  020105  051127  047117
11004  043454  020107  040520  044522
11005  043462  054524  020047  044502
11006  043470  020124  047516  020124
11007  043476  046103  040505  000122
11008  043504  050047  051101  052111  EM6      ASCIZ  "'PARITY DISABLE' BIT NOT SET"
11009  043512  020131  044504  040523
11010  043520  046102  023505  041040
11011  043526  052111  047040  052117
11012  043534  051440  052105     000
11013  043541     047  040520  044522  EM7      ASCIZ  "'PARITY ERROR' NOT CLEAR"
11014  043546  054524  042440  051122
11015  043554  051117  020047  047516
11016  043562  020124  046103  040505
11017  043570  000122
11018  043572  053447  044522  042524  EM10     ASCIZ  "'WRITE WRONG PARITY' BIT NOT SET"
11019  043600  053440  047522  043516
11020  043606  050040  051101  052111
11021  043614  023531  041040  052111
11022  043622  047040  052117  051440
11023  043630  052105     000
11024  043633     123  040524  052524  EM11     ASCIZ  "STATUS ERROR ON WRITE TO WCS LOCATION"
11025  043640  020123  051105  047522
11026  043646  020122  047117  053440
11027  043654  044522  042524  052040
11028  043662  020117  041527  020123
11029  043670  047514  040503  044524
11030  043676  047117     000
11031  043701     104  052101  020101  EM12     ASCIZ  "DATA ERROR ON READ FROM WCS LOCATION"
11032  043706  051105  047522  020122
11033  043714  047117  051040  040505
11034  043722  020104  051106  046517
11035  043730  053440  051503  046040
11036  043736  041517  052101  047511
11037  043744  000116
11038  043746  052123  052101  051525  EM13     ASCIZ  "STATUS ERROR ON READ FROM WCS LOCATION"
11039  043754  042440  051122  051117
11040  043762  047440  020116  042522
```

```
11041  043770  042101  043040  047522
11042  043776  020115  041527  020123
11043  044004  047514  040503  044524
11044  044012  047117     000
11045  044015     124  040522  020120  EM14    .ASCIZ  "TRAP AT LOCATION"
11046  044022  052101  046040  041517
11047  044030  052101  047511  000116
11048  044036  047111  047503  051122  EM15     ASCIZ  "INCORRECT PARITY BIT GENERATED FOR PATTERN"
11049  044044  041505  020124  040520
11050  044052  044522  054524  041040
11051  044060  052111  043440  047105
11052  044066  051105  052101  042105
11053  044074  043040  051117  050040
11054  044102  052101  042524  047122
11055  044110     000
11056  044111     111  041516  051117  EM16     ASCIZ  "INCORRECT PARITY BIT GENERATED-BIT7-(WITH WWP) FOR PATTERN"
11057  044116  042522  052103  050040
11058  044124  051101  052111  020131
11059  044132  044502  020124  042507
11060  044140  042516  040522  042524
11061  044146  026504  044502  033524
11062  044154  024055  044527  044124
11063  044162  053440  050127  020051
11064  044170  047506  020122  040520
11065  044176  052124  051105  000116
11066  044204  047125  054105  042520  EM17     ASCIZ  "UNEXPECTED PARITY TRAP ON READING BAD PARITY THOUGH 'PARDIS' WAS SET"
11067  044212  052103  042105  050040
11068  044220  051101  052111  020131
11069  044226  051124  050101  047440
11070  044234  020116  042522  042101
11071  044242  047111  020107  040502
11072  044250  020104  040520  044522
11073  044256  054524  052040  047510
11074  044264  043525  020110  050047
11075  044272  051101  044504  023523
11076  044300  053440  051501  051440
11077  044306  052105     000
11078  044311     047  040520  044522  EM20     ASCIZ  "'PARITY ERROR' DID NOT SET ON PARITY EPROR TRAP"
11079  044316  054524  042440  051122
11080  044324  051117  020047  044504
11081  044332  020104  047516  020124
11082  044340  042523  020124  047117
11083  044346  050040  051101  052111
11084  044354  020131  051105  047522
11085  044362  020122  051124  050101
11086  044370     000
11087  044371     111  041516  051117  EM21     ASCIZ  "INCORRECT PARITY BIT STORED"
11088  044376  042522  052103  050040
11089  044404  051101  052111  020131
11090  044412  044502  020124  052123
11091  044420  051117  042105     000
11092  044425     116  020117  040520  EM22     ASCIZ  "NO PARITY ERROR TRAP ON PEADING WRONG PARITY"
11093  044432  044522  054524  042440
11094  044440  051122  051117  052040
11095  044446  040522  020120  047117
11096  044454  051040  040505  044504
```

```
11097  044462  043516  053440  047522
11098  044470  043516  050040  051101
11099  044476  052111  000131
11100  044502  050047  051101  052111  EM23:    ASCIZ  "'PARITY ERROR' BIT NOT SET ON READING BAD PARITY"
11101  044510  020131  051105  047522
11102  044516  023522  041040  052111
11103  044524  047040  052117  051440
11104  044532  052105  047440  020116
11105  044540  042522  042101  047111
11106  044546  020107  040502  020104
11107  044554  040520  044522  054524
11108  044562     000
11109  044563     123  052105  044524  EM24     ASCIZ  "SETTING 'PARDIS' DID NOT CLEAR 'PARERR'"
11110  044570  043516  023440  040520
11111  044576  042122  051511  020047
11112  044604  044504  020104  047516
11113  044612  020124  046103  040505
11114  044620  020122  050047  051101
11115  044626  051105  023522     000
11116  044633     102  042101  050040  EM25     ASCIZ  "BAD PARITY NOT DETECTED BY CHECKER"
11117  044640  051101  052111  020131
11118  044646  047516  020124  042504
11119  044654  042524  052103  042105
11120  044662  041040  020131  044103
11121  044670  041505  042513  000122
11122  044676  040520  044522  054524  EM26     ASCIZ  "PARITY ERROR ON READING WCS"
11123  044704  042440  051122  051117
11124  044712  047440  020116  042522
11125  044720  042101  047111  020107
11126  044726  041527  000123
11127  044732  051124  050101  040440  EM27     ASCIZ  "TRAP AT LOCATION, ON DOING READ"
11128  044740  020124  047514  040503
11129  044746  044524  047117  020054
11130  044754  047117  042040  044517
11131  044762  043516  051040  040505
11132  044770  000104
11133  044772  047503  051122  041505  EM30     ASCIZ  "CORRECT XFC-CODE WAS NOT SAVED AFTER 'OTHER USER' DISPATCH OF XFC"
11134  045000  020124  043130  026503
11135  045006  047503  042504  053440
11136  045014  051501  047040  052117
11137  045022  051440  053101  042105
11138  045030  040440  052106  051105
11139  045036  023440  052117  042510
11140  045044  020122  051525  051105
11141  045052  020047  044504  050123
11142  045060  052101  044103  047440
11143  045066  020106  043130  000103
11144  045074  040527  041524  026510  EM31     ASCIZ  "WATCH-DOG TIMED OUT AFTER 'OTHER USER' DISPATCH OF XFC"
11145  045102  047504  020107  044524
11146  045110  042515  020104  052517
11147  045116  020124  043101  042524
11148  045124  020122  047447  044124
11149  045132  051105  052440  042523
11150  045140  023522  042040  051511
11151  045146  040520  041524  020110
11152  045154  043117  054040  041506
```

```
045162     000
045163     103  051117  042522  EM32:   .ASCIZ  "CORRECT XFC-CODE WAS NOT SAVED AFTER 'USER' DISPATCH OF XFC"
045170  052103  054040  041506
045176  041455  042117  020105
045204  040527  020123  047516
045212  020124  040523  042526
045220  020104  043101  042524
045226  020122  052447  042523
045234  023522  042040  051511
045242  040520  041524  020110
045250  043117  054040  041506
045256     000
045257     127  052101  044103  EM33    ASCIZ  "WATCH-DOG TIMED OUT AFTER 'USER' DISPATCH OF XFC"
045264  042055  043517  052040
045272  046511  042105  047440
045300  052125  040440  052106
045306  051105  023440  051525
045314  051105  020047  044504
045322  050123  052101  044103
045330  047440  020106  043130
045336  000103
045340  046106  043501  047040  EM34    ASC Z  "FLAG NOT =1 AFTER ENTERING WCS VIA 'ODD PC' DISPATCH"
045346  052117  036440  020061
045354  043101  042524  020122
045362  047105  042524  044522
045370  043516  053440  051503
045376  053040  040511  023440
045404  042117  020104  041520
045412  020047  044504  050123
045420  052101  044103     000
045425     127  052101  044103  EM35    ASCIZ  "WATCH-DOG TIMED OUT AFTER 'ODD PC' DISPATCH TO WCS"
045432  042055  043517  052040
045440  046511  042105  047440
045446  052125  040440  052106
045454  051105  023440  042117
045462  020104  041520  020047
045470  044504  050123  052101
045476  044103  052040  020117
045504  041527  000123
045510  046106  043501  047040  EM36.    ASCIZ  "FLAG NOT =1 AFTER ENTERING WCS VIA 'MICRO-BREAK' DISPATCH"
045516  052117  036440  020061
045524  043101  042524  020122
045532  047105  042524  044522
045540  043516  053440  051503
045546  053040  040511  023440
045554  044515  051103  026517
045562  051102  040505  023513
045570  042040  051511  040520
045576  041524  000110
045602  040527  041524  026510  EM37   .ASCIZ  "WATCH-DOG TIMED OUT AFTER 'MICRO-BREAK' DISPATCH TO WCS"
045610  047504  020107  044524
045616  042515  020104  052517
045624  020124  043101  042524
045632  020122  046447  041511
045640  047522  041055  042522
045646  045501  020047  044504
```

```
11209  045654  050123  052101  044103
11210  045662  052040  020117  041527
11211  045670  000123
11212  045672  047503  051122  041505  EM40:    ASCIZ  "CORRECT DATA NOT STORED ON BLOCK MOVE OF GR'S TO WCS"
11213  045700  020124  040504  040524
11214  045706  047040  052117  051440
11215  045714  047524  042522  020104
11216  045722  047117  041040  047514
11217  045730  045503  046440  053117
11218  045736  020105  043117  043440
11219  045744  023522  020123  047524
11220  045752  053440  051503     000
11221  045757     127  052101  044103  EM41    .ASCIZ  "WATCH-DOG TIMED OUT ON STORING GP'S IN WCS"
11222  045764  042055  043517  052040
11223  045772  046511  042105  047440
11224  046000  052125  047440  020116
11225  046006  052123  051117  047111
11226  046014  020107  051107  051447
11227  046022  044440  020116  041527
11228  046030  000123
11229  046032  047503  051122  041505  EM42     ASCIZ  "CORRECT DATA NOT STORED ON LOAD OF GR S FROM WCS"
11230  046040  020124  040504  040524
11231  046046  047040  052117  051440
11232  046054  047524  042522  020104
11233  046062  047117  046040  040517
11234  046070  020104  043117  043440
11235  046076  023522  020123  051106
11236  046104  046517  053440  051503
11237  046112     000
11238  046113     127  052101  044103  EM43     ASCIZ  "WATCH-DOG TIMED OUT ON LOADING OF GR'S FROM WCS"
11239  046120  042055  043517  052040
11240  046126  046511  042105  047440
11241  046134  052125  047440  020116
11242  046142  047514  042101  047111
11243  046150  020107  043117  043440
11244  046156  023522  020123  051106
11245  046164  046517  053440  051503
11246  046172     000
11247  046173     103  051117  042522  EM44    .ASCIZ  "CORRECT RESERVED INST. CODE NOT SAVED AFTER 'RESVD INSTR' DISPATCH TO W
                                                                                                                          CS"
11248  046200  052103  051040  051505
11249  046206  051105  042526  020104
11250  046214  047111  052123  020056
11251  046222  047503  042504  047040
11252  046230  052117  051440  053101
11253  046236  042105  040440  052106
11254  046244  051105  023440  042522
11255  046252  053123  020104  047111
11256  046260  052123  023522  042040
11257  046266  051511  040520  041524
11258  046274  020110  047524  053440
11259  046302  051503     000
11260  046305     127  052101  044103  EM45     ASCIZ  "WATCH-DOG TIMED OUT AFTER 'RESVD INST' DISPATCH TO WCS"
11261  046312  042055  043517  052040
11262  046320  046511  042105  047440
11263  046326  052125  040440  052106
```

```
11264  046334  051105  023440  042522
11265  046342  053123  020104  047111
11266  046350  052123  020047  044504
11267  046356  050123  052101  044103
11268  046364  052040  020117  041527
11269  046372  000123
11270  046374  047503  051122  041505  EM46    ASCIZ  "CORRECT DATA WAS NOT STORED ON BLOCK MOVE OF WFP REGISTERS TO WCS"
11271  046402  020124  040504  040524
11272  046410  053440  051501  047040
11273  046416  052117  051440  047524
11274  046424  042522  020104  047117
11275  046432  041040  047514  045503
11276  046440  046440  053117  020105
11277  046446  043117  053440  050106
11278  046454  051040  043505  051511
11279  046462  042524  051522  052040
11280  046470  020117  041527  000123
11281  046476  040527  041524  026510  EM47    ASCIZ  "WATCH-DOG TIMED OUT ON BLOCK MOVE OF WFP REGISTERS TO WCS"
11282  046504  047504  020107  044524
11283  046512  042515  020104  052517
11284  046520  020124  047117  041040
11285  046526  047514  045503  046440
11286  046534  053117  020105  043117
11287  046542  053440  050106  051040
11288  046550  043505  051511  042524
11289  046556  051522  052040  020117
11290  046564  041527  000123
11291  046570  047503  051122  041505  EM50    ASCIZ  "CORRECT DATA WAS NOT STORED ON BLOCK MOVE TO WFP REGISTERS FROM WCS"
11292  046576  020124  040504  040524
11293  046604  053440  051501  047040
11294  046612  052117  051440  047524
11295  046620  042522  020104  047117
11296  046626  041040  047514  045503
11297  046634  046440  053117  020105
11298  046642  047524  053440  050106
11299  046650  051040  043505  051511
11300  046656  042524  051522  043040
11301  046664  047522  020115  041527
11302  046672  000123
11303  046674  040527  041524  026510  EM51    ASCIZ  "WATCH-DOG TIMED OUT ON BLOCK MOVE FROM WCS TO CSP"
11304  046702  047504  020107  044524
11305  046710  042515  020104  052517
11306  046716  020124  047117  041040
11307  046724  047514  045503  046440
11308  046732  053117  020105  051106
11309  046740  046517  053440  051503
11310  046746  052040  020117  051503
11311  046754  000120
11312  046756  047503  051122  041505  EM52    ASCIZ  "CORRECT DATA WAS NOT STORED ON BLOCK MOVE OF CSP REGISTERS TO WCS"
11313  046764  020124  040504  040524
11314  046772  053440  051501  047040
11315  047000  052117  051440  047524
11316  047006  042522  020104  047117
11317  047014  041040  047514  045503
11318  047022  046440  053117  020105
11319  047030  043117  041440  050123
```

```
11320  047036  051040  043505  051511
11321  047044  042524  051522  052040
11322  047052  020117  041527  000123
11323  047060  040527  041524  026510  EM53:   .ASCIZ  "WATCH-DOG TIMED OUT ON BLOCK MOVE OF CSP REGISTERS TO WCS"
11324  047066  047504  020107  044524
11325  047074  042515  020104  052517
11326  047102  020124  047117  041040
11327  047110  047514  045503  046440
11328  047116  053117  020105  043117
11329  047124  041440  050123  051040
11330  047132  043505  051511  042524
11331  047140  051522  052040  020117
11332  047146  041527  000123
11333  047152  047503  051122  041505  EM54:   .ASCIZ  "CORRECT DATA WAS NOT STORED ON BLOCK MOVE FROM WCS TO CSP"
11334  047160  020124  040504  040524
11335  047166  053440  051501  047040
11336  047174  052117  051440  047524
11337  047202  042522  020104  047117
11338  047210  041040  047514  045503
11339  047216  046440  053117  020105
11340  047224  051106  046517  053440
11341  047232  051503  052040  020117
11342  047240  051503  000120
11343  047244  040527  041524  026510  EM55     ASCIZ  "WATCH-DOG TIMED OUT ON BLOCK MOVE OF CSP REGISTERS TO WCS"
11344  047252  047504  020107  044524
11345  047260  042515  020104  052517
11346  047266  020124  047117  041040
11347  047274  047514  045503  046440
11348  047302  053117  020105  043117
11349  047310  041440  050123  051040
11350  047316  043505  051511  042524
11351  047324  051522  052040  020117
11352  047332  041527  000123
11353  047336  047503  051122  041505  EM56     ASCIZ  "CORRECT DATA WAS NOT STORED ON BLOCK MOVE OF WCS-USER-REG'S TO WCS"
11354  047344  020124  040504  040524
11355  047352  053440  051501  047040
11356  047360  052117  051440  047524
11357  047366  042522  020104  047117
11358  047374  041040  047514  045503
11359  047402  046440  053117  020105
11360  047410  043117  053440  051503
11361  047416  052455  042523  026522
11362  047424  042522  023507  020123
11363  047432  047524  053440  051503
11364  047440     000
11365  047441     127  052101  044103  EM57     ASCIZ  "WATCH DOG TIMED OUT ON BLOCK MOVE OF WCS-USER-REG'S TO WCS"
11366  047446  042040  043517  052040
11367  047454  046511  042105  047440
11368  047462  052125  047440  020116
11369  047470  046102  041517  020113
11370  047476  047515  042526  047440
11371  047504  020106  041527  026523
11372  047512  051525  051105  051055
11373  047520  043505  051447  052040
11374  047526  020117  041527  000123
11375  047534  047503  051122  041505  EM60     ASCIZ  "CORRECT DATA WAS NOT LOADED ON BLOCK MOVE FROM WCS TO WCS-USER-REG'S"
```

```
11376  047542  020124  040504  040524
11377  047550  053440  051501  047040
11378  047556  052117  046040  040517
11379  047564  042504  020104  047117
11380  047572  041040  047514  045503
11381  047600  046440  053117  020105
11382  047606  051106  046517  053440
11383  047614  051503  052040  020117
11384  047622  041527  026523  051525
11385  047630  051105  051055  043505
11386  047636  051447     000
11387  047641     127  052101  044103  EM61    ASCIZ  "WATCH DOG TIMED OUT ON BLOCK MOVE FROM WCS TO WCS-USER-REG'S"
11388  047646  042040  043517  052040
11389  047654  046511  042105  047440
11390  047662  052125  047440  020116
11391  047670  046102  041517  020113
11392  047676  047515  042526  043040
11393  047704  047522  020115  041527
11394  047712  020123  047524  053440
11395  047720  051503  052455  042523
11396  047726  026522  042522  023507
11397  047734  000123
11398  047736  042117  026504  041520  EM62    ASCIZ  "ODD-PC TRAP INSTEAD OF ODD-PC DISPATCH TO WCS"
11399  047744  052040  040522  020120
11400  047752  047111  052123  040505
11401  047760  020104  043117  047440
11402  047766  042104  050055  020103
11403  047774  044504  050123  052101
11404  050002  044103  052040  020117
11405  050010  041527  000123
11406  050014  042522  051123  042126  EM63    ASCIZ  "RESRVD  INSTR  TRAP INSTEAD OF RSRVD  INST  DISPATCH TO WCS"
11407  050022  020056  047111  052123
11408  050030  027122  052040  040522
11409  050036  020120  047111  052123
11410  050044  040505  020104  043117
11411  050052  051040  051123  042126
11412  050060  020056  047111  052123
11413  050066  020056  044504  050123
11414  050074  052101  044103  052040
11415  050102  020117  041527  000123
11416  050110  041527  020123  040527  EM64    ASCIZ  "WCS WATCH DOG TIMER DID NOT TIME OUT"
11417  050116  041524  020110  047504
11418  050124  020107  044524  042515
11419  050132  020122  044504  020104
11420  050140  047516  020124  044524
11421  050146  042515  047440  052125
11422  050154     000
11423  050155     127  051503  053440  EM65    ASCIZ  "WCS WATCH DOG TIMER NOT WITHIN ACCEPTED RANGE"
11424  050162  052101  044103  042040
11425  050170  043517  052040  046511
11426  050176  051105  047040  052117
11427  050204  053440  052111  044510
11428  050212  020116  041501  042503
11429  050220  052120  042105  051040
11430  050226  047101  042507     000
11431  050233     130  041506  047440  EM66    ASCIZ  "XFC OPCODE DID NOT TRAP AS RESVD  INSTR  WHEN WCS WAS DISABLED"
```

```
11432  050240  041520  042117  020105
11433  050246  044504  020104  047516
11434  050254  020124  051124  050101
11435  050262  040440  020123  042522
11436  050270  053123  027104  044440
11437  050276  051516  051124  020056
11438  050304  044127  047105  053440
11439  050312  051503  053440  051501
11440  050320  042040  051511  041101
11441  050326  042514  000104
11442  050332  041527  026523  047111  EM67    ASCIZ  "WCS-INIT DID NOT CLEAR BAD PARITY IN WCS LOC "
11443  050340  052111  042040  042111
11444  050346  047040  052117  041440
11445  050354  042514  051101  041040
11446  050362  042101  050040  051101
11447  050370  052111  020131  047111
11448  050376  053440  051503  046040
11449  050404  041517  000056
11450  050410  044515  051103  026517  EM70    ASCIZ  "MICRO-WORD LOADED WRONGLY IN WCS AT LOC"
11451  050416  047527  042122  046040
11452  050424  040517  042504  020104
11453  050432  051127  047117  046107
11454  050440  020131  047111  053440
11455  050446  051503  040440  020124
11456  050454  047514  000103
11457  050460  051127  047117  020107  EM71    ASCIZ  "WRONG PARITY BIT-PARO-(BIT 1 IN STATUS) READ FROM WCS LOC"
11458  050466  040520  044522  054524
11459  050474  041040  052111  050055
11460  050502  051101  026460  041050
11461  050510  052111  030440  044440
11462  050516  020116  052123  052101
11463  050524  051525  020051  042522
11464  050532  042101  043040  047522
11465  050540  020115  041527  020123
11466  050546  047514  000103
11467  050552  051127  047117  020107  EM72    ASCIZ  "WRONG PARITY BIT-PAR1-(BIT 2 IN STATUS) READ FROM WCS LOC"
11468  050560  040520  044522  054524
11469  050566  041040  052111  050055
11470  050574  051101  026461  041050
11471  050602  052111  031040  044440
11472  050610  020116  052123  052101
11473  050616  051525  020051  042522
11474  050624  042101  043040  047522
11475  050632  020115  041527  020123
11476  050640  047514  000103
11477  050644  051127  047117  020107  EM73    ASCIZ  "WRONG PARITY BIT-PAR2-(BIT 3 IN STATUS) READ FROM WCS LOC"
11478  050652  040520  044522  054524
11479  050660  041040  052111  050055
11480  050666  051101  026462  041050
11481  050674  052111  031440  044440
11482  050702  020116  052123  052101
11483  050710  051525  020051  042522
11484  050716  042101  043040  047522
11485  050724  020115  041527  020123
11486  050732  047514  000103
11487  050736  046106  043501  047040  EM74    ASCIZ  "FLAG NOT =2 AFTER ENTERING WCS VIA 'FLAG ~ -SWC' DISPATCH"
```

```
11488  050744  052117  036440  020062
11489  050752  043101  042524  020122
11490  050760  047105  042524  044522
11491  050766  043516  053440  051503
11492  050774  053040  040511  023440
11493  051002  046106  043501  033474
11494  051010  026476  053123  023503
11495  051016  042040  051511  040520
11496  051024  041524  000110
11497  051030  040527  041524  026510  EM75     ASCIZ  "WATCH-DOG TIMED OUT AFTER 'FLAG<7>-SVC' DISPATCH TO WCS"
11498  051036  047504  020107  044524
11499  051044  042515  020104  052517
11500  051052  020124  043101  042524
11501  051060  020122  043047  040514
11502  051066  036107  037067  051455
11503  051074  041526  020047  044504
11504  051102  050123  052101  044103
11505  051110  052040  020117  041527
11506  051116  000123
11507  051120  047111  047503  051122  EM76     ASCIZ  "INCORPECT DATA STORED DURING 'LOAD WRITE 2' TMS FUNCTION"
11508  051126  041505  020124  040504
11509  051134  040524  051440  047524
11510  051142  042522  020104  052504
11511  051150  044522  043516  023440
11512  051156  047514  042101  053440
11513  051164  044522  042524  031040
11514  051172  020047  046524  020123
11515  051200  052506  041516  044524
11516  051206  047117     000
11517  051211     127  052101  044103  EM77     ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD WRITE 2' TMS FUNCTION"
11518  051216  042055  043517  052040
11519  051224  046511  047505  052125
11520  051232  042040  051125  047111
11521  051240  020107  046047  040517
11522  051246  020104  051127  052111
11523  051254  020105  023462  052040
11524  051262  051515  043040  047125
11525  051270  052103  047511  000116
11526  051276  047111  047503  051122  EM100    ASCIZ  "INCORPECT DATA STORED DURING 'LOAD READ 2' TMS FUNCTION"
11527  051304  041505  020124  040504
11528  051312  040524  051440  047524
11529  051320  042522  020104  052504
11530  051326  044522  043516  023440
11531  051334  047514  042101  051040
11532  051342  040505  020104  023462
11533  051350  052040  051515  043040
11534  051356  047125  052103  047511
11535  051364  000116
11536  051366  040527  041524  026510  EM101    ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD READ 2' TMS FUNCTION"
11537  051374  047504  020107  044524
11538  051402  042515  052517  020124
11539  051410  052504  044522  043516
11540  051416  023440  047514  042101
11541  051424  051040  040505  020104
11542  051432  023462  052040  051515
11543  051440  043040  047125  052103
```

```
11544  051446  047511  000116
11545  051452  047111  047503  051122  EM102   ASCIZ  "INCORRECT DATA STORED DURING 'SET STORE / WRITE 2' TMS FUNCTION"
11546  051460  041505  020124  040504
11547  051466  040524  051440  047524
11548  051474  042522  020104  052504
11549  051502  044522  043516  023440
11550  051510  042523  020124  052123
11551  051516  051117  020105  020057
11552  051524  051127  052111  020105
11553  051532  023462  052040  051515
11554  051540  043040  047125  052103
11555  051546  047511  000116
11556  051552  040527  041524  026510  EM103   ASCIZ  "WATCH-DOG TIMEOUT DURING  SET STORE / WRITE 2' TMS FUNCTION'
11557  051560  047504  020107  044524
11558  051566  042515  052517  020124
11559  051574  052504  044522  043516
11560  051602  023440  042523  020124
11561  051610  052123  051117  020105
11562  051616  020057  051127  052111
11563  051624  020105  023462  052040
11564  051632  051515  043040  047125
11565  051640  052103  047511  000116
11566  051646  047111  047503  051122  EM104   ASCIZ  "INCORRECT DATA STORED DURING 'SET LOAD / INC READ 2' TMS FUNCTION"
11567  051654  041505  020124  040504
11568  051662  040524  051440  047524
11569  051670  042522  020104  052504
11570  051676  044522  043516  023440
11571  051704  042523  020124  047514
11572  051712  042101  027440  044440
11573  051720  041516  051040  040505
11574  051726  020104  023462  052040
11575  051734  051515  043040  047125
11576  051742  052103  047511  000116
11577  051750  040527  041524  026510  EM105   ASCIZ  "WATCH-DOG TIMEOUT DURING 'SET LOAD  INC READ 2' TMS FUNCTION"
11578  051756  047504  020107  044524
11579  051764  042515  052517  020124
11580  051772  052504  044522  043516
11581  052000  023440  042523  020124
11582  052006  047514  042101  027440
11583  052014  044440  041516  051040
11584  052022  040505  020104  023462
11585  052030  052040  051515  043040
11586  052036  047125  052103  047511
11587  052044  000116
11588  052046  047111  047503  051122  EM106   ASCIZ  "INCORRECT DATA STORED DURING 'WRITE INDIRECT' TMS FUNCTION"
11589  052054  041505  020124  040504
11590  052062  040524  051440  047524
11591  052070  042522  020104  052504
11592  052076  044522  043516  023440
11593  052104  051127  052111  020105
11594  052112  047111  044504  042522
11595  052120  052103  020047  046524
11596  052126  020123  052506  041516
11597  052134  044524  047117     000
11598  052141     127  052101  044103  EM107   ASCIZ  "WATCH-DOG TIMEOUT DURING 'WRITE-INDIRECT' TMS FUNCTION"
11599  052146  042055  043517  052040
```

```
11600  052154  046511  047505  052125
11601  052162  042040  051125  047111
11602  052170  020107  053447  044522
11603  052176  042524  044455  042116
11604  052204  051111  041505  023524
11605  052212  052040  051515  043040
11606  052220  047125  052103  047511
11607  052226  000116
11608  052230  047111  047503  051122  EM110    ASCIZ  "INCORRECT DATA STORED DURING 'READ-INDIRECT  TMS FUNCTION"
11609  052236  041505  020124  040504
11610  052244  040524  051440  047524
11611  052252  042522  020104  052504
11612  052260  044522  043516  023440
11613  052266  042522  042101  044455
11614  052274  042116  051111  041505
11615  052302  023524  052040  051515
11616  052310  043040  047125  052103
11617  052316  047511  000116
11618  052322  040527  041524  026510  EM111    ASCIZ  "WATCH-DOG TIMEOUT DURING 'READ-INDIRECT' TMS FUNCTION"
11619  052330  047504  020107  044524
11620  052336  042515  052517  020124
11621  052344  052504  044522  043516
11622  052352  023440  042522  042101
11623  052360  044455  042116  051111
11624  052366  041505  023524  052040
11625  052374  051515  043040  047125
11626  052402  052103  047511  000116
11627  052410  047111  047503  051122  EM112    ASCIZ  "INCORRECT DATA STORED DURING 'STORE WFP<0 1>' TMS FUNCTION"
11628  052416  041505  020124  040504
11629  052424  040524  051440  047524
11630  052432  042522  020104  052504
11631  052440  044522  043516  023440
11632  052446  052123  051117  020105
11633  052454  043127  036120  035060
11634  052462  037061  020047  046524
11635  052470  020123  052506  041516
11636  052476  044524  047117     000
11637  052503     127  052101  044103  EM113    ASCIZ  "WATCH-DOG TIMEOUT DURING 'STORE WFP 0 1 ' TMS FUNCTION"
11638  052510  042055  043517  052040
11639  052516  046511  047505  052125
11640  052524  042040  051125  047111
11641  052532  020107  051447  047524
11642  052540  042522  053440  050106
11643  052546  030074  030472  023476
11644  052554  052040  051515  043040
11645  052562  047125  052103  047511
11646  052570  000116
11647  052572  047111  047503  051122  EM114    ASCIZ  "INCORRECT DATA STORED DURING  STORE WFP 2 3>' TMS FUNCTION"
11648  052600  041505  020124  040504
11649  052606  040524  051440  047524
11650  052614  042522  020104  052504
11651  052622  044522  043516  023440
11652  052630  052123  051117  020105
11653  052636  043127  036120  035062
11654  052644  037063  020047  046524
11655  052652  020123  052506  041516
```

```
11656  052660  044524  047117     000
11657  052665     127  052101  044103  EM115   ASCIZ  "WATCH-DOG TIMEOUT DURING 'STORE WFP<2 3>' TMS FUNCTION"
11658  052672  042055  043517  052040
11659  052700  046511  047505  052125
11660  052706  042040  051125  047111
11661  052714  020107  051447  047524
11662  052722  042522  053440  050106
11663  052730  031074  031472  023476
11664  052736  052040  051515  043040
11665  052744  047125  052103  047511
11666  052752  000116
11667  052754  047111  047503  051122  EM116   ASCIZ  "INCORRECT DATA STORED DURING 'STORE WFP<4 5>' TMS FUNCTION"
11668  052762  041505  020124  040504
11669  052770  040524  051440  047524
11670  052776  042522  020104  052504
11671  053004  044522  043516  023440
11672  053012  052123  051117  020105
11673  053020  043127  036120  035064
11674  053026  037065  020047  046524
11675  053034  020123  052506  041516
11676  053042  044524  047117     000
11677  053047     127  052101  044103  EM117   ASCIZ  "WATCH-DOG TIMEOUT DURING 'STORE WFP<4 5>' TMS FUNCTION"
11678  053054  042055  043517  052040
11679  053062  046511  047505  052125
11680  053070  042040  051125  047111
11681  053076  020107  051447  047524
11682  053104  042522  053440  050106
11683  053112  032074  032472  023476
11684  053120  052040  051515  043040
11685  053126  047125  052103  047511
11686  053134  000116
11687  053136  047111  047503  051122  EM120   ASCIZ  "INCORRECT DATA STORED DURING 'LOAD WFP<0 1>' TMS FUNCTION"
11688  053144  041505  020124  040504
11689  053152  040524  051440  047524
11690  053160  042522  020104  052504
11691  053166  044522  043516  023440
11692  053174  047514  042101  053440
11693  053202  050106  030074  030472
11694  053210  023476  052040  051515
11695  053216  043040  047125  052103
11696  053224  047511  000116
11697  053230  040527  041524  026510  EM121   ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD WFP<0 1>' TMS FUNCTION"
11698  053236  047504  020107  044524
11699  053244  042515  052517  020124
11700  053252  052504  044522  043516
11701  053260  023440  047514  042101
11702  053266  053440  050106  030074
11703  053274  030472  023476  052040
11704  053302  051515  043040  047125
11705  053310  052103  047511  000116
11706  053316  047111  047503  051122  EM122   ASCIZ  "INCORRECT DATA STORED DURING 'LOAD WFP<2 3>' TMS FUNCTION"
11707  053324  041505  020124  040504
11708  053332  040524  051440  047524
11709  053340  042522  020104  052504
11710  053346  044522  043516  023440
11711  053354  047514  042101  053440
```

```
11712  053362  050106  031074  031472
11713  053370  023476  052040  051515
11714  053376  043040  047125  052103
11715  053404  047511  000116
11716  053410  040527  041524  026510  EM123    ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD WFP<2.3>' TMS FUNCTION"
11717  053416  047504  020107  044524
11718  053424  042515  052517  020124
11719  053432  052504  044522  043516
11720  053440  023440  047514  042101
11721  053446  053440  050106  031074
11722  053454  031472  023476  052040
11723  053462  051515  043040  047125
11724  053470  052103  047511  000116
11725  053476  047111  047503  051122  EM124    ASCIZ  "INCORRECT DATA STORED DURING 'LOAD WFP<4.5>' TMS FUNCTION"
11726  053504  041505  020124  040504
11727  053512  040524  051440  047524
11728  053520  042522  020104  052504
11729  053526  044522  043516  023440
11730  053534  047514  042101  053440
11731  053542  050106  032074  032472
11732  053550  023476  052040  051515
11733  053556  043040  047125  052103
11734  053564  047511  000116
11735  053570  040527  041524  026510  EM125    ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD WFP<4.5>' TMS FUNCTION"
11736  053576  047504  020107  044524
11737  053604  042515  052517  020124
11738  053612  052504  044522  043516
11739  053620  023440  047514  042101
11740  053626  053440  050106  032074
11741  053634  032472  023476  052040
11742  053642  051515  043040  047125
11743  053650  052103  047511  000116
11744  053656  047111  047503  051122  EM126    ASCIZ  "INCORRECT DATA STORED DURING 'STORE ASPAD 00,37' TMS FUNCTION"
11745  053664  041505  020124  040504
11746  053672  040524  051440  047524
11747  053700  042522  020104  052504
11748  053706  044522  043516  023440
11749  053714  052123  051117  020105
11750  053722  051501  040520  055504
11751  053730  030060  031472  056467
11752  053736  020047  046524  020123
11753  053744  052506  041516  044524
11754  053752  047117     000
11755  053755     127  052101  044103  EM127    ASCIZ  "WATCH-DOG TIMEOUT DURING 'STORE ASPAD 00,37' TMS FUNCTION"
11756  053762  042055  043517  052040
11757  053770  046511  047505  052125
11758  053776  042040  051125  047111
11759  054004  020107  051447  047524
11760  054012  042522  040440  050123
11761  054020  042101  030133  035060
11762  054026  033463  023535  052040
11763  054034  051515  043040  047125
11764  054042  052103  047511  000116
11765  054050  047111  047503  051122  EM130    ASCIZ  "INCORRECT DATA STORED DURING 'STORE BSPAD 00,37' TMS FUNCTION"
11766  054056  041505  020124  040504
11767  054064  040524  051440  047524
```

```
11768  054072  042522  020104  052504
11769  054100  044522  043516  023440
11770  054106  052123  051117  020105
11771  054114  051502  040520  055504
11772  054122  030060  031472  056467
11773  054130  020047  046524  020123
11774  054136  052506  041516  044524
11775  054144  047117     000
11776  054147     127  052101  044103  EM131   .ASCIZ  "WATCH-DOG TIMEOUT DURING 'STORE BSPAD 00 37 ' TMS FUNCTION"
11777  054154  042055  043517  052040
11778  054162  046511  047505  052125
11779  054170  042040  051125  047111
11780  054176  020107  051447  047524
11781  054204  042522  041040  050123
11782  054212  042101  030133  035060
11783  054220  033463  023535  052040
11784  054226  051515  043040  047125
11785  054234  052103  047511  000116
11786  054242  047111  047503  051122  EM132    ASCIZ  "INCORRECT DATA STORED DURING 'STORE CSPAD 17 00 ' TMS FUNCTION"
11787  054250  041505  020124  040504
11788  054256  040524  051440  047524
11789  054264  042522  020104  052504
11790  054272  044522  043516  023440
11791  054300  052123  051117  020105
11792  054306  051503  040520  055504
11793  054314  033461  030072  056460
11794  054322  020047  046524  020123
11795  054330  052506  041516  044524
11796  054336  047117     000
11797  054341     127  052101  044103  EM133    ASCIZ  "WATCH-DOG TIMEOUT DURING 'STOPE CSPAD 17 00 ' TMS FUNCTION"
11798  054346  042055  043517  052040
11799  054354  046511  047505  052125
11800  054362  042040  051125  047111
11801  054370  020107  051447  047524
11802  054376  042522  041440  050123
11803  054404  042101  030533  035067
11804  054412  030060  023535  052040
11805  054420  051515  043040  047125
11806  054426  052103  047511  000116
11807  054434  047111  047503  051122  EM134    ASCIZ  "'INCORRECT DATA LOADED DUR NG 'LOAD ASPAD 00 37 ' TMS FUNCTION"
11808  054442  041505  020124  040504
11809  054450  040524  046040  040517
11810  054456  042504  020104  052504
11811  054464  044522  043516  023440
11812  054472  047514  042101  040440
11813  054500  050123  042101  030133
11814  054506  035060  033463  023535
11815  054514  052040  051515  043040
11816  054522  047125  052103  047511
11817  054530  000116
11818  054532  040527  041524  026510  EM135    ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD ASPAD 00 37 ' TMS FUNCTION"
11819  054540  047504  020107  044524
11820  054546  042515  052517  020124
11821  054554  052504  044522  043516
11822  054562  023440  047514  042101
11823  054570  040440  050123  042101
```

```
11824  054576  030133  035060  033463
11825  054604  023535  052040  051515
11826  054612  043040  047125  052103
11827  054620  047511  000116
11828  054624  047111  047503  051122  EM136    ASCIZ  "INCORRECT DATA LOADED DURING 'LOAD BSPAD 00 37 ' TMS FUNCTION"
11829  054632  041505  020124  040504
11830  054640  040524  046040  040517
11831  054646  042504  020104  052504
11832  054654  044522  043516  023440
11833  054662  047514  042101  041040
11834  054670  050123  042101  030133
11835  054676  035060  033463  023535
11836  054704  052040  051515  043040
11837  054712  047125  052103  047511
11838  054720  000116
11839  054722  040527  041524  026510  EM137    ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD BSPAD 00 37 ' TMS FUNCTION"
11840  054730  047504  020107  044524
11841  054736  042515  052517  020124
11842  054744  052504  044522  043516
11843  054752  023440  047514  042101
11844  054760  041040  050123  042101
11845  054766  030133  035060  033463
11846  054774  023535  052040  051515
11847  055002  043040  047125  052103
11848  055010  047511  000116
11849  055014  047111  047503  051122  EM140    ASCIZ  "INCORRECT DATA LOADED DURING 'LOAD CSPAD 17 00 ' TMS FUNCTION"
11850  055022  041505  020124  040504
11851  055030  040524  046040  040517
11852  055036  042504  020104  052504
11853  055044  044522  043516  023440
11854  055052  047514  042101  041440
11855  055060  050123  042101  030533
11856  055066  035067  030060  023535
11857  055074  052040  051515  043040
11858  055102  047125  052103  047511
11859  055110  000116
11860  055112  040527  041524  026510  EM141    ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD CSPAD 17 00 ' TMS FUNCTION"
11861  055120  047504  020107  044524
11862  055126  042515  052517  020124
11863  055134  052504  044522  043516
11864  055142  023440  047514  042101
11865  055150  041440  050123  042101
11866  055156  030533  035067  030060
11867  055164  023535  052040  051515
11868  055172  043040  047125  052103
11869  055200  047511  000116
11870  055204  047111  047503  051122  EM142    ASCIZ  "INCORRECT DATA LOADED DURING 'LOAD TEMP-S' TMS FUNCTION"
11871  055212  041505  020124  040504
11872  055220  040524  046040  040517
11873  055226  042504  020104  052504
11874  055234  044522  043516  023440
11875  055242  047514  042101  052040
11876  055250  046505  026520  023523
11877  055256  052040  051515  043040
11878  055264  047125  052103  047511
11879  055272  000116
```

```
11880  055274  040527  041524  026510  EM143.   .ASCIZ  "WATCH-DOG TIMEOUT DURING 'LOAD TEMP-S' TMS FUNCTION"
11881  055302  047504  020107  044524
11882  055310  042515  052517  020124
11883  055316  052504  044522  043516
11884  055324  023440  047514  042101
11885  055332  052040  046505  026520
11886  055340  023523  052040  051515
11887  055346  043040  047125  052103
11888  055354  047511  000116
11889  055360  047111  047503  051122  EM144.    ASCIZ  "INCORRECT DATA STORED DURING 'STORE TEMP-S' TMS FUNCTION"
11890  055366  041505  020124  040504
11891  055374  040524  051440  047524
11892  055402  042522  020104  052504
11893  055410  044522  043516  023440
11894  055416  052123  051117  020105
11895  055424  042524  050115  051455
11896  055432  020047  046524  020123
11897  055440  052506  041516  044524
11898  055446  047117     000
11899  055451     127  052101  044103  EM145     ASCIZ  "WATCH-DOG TIMEOUT DURING 'STORE TEMP-S' TMS FUNCTION"
11900  055456  042055  043517  052040
11901  055464  046511  047505  052125
11902  055472  042040  051125  047111
11903  055500  020107  051447  047524
11904  055506  042522  052040  046505
11905  055514  026520  023523  052040
11906  055522  051515  043040  047125
11907  055530  052103  047511  000116
11908
11909
11910                                          SBTTL ERROR DATA HEADERS
11911
11912  055536  042444  051122  041520  DH1       ASCIZ  "$ERRPC  REG-ADRS"
11913  055544  020040  042522  026507
11914  055552  042101  051522     000
11915  055557     044  051105  050122  DH2       ASCIZ  "$ERRPC  WHAMI"
11916  055564  020103  053440  040510
11917  055572  044515     000
11918  055575     044  051105  050122  DH3       ASCIZ  "$ERRPC  STATUS"
11919  055602  020103  051440  040524
11920  055610  052524  000123
11921  055614  042444  051122  041520  DH11      ASCIZ  "$ERRPC  E-DATA  R-DATA  WCSLOC  PATTRN"
11922  055622  020040  026505  040504
11923  055630  040524  020040  026522
11924  055636  040504  040524  020040
11925  055644  041527  046123  041517
11926  055652  020040  040520  052124
11927  055660  047122     000
11928  055663     044  051105  050122  DH12      ASCIZ  "$ERRPC  WCSLOC  E-DATA  R-DATA"
11929  055670  020103  053440  051503
11930  055676  047514  020103  042440
11931  055704  042055  052101  020101
11932  055712  051040  042055  052101
11933  055720  000101
11934  055722  042444  051122  041520  DH14      ASCIZ  "$ERRPC  TRPLOC"
11935  055730  020040  051124  046120
```

```
11936  055736  041517     000
11937  055741     044  051105  050122  DH15:   .ASCIZ  "$ERRPC  PATTRN  E-DATA  .PAR  "
11938  055746  020103  050040  052101
11939  055754  051124  020116  042440
11940  055762  042055  052101  020101
11941  055770  027040  040520  027122
11942  055776  000056
11943  056000  042444  051122  041520  DH17    .ASCIZ  "$ERRPC  STATUS  PATTRN"
11944  056006  020040  052123  052101
11945  056014  051525  020040  040520
11946  056022  052124  047122     000
11947  056027     044  051105  050122  DH21:    ASCIZ  "$ERRPC  WCSLOC  PATTRN  STATUS"
11948  056034  020103  053440  051503
11949  056042  047514  020103  050040
11950  056050  052101  051124  020116
11951  056056  051440  040524  052524
11952  056064  000123
11953  056066  042444  051122  041520  DH23.    ASCIZ  "$ERRPC"
11954  056074     000
11955  056075     044  051105  050122  DH26:    ASCIZ  "$ERRPC  WCSLOC  E-DATA  STATUS"
11956  056102  020103  053440  051503
11957  056110  047514  020103  042440
11958  056116  042055  052101  020101
11959  056124  051440  040524  052524
11960  056132  000123
11961  056134  042444  051122  041520  DH30     ASCIZ  "$ERRPC  E-DATA  R-DATA  (XFC-CODES)"
11962  056142  020040  026505  040504
11963  056150  040524  020040  026522
11964  056156  040504  040524  020040
11965  056164  054050  041506  041455
11966  056172  042117  051505  000051
11967  056200  042444  051122  041520  DH31     ASCIZ  "$ERRPC  XFC-CODE"
11968  056206  020040  043130  026503
11969  056214  047503  042504     000
11970  056221     044  051105  050122  DH34     ASCIZ  "$ERRPC  R3-FLAG"
11971  056226  020103  051040  026463
11972  056234  046106  043501     000
11973  056241     044  051105  050122  DH40    .ASCIZ  "$ERRPC  WCSLOC  E-DATA  P-DATA  GPR ##"
11974  056246  020103  053440  051503
11975  056254  047514  020103  042440
11976  056262  042055  052101  020101
11977  056270  051040  042055  052101
11978  056276  020101  043440  051120
11979  056304  021456  000043
11980  056310  042444  051122  041520  DH42     ASCIZ  "$ERRPC  GPR ##  E-DATA  P-DATA  WCSLOC"
11981  056316  020040  050107  027122
11982  056324  021443  020040  026505
11983  056332  040504  040524  020040
11984  056340  026522  040504  040524
11985  056346  020040  041527  046123
11986  056354  041517     000
11987  056357     044  051105  050122  DH44    .ASCIZ  "$ERRPC  E-DATA  R-DATA"
11988  056364  020103  042440  042055
11989  056372  052101  020101  051040
11990  056400  042055  052101  000101
11991  056406  042444  051122  041520  DH46.   .ASCIZ  "$ERRPC  WCSLOC  E-DATA  R-DATA  WFP###"
```

```
11992  056414  020040  041527  046123
11993  056422  041517  020040  026505
11994  056430  040504  040524  020040
11995  056436  026522  040504  040524
11996  056444  020040  043127  021520
11997  056452  021443     000
11998  056455     044  051105  050122  DH50    ASCIZ  "$ERRPC  WFP###  E-DATA  R-DATA  WCSLOC"
11999  056462  020103  053440  050106
12000  056470  021443  020043  042440
12001  056476  042055  052101  020101
12002  056504  051040  042055  052101
12003  056512  020101  053440  051503
12004  056520  047514  000103
12005  056524  042444  051122  041520  DH52    ASCIZ  "$ERRPC  WCSLOC  E-DATA  R-DATA  CSP###"
12006  056532  020040  041527  046123
12007  056540  041517  020040  026505
12008  056546  040504  040524  020040
12009  056554  026522  040504  040524
12010  056562  020040  051503  021520
12011  056570  021443     000
12012  056573     044  051105  050122  DH54    ASCIZ  "$ERRPC  CSP###  E-DATA  R-DATA  WCSLOC"
12013  056600  020103  041440  050123
12014  056606  021443  020043  042440
12015  056614  042055  052101  020101
12016  056622  051040  042055  052101
12017  056630  020101  053440  051503
12018  056636  047514  000103
12019  056642  042444  051122  041520  DH56    ASCIZ  "$ERRPC  WCSLOC  E-DATA  R-DATA   MED"
12020  056650  020040  041527  046123
12021  056656  041517  020040  026505
12022  056664  040504  040524  020040
12023  056672  026522  040504  040524
12024  056700  020040  046440  042105
12025  056706     000
12026  056707     044  051105  050122  DH62    ASCIZ  "$ERRPC  ODD-PC-AT"
12027  056714  020103  047440  042104
12028  056722  050055  026503  052101
12029  056730     000
12030  056731     044  051105  050122  DH65    ASCIZ  "$ERRPC  TIME"
12031  056736  020103  052040  046511
12032  056744  000105
12033  056746  042444  051122  041520  DH67    ASCIZ  "$ERRPC  STATUS  WCSLOC"
12034  056754  020040  052123  052101
12035  056762  051525  020040  041527
12036  056770  046123  041517     000
12037  056775     044  051105  050122  DH71    ASCIZ  "$ERRPC  WCSLOC  STATUS"
12038  057002  020103  053440  051503
12039  057010  047514  020103  051440
12040  057016  040524  052524  000123
12041  057024  042444  051122  041520  DH76    ASCIZ  "$ERRPC  GPR ##  E-DATA  R-DATA  WCSLOC"
12042  057032  020040  050107  027122
12043  057040  021443  020040  026505
12044  057046  040504  040524  020040
12045  057054  026522  040504  040524
12046  057062  020040  041527  046123
12047  057070  041517     000
```

```
12048  057073     044  051105  050122  DH100:  .ASCIZ  "$ERRPC  GPR.##  E-DATA  R-DATA"
12049  057100  020103  043440  051120
12050  057106  021456  020043  042440
12051  057114  042055  052101  020101
12052  057122  051040  042055  052101
12053  057130  000101
12054  057132  042444  051122  041520  DH106    ASCIZ  "$ERRPC  ADDR 1  DATA 1  ADDR 2  E-DATA  R-DATA"
12055  057140  020040  042101  051104
12056  057146  030456  020040  040504
12057  057154  040524  030456  020040
12058  057162  042101  051104  031056
12059  057170  020040  026505  040504
12060  057176  040524  020040  026522
12061  057204  040504  040524     000
12062  057211     044  051105  050122  DH120    ASCIZ  'SERRPC   MED    E-DATA  R-DATA"
12063  057216  020103  020040  042515
12064  057224  020104  020040  042440
12065  057232  042055  052101  020101
12066  057240  051040  042055  052101
12067  057246  000101
12068  057250                          DH112   DH126   DH130
12069  057250  042444  051122  041520  DH132    ASCIZ  'SERRPC   MED    WCSLOC  E-DATA  R-DATA"
12070  057256  020040  046440  042105
12071  057264  020040  020040  041527
12072  057272  046123  041517  020040
12073  057300  026505  040504  040524
12074  057306  020040  026522  040504
12075  057314  040524     000
12076
12077                                          SBTTL  ERROR DATA VECTORS
12078
12079          057320                          EVEN
12080  057320  001116  001162  000000  DT1      .WORD   $ERRPC,$REG0,0
12081  057326                          DT76.  DT40  DT112.
12082  057326  001116  001162  001164  DT11     WORD   $ERRPC,$REG0,$REG1,$REG2,$REG3,0
12083  057334  001166  001170  000000
12084  057342                          DT100·  DT120.
12085  057342  001116  001162  001164  DT12     .WORD   $ERRPC,$REG0,$REG1,$REG2,0
12086  057350  001166  000000
12087  057354  001116  001162  001164  DT15     .WORD   $ERRPC,$REG0,$REG1,0
12088  057362  000000
12089  057364  001116  000000          DT23     .WORD   $ERRPC,0
12090  057370  001116  001162  001164  DT106·    WORD   $ERRPC,$REG0,$REG1,$REG2,$PEG3 ±PEG4,0
12091  057376  001166  001170  001172
12092  057404  000000
12093                                  ;END OF MACRO CODE
```

```
12094                                   .SBTTL  MICRO-CODE
12095
```

```
                                        ;
                                        ;       , START OF MICROCODE
                                        ;
                                        ;       ,*** NOTE ***
                                        ;       ;
                                        ;       ;       ALL MICROWORDS FOR A PARTICULAR TEST MUST (!!!) BE IN CONSECUTIVE
                                        ;       ;       MICROADDRESS LOCATIONS (IE, 6026,6027,6030,    )
                                        ;       ;
                                        ;       ;       MICROADDRESSES:
                                        ;       ;               (0XXX) MAP TO ADDRESSES (6XXX)
                                        ;       ;               (1XXX)  "  "      "     (7XXX)
                                        ;       ;
                                        ;       ;               (3XXX) MAP TO ENTRY POINT LOCATION
                                        ;       ;
                                        ;       ;***
                                        ;
                                        ;
                                        ;
                                        ;       ;*****************************************
                                        ;       ;LOAD,READ-2 FROM LOCAL STORE TMS FUNCTION
                                        ;       ;*****************************************
                                        ;
057406                                  MLDRD2
                                        ;       6002:
                                        ;       UDISP
                                        ;               D_R2,                   , LOCAL STORE ADDRESS
                                        ;               J/570

057406  030570  010000  170212          WORD    UWRD1,UWRD2,UWRD3


                                        ;       6570:
                                        ;               ENTER.TMS, TMSPTR_LOAD.READ 2'552 ,     ; ENTER INTO TMS ROUTINE
                                        ;               J/571

057414  030571  100660  022414          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6571:   , NULL WORD #1
                                        ;               RETURN_BRADS,           WILL EX T WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/572

057422  034572  100000  000007          .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6572    , NULL WORD #2
                                        ;               MD_DATA,                , MUST DO TO SUPPORT TMS
                                        ;               J/573

057430  030573  000010  007000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6573
                                        ;               R3_D,                   ; GET FIRST DATA ITEM INTO R3
                                        ;               J/574
```

```
057436  130574  000001  000032          WORD    UWRD1,UWRD2,UWRD3

                                ;
                                ;       6574.
                                ;               D_MD,                   ; READ 2ND DATA ITEM
                                ;               R4_D,                   ; INTO R4
                                ;               BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

057444  137000  010001  127014          .WORD   UWRD1,UWRD2,UWRD3

                                ;
057452  125252                  UWDEND
                                ;
                                ;
                                ;
                                ;
                                ;       ;*****************************************
                                ;       ;LOAD,WRITE-2 TO LOCAL STORE TMS FUNCTION
                                ;       ;*****************************************
                                ;
057454                          MLDWR2
                                ;       6002
                                ;       UDISP
                                ;               D_R2,                   ; LOCAL STORE ADDRESS
                                                J/560

057454  030560  010000  170212          WORD    UWRD1,UWRD2,UWRD3

                                ;
                                ;       6560
                                ;               ENTER TMS, TMSPTR_LOAD WRITE 2(561),    ; ENTER INTO TMS ROUTINE
                                ;               J/561

057462  030561  100660  120214          WORD    UWRD1,UWRD2,UWRD3

                                ;
                                ;       6561    ; NULL WORD #1
                                ;               D_P3,                   ; MUST DO TO SUPPORT TMS
                                ;               J/562

057470  030562  010000  170232          WORD    UWRD1,UWRD2,UWRD3


                                        6562    ; NULL WORD #2
                                ;               D_R4,                   ; MUST DO TO SUPPORT TMS
                                ;               J/563

057476  030563  010000  170214          WORD    UWRD1,UWRD2,UWRD3


                                        6563
                                                GOTO-PAGE(0),           ; EXIT TO BUT(SERVICE) WORD
                                                J/BRA05

057504  034003  000000  000000          WORD    UWRD1,UWRD2,UWRD3
```

```
12208
12209                                   ;
12210  057512  125252                   UWDEND
12211                                   ,
12212                                   ;
12213                                   ,
12214                                   ,
12215                                   ;       ,*****************************************
12216                                   ,       ;READ INDIRECT TMS ROM FUNCTION
12217                                   ,       ;*****************************************
12218                                   ,
12219  057514                           MRDIND
12220                                   ,       6002
12221                                   ,       UDISP
12222                                   ,               D_R2,                   , LOCAL STORE ADDRESS
12223                                   ,               J/550
12224
12225  057514  030550  010000  170212           WORD    UWRD1,UWRD2,UWRD3
12226
12227                                   ;
12228                                   ,       6550.
12229                                   ,               ENTER.TMS, TMSPTR_READ IND(571),        , ENTER INTO TMS ROUTINE
12230                                   ,               J/551
12231
12232  057522  030551  100660  122214           WORD    UWRD1,UWRD2,UWRD3
12233
12234                                   ,
12235                                   ,       6551    ; NULL WORD #1
12236                                   .               RETURN_BRAO5,           . WILL EXIT WCS THRU HERE
12237                                   ,
12238                                   .               GOTO-PAGE(6),
12239                                   .               J/552
12240
12241  057530  034552  100000  000007           WORD    UWRD1,UWRD2,UWRD3
12242
12243                                   ,
12244                                   ,       6552    ; NULL WORD #2
12245                                   ,               MD_DATA,                . MUST DO TO SUPPORT TMS ROUTINE
12246                                   ,               J/553
12247
12248  057536  030553  000010  007000           WORD    UWRD1,UWRD2,UWRD3
12249
12250                                   ,
12251                                           6553
12252                                           D_MD,                   . GET RETURNED DATA
12253                                   .       R3_D,                   ; INTO R3
12254                                           BJT(RETURN)             . EXIT TO "BRAC5" WHICH DOES "BUT SERVICE)"
12255
12256  057544  137000  010001  127032           WORD    UWRD1,UWRD2 UWRD3
12257
12258                                   ,
12259  057552  125252                   UWDEND
12260
12261                                   .
12262
12263                                   ,
```

```
                                        ;       ;*****************************************
                                        ;       ;WRITE INDIRECT TMS ROM FUNCTION
                                        ;       ;*****************************************
                                        ;
057554                                  MWRIND
                                        ;       6002
                                        ;       UDISP
                                        ;               D_R2,                   ; LOCAL STORE ADDRESS
                                        ;               J/540

057554  030540  010000  170212                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6540
                                        ;               ENTER TMS, TMSPTR_WRITE IND(577),       ; ENTER INTO TMS ROUTINE
                                        ;               J/541

057562  030541  100660  123614                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6541    ; NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/542

057570  034542  100000  000007                  WORD    UWRD1,UWRD2,UWRD3


                                        ;       6542    ; NULL WORD #2
                                        ;               MD_DATA,                ; MUST DO TO SUPPORT TMS ROUTINE
                                        ;               J/543

057576  030543  000010  007000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6543
                                        ;               ; NOTE  DATA WRITTEN COMES FROM WCSA 0 , MED 020/220
                                        ;               BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

057604  037000  000000  000000                  WORD    UWRD1,UWRD2,UWRD3


057612  125252                          UWDEND


                                        ;       ;*****************************************
                                        ;       ;LOAD INCR-READ 2 TMS ROM FUNCTIONS
                                        ;       ;*****************************************
                                        ;
057614                                  MICRD2
                                        ;       6002
                                        ;       UDISP
                                        ;               D_R2 MINUS 2,           ; LOCAL STORE ADDRESS
                                        ;               J/410

057614  034100  010000  157612                  WORD    UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6410
                                                        ENTER.TMS, TMSPTR_SET.LOAD(251),        , ENTER INTO TMS ROUTINE
                                        ;               J/411

057622  030411  040660  022204           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6411    , NULL WORD #1
                                        ;               RETURN_BRAOS,           , WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/412

057630  034412  100000  000007           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6412      NULL WORD #2
                                        ;               D_0,                    . ZAP ADDR TO MARGIN WCS
                                        ;               J/413

057636  030413  010000  030000           WORD    UWRD1,UWRD2,UWRD3


                                        6413
                                                        ENTER TMS, TMSPTR_INC READ 2(556),      ENTER INTO TMS ROUTINE
                                                        J/414

057644  030414  100660  022414           WORD    UWRD1,UWRD2,UWRD3


                                        6414    . NULL WORD #1
                                                J 415

057652  020415  000000  000000           WORD    UWRD1,UWRD2 UWRD3


                                        6415    . NULL WORD #2
                                                MD_DATA                         MUST DO TO SUPPORT TMS
                                                J/416

057660  020416  000010  007000           WORD    UWRD1,UWRD2,UWRD3


                                        6416
                                                R3_D                            ;2  FIRST DATA ITEM INTO R3
                                                J/417

057666  130417  000001  000032           WORD    UWRD1,UWRD2 UWRD3


                                        6417
                                                D_MD,                           READ 2ND DATA ITEM
                                                R4_D                            INTO R4
                                                BUT RETURN)                     EXIT TO "BRAOS" WHICH DOES "BUT(SERVICE)"
```

```
057674  137000  010001  127014          .WORD   UWRD1,UWRD2,UWRD3

                                  ;
                                  ;
057702  125252                    UWDEND
                                  ;
                                  ;
                                  ;
                                  ;
                                  ;       ;*****************************************
                                  ;       ;LOAD,WRITE-2 TMS ROM FUNCTIONS
                                  ;       ;*****************************************
                                  ;
057704                            MWR2:
                                  ;       6002
                                  ;       UDISP
                                  ;               D_R2 MINUS 1,           ; LOCAL STORE ADDRESS
                                  ;               J/430

057704  030430  010000  156212           WORD   UWRD1,UWRD2,UWRD3


                                  ;       6430
                                  ;               ENTER.TMS, TMSPTR_SET STOPE(254),       ; ENTER  NTO TMS ROUTINE
                                  ;               J/431

057712  030431  040660  023004          .WORD   UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6431.   ;.NULL WORD #1
                                  ;               RETURN_BRADS,           ; WILL EXIT WCS THRU HERE
                                  ;               GOTO-PAGE(6),
                                  ;               J/432

057720  034432  100000  000007           WORD   UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6432    ; NULL WORD #2
                                  ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                  ;               J/433

057726  030433  010000  030000           WORD   UWRD1,UWRD2,UWRD3


                                  ;       6433
                                  ;               ENTER TMS, TMSPTR_WRITE 2(565), ; ENTER INTO TMS ROUTINE
                                  ;               J/434

057734  030434  100660  121214          .WORD   UWRD1,UWRD2,UWRD3


                                  ;       6434    ;.NULL WORD #1
                                  ;               D_R3,                   ; MUST DO TO SUPPORT TMS
                                  ;               J/435

057742  030435  010000  170232           WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6435.   ;.NULL WORD #2
                                        ;               D_R4,                   ,.MUST DO TO SUPPORT TMS
                                        ;               J/436

057750  030436  010000  170214          .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6436.
                                        ,               BUT(RETURN)             ,.EXIT TO BUT(SERVICE) WORD

057756  037000  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                        ,
057764  125252                          UWDEND
                                        ;
                                        ,
                                        ,
                                        ;
                                        ,       ;*****************************************
                                        ,       LOAD FP.AC<0,1> FROM LOCAL STORE
                                        ,       ;*****************************************
                                        ;
057766                                  MLSF01:
                                        ,       6002:
                                        ;       UDISP:
                                        ,               D_R2 MINUS 1,           , LOCAL STORE ADDRESS
                                        ;               J/600

057766  030600  010000  156212           WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ;       6600:
                                        ,               ENTER.TMS, TMSPTR_LOAD FP 01(605)       , ENTER INTO TMS ROUTINE
                                        ;               J/601

057774  030601  140660  021200          .WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6601.   ;.NULL WORD #1
                                        ,               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ,               GOTO-PAGE(6),
                                                        J/602

060002  034602  100000  000007          .WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ;       6602.   ;.NULL WORD #2
                                        ;               D_0,                    , ZAP ADDR TO MARGIN WCS
                                        ;               J/603

060010  030603  010000  030000           WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6603
```

```
                                        ,               BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060016  037000  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                        ,
060024  125252                          UWDEND
                                        ,
                                        ,
                                        ,
                                        ,       ,*****************************************
                                        ,       ,STORE FP AC(0,1) TO LOCAL STORE
                                        ,       ,*****************************************
                                        ,
060026                                  MF01LS
                                        ,       6002
                                        ,       UDISP
                                        ,               D_R2 MINUS 1,           ,.LOCAL STORE ADDRESS
                                        ,
                                        ,               J/610

060026  030610  010000  156212          WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6610
                                        ;               ENTER TMS, TMSPTR_STORE FP 01(654),     , ENTER INTO TMS ROUTINE
                                        ;               J/611

060034  030611  140660  023004          .WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6611    ,.NULL WORD #1
                                        ,               RETURN_BRA05,           , WILL EXIT WCS THRU HERE
                                        ,               GOTO-PAGE(6),
                                        ;               J/612

060042  034612  100000  000007          WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6612    , NULL WORD #2
                                        ,               D_0,                    ZAP ADDR TO MARGIN WCS
                                        ,               J/613

060050  030613  010000  030000          WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                                6613
                                                        BUT(RETURN)             EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060056  037000  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                        ,
060064  125252                          UWDEND
                                        ,
                                        ,
                                        ,
                                        ,       ,*****************************************
```

```
                                        ;       ;LOAD FP.AC(2,3) FROM LOCAL STORE
                                        ;       ;*****************************************
                                        ;
060066                                  MLSF23
                                        ;       6002
                                        ;       UDISP.
                                        ;               D_R2 MINUS 1,           ;.LOCAL STORE ADDRESS
                                        ;               J/620

060066  030620  010000  156212           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6620.
                                        ;               ENTER TMS, TMSPTR_LOAD FP 23(622),      ; ENTER INTO TMS ROUTINE
                                        ;               J/621

060074  030621  140660  120400           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6621    ;.NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/622

060102  034622  100000  030007           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6622    ;.NULL WORD #2
                                        ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                        ;               J/623

060110  030623  010000  030000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6623
                                        ;               BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060116  037000  000000  000000           .WORD   UWRD1,UWRD2,UWRD3

                                        ;
060124  125252                          UWDEND
                                        ;
                                        ;
                                        ;
                                        ;       ;*****************************************
                                        ;       ;STORE FP.AC(2,3) TO LOCAL STORE
                                        ;       ;*****************************************
                                        ;
060126                                  MF23LS
                                        ;       6002.
                                        ;       UDISP.
                                        ;               D_R2 MINUS 1,           ; LOCAL STORE ADDRESS
                                        ;               J/630

060126  030630  010000  156212           .WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6630:
                                        ;               ENTER.TMS, TMSPTR_STORE.FP.23(671),     ; ENTER INTO TMS ROUTINE
                                        ;               J/631

060134  030631  140660  122204          .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6631:   ;.NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ,               GOTO-PAGE(6),
                                        ,               J/632

060142  034632  100000  000007          .WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ;       6632.   , NULL WORD #2
                                        ;               D_0,                    , ZAP ADDR TO MARGIN WCS
                                        ,               J/633

060150  030633  010000  030000          .WORD   UWRD1,UWRD2,UWRD3

                                        .
                                        ;       6633.
                                        ;               BUT(RETURN)             , EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060156  037000  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ,
060164  125252                          UWDEND
                                        ,
                                        ,
                                        ;
                                        ,       ;*****************************************
                                        ;       ,LOAD FP.AC<4,5> FROM LOCAL STORE
                                        ;       ,*****************************************
                                        ,
060166                                  MLSF45.
                                        ;       6002:
                                        ,       UDISP.
                                        ,               D_R2 MINUS 1,           , LOCAL STORE ADDRESS
                                        ,               J/640

060166  030640  010000  156212          WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        ;       6640·
                                        ;               ENTER TMS, TMSPTR_LOAD FP 45(637),      ;.ENTER INTO TMS ROUTINE
                                        ,               J/641

060174  030641  140660  123600          WORD    UWRD1,UWRD2,UWRD3

                                        .
                                        ;       6641·   ; NULL WORD #1
                                        ;               RETURN_BRA05,           , WILL EXIT WCS THRU HERE
```

```
                                        ;               GOTO-PAGE(6),
                                        ;               J/642

060202  034642  100000  000007                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6642    ;.NULL WORD #2
                                        ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                        ;               J/643

060210  030643  010000  030000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6643
                                        ;               BUT(RETURN)             ;.EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060216  037000  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
060224  125252                          UWDEND
                                        ;


                                        ;
                                        ;       ;*****************************************
                                        ;       ;STORE FP AC(4,5) TO LOCAL STORE
                                        ;       ;*****************************************

060226                                  MF45LS
                                        ;       6002
                                        ;       UDISP
                                        ;               D_R2 MINUS 1,           ; LOCAL STORE ADDRESS
                                        ;               J/650

060226  030650  010000  156212                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6650
                                        ;               ENTER TMS, TMSPTR_STOPE FP 45(706),     ; ENTER INTO TMS ROUTINE
                                        ;               J/651

060234  030651  140660  021410                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6651    ; NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/652

060242  034652  100000  000007                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6652    ;.NULL WORD #2
                                        ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                        ;               J/653

060250  030653  010000  030000                  WORD    UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6653
                                        ;               BUT(RETURN)             , EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060256  037000  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                        ;
060264  125252                          UWDEND
                                        ;
                                        ,
                                        ,
                                        ;       ,*****************************************
                                        ;       ,LOAD ASP(00 37) FROM LOCAL STORE
                                        ,       ,*****************************************
                                        ;
060266                                  MLSASP
                                        ,       6002
                                        ,       UDISP·
                                        ;               D_R2 MINUS 1.           , LOCAL STORE ADDRESS
                                        ;               J 660

060266  030660  010000  156212           WORD    UWRD1,UWRD2,UWRD3

                                        .
                                        ,       6660·
                                        ,
                                        .               ENTER TMS, TMSPTR_LOAD ASPAD(256 ,      , ENTER INTO TMS ROUTINE
                                        :               J'661

060274  030661  040660  023404           WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        .       6661    , NULL WORD #1
                                        .               RETURN_BRA05            , WILL EXIT WCS THRU HERE
                                        .               GOTO-PAGE(6),
                                        ;               J'662

060302  034662  100000  000007           WORD    UWRD1,UWRD2,UWRD3

                                        .       6662    , NULL WORD #2
                                        .               D_0.                    , ZAP ALDR TO MAPGIN WCS
                                                        J 663

060310  030663  010000  030000           WORD    UWRD1,UWRD2,UWRD3

                                        .
                                        .       6663
                                        .               BUT(RETURN)             EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060316  037000  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        .
060324  125252                          UWDEND
                                        .
```

```
                                        ;
                                        ;
                                        ;       ;*****************************************
                                        ;       ;STORE ASP<00 37> TO LOCAL STORE
                                        ;       ;*****************************************
                                        ;
060326                                  MASPLS
                                        ;       6002
                                        ;       UDISP
                                        ;               D_R2 MINUS 1,           ; LOCAL STORE ADDRESS
                                        ;               J/670

060326  030670  010000  156212          .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6670
                                        ;               ENTER TMS, TMSPTR_STORE ASPAD(323),     ; ENTER INTO TMS ROUTINE
                                        ;               J/671

060334  030671  040660  120610          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6671    ;.NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/672

060342  034672  100000  000007          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6672    ; NULL WORD #2
                                        ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                        ;               J/673

060350  030673  010000  030000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6673
                                        ;               BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060356  037000  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
060364  125252                          UWDEND
                                        ;
                                        ;
                                        ;
                                        ;       ;*****************************************
                                        ;       ;LOAD BSP<00:37> FROM LOCAL STORE
                                        ;       ;*****************************************
                                        ;
060366                                  MLSBSP:
                                        ;       6002:
                                        ;       UDISP:
                                        ;               D_R2 MINUS 1,           ;.LOCAL STORE ADDRESS
                                        ;               J/700
```

```
060366  030700  010000  156212          WORD   UWRD1,UWRD2,UWRD3

                                 ;
                                 ;       6700:
                                 ;               ENTER.TMS, TMSPTR_LOAD BSPAD(367),      ;.ENTER INTO TMS ROUTINE
                                 ;               J/701

060374  030701  040660  121614          WORD   UWRD1,UWRD2,UWRD3

                                 ;
                                 ;       6701    ; NULL WORD #1
                                 ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                 ;               GOTO-PAGE(6),
                                 ;               J/702

060402  034702  100000  000007          WORD   UWRD1,UWRD2,UWRD3

                                 ;
                                 ;
                                 ;       6702    ; NULL WORD #2
                                 ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                 ;               J/703

060410  030703  010000  030000          WORD   UWRD1,UWRD2,UWRD3

                                 ;
                                         6703
                                 ;               BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060416  037000  000000  000000          WORD   UWRD1,UWRD2,UWRD3

                                 ;
060424  125252                   UWDEND
                                 ;
                                 ;
                                 ;
                                 ;       ;*****************************************
                                 ;       ;STORE BSP(00 37) TO LOCAL STORE
                                 ;       ;*****************************************
                                 ;
060426                           MBSPLS:
                                         6002
                                         UDISP
                                 ;               D_R2 MINUS 1,           LOCAL STORE ADDRESS
                                 ;               J/710

060426  030710  010000  156212          WORD   UWRD1,UWRD2,UWRD3

                                 ;
                                         6710:
                                         ENTER TMS, TMSPTR_STORE BSPAD(424)      ; ENTER INTO TMS ROUTINE
                                         J/711

060434  030711  100660  123000          WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6711.   ;.NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/712

060442  034712  100000  000007          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6712    ;.NULL WORD #2
                                        ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                        ;               J/713

060450  030713  010000  030000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6713
                                        ;               BUT(RETURN)             ; EXIT TO "BFA05" WHICH DOES "BUT(SERVICE)"

060456  037000  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
060464  125252                          UWDEND
                                        ;

                                        .
                                        ;*****************************************
                                        ;LOAD CSP<17:00> FROM LOCAL STORE
                                        ;*****************************************

060466                                  MLSCSP
                                        .       6002
                                        ;       UDISP
                                        .               D_R2 MINUS 1            ; LOCAL STORE ADDRESS
                                        ;               J/730

060466  030730  010000  156212          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        .       6730
                                        .               ENTER TMS, TMSPTR_LOAD ALL CSP<5:0>,    ENTER INTO TMS ROUTINE
                                        ;               J/731

060474  030731  100660  020210          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        .       6731    ; NULL WORD #1
                                                        RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                        ;               GOTO-PAGE(6),
                                        ;               J/732

060502  034732  100000  000007          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        .       6732    ; NULL WORD #2
                                        .               D_0,                    ; ZAP ADDR TO MARGIN WCS
```

```
                                        ;               J/733

060510  030733  010000  030000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ,
                                        ,       6733
                                        ,               BUT(RETURN)             , EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060516  037000  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ,
060524  125252                          UWDEND
                                        ,
                                        ,
                                        ,
                                        ,       ,*****************************************
                                        ,       ,STORE CSP<17 00> TO LOCAL STORE
                                        ,       ,*****************************************
                                        ,
060526                                  MCSPLS.
                                                6002
                                                UDISP
                                                        D_R2 MINUS 1,           , LOCAL STORE ADDRESS
                                                        J/740

060526  030740  010000  156212           WORD    UWRD1,UWRD2 UWRD3


                                        ,       6740
                                                        ENTER TMS, TMSPTR_STORE ALL CSP(525),   , ENTER INTO TMS ROUTINE
                                                        J/741

060534  030741  100660  121210           WORD    UWRD1,UWRD2 UWRD3

                                        ,
                                        ,       6741    , NULL WORD #1
                                        ,               RETURN_BRA05,           W LL EXIT WCS THRU HERE
                                        ,               GOTO-PAGE(6)
                                        ,               J/742

060542  034742  100000  000007           WORD    UWRD1,UWRD2,UWRD3


                                                6742    , NULL WORD #2
                                                D_0                     , ZAP ADDR TO MARGIN WCS
                                                J/743

060550  030743  010000  030000           WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                                6743
                                        ,               BUT(RETURN)             , EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060556  037000  000000  000000           WORD    UWRD1,UWRD2 UWRD3
```

```
                                        ;
060564  125252                          UWDEND
                                        ;
                                        ;
                                        ;
                                        ;       ;*****************************************
                                        ;       ;LOAD T<1:2>A,T<1.2>B,FDST<0:3> FROM LOCAL STORE
                                        ;       ;*****************************************
                                        ;
060566                                  MLSTMP
                                        ;       6002
                                        ;       UDISP
                                        ;               D_R2 MINUS 1,           ; LOCAL STORE ADDRESS
                                        ;               J/750
060566  030750  010000  156212           WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6750
                                        ;               ENTER.TMS, TMSPTR_LOAD TEMP(723),       ; ENTER INTO TMS ROUTINE
                                        ;               J/751
060574  030751  140660  120610           WORD   UWRD1,UWRD2,UWRD3
                                                       6751    ; NULL WORD #1
                                        ;               RETURN_BRA05,           ; WILL EXIT WCS THRU HERE
                                                               GOTO-PAGE(6),
                                        ;               J/752
060602  034752  100000  000007          .WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6752    ;.NULL WORD #2
                                        ;               D_0,                    ; ZAP ADDR TO MARGIN WCS
                                        ;
                                        ;               J/753
060610  030753  010000  030000          .WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6753.
                                                       BUT(RETURN)             ; EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"
060616  037000  000000  000000           WORD   UWRD1,UWRD2,UWRD3
                                        ;
060624  125252                          UWDEND
                                        ;
                                        ;
                                        ;
                                                ;*****************************************
                                                .STORE T<1.2>A,T<1 2>B,FDST<0.3> TO LOCAL STORE
                                                ;*****************************************
060626                                  MTMPLS
```

```
                                        ,       6002:
                                        ,       UDISP:
                                        ,               D_R2 MINUS 1,           ; LOCAL STORE ADDRESS
                                        ,               J/760

060626  030760  010000  156212                  WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6760
                                        ;               ENTER TMS, TMSPTR_STORE TEMP(740),      , ENTER INTO TMS ROUTINE
                                        ,               J/761

060634  030761  140660  020014                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ,       6761:   ,.NULL WORD #1
                                        ,               RETURN_BRA05,           , WILL EXIT WCS THRU HERE
                                        ,               GOTO-PAGE(6),
                                        ,               J/762

060642  034762  100000  000007                  .WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6762    ,.NULL WORD #2
                                        ;               D_0,                    , ZAP ADDR TO MARGIN WCS
                                        ,               J/763

060650  030763  010000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ,       6763:
                                        ,               BUT(RETURN)             , EXIT TO "BRA05" WHICH DOES "BUT(SERVICE)"

060656  037000  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
060664  125252                          UWDEND
                                        ,
                                        ,
                                        ,       ;*****************************************************
                                        ,       ;STORE GR'S IN LS
                                        ,       ;*****************************************************

060666                                  MGRLS
                                        ,       6002:
                                                UDISP:
                                                        J/LSGR1

060666  030026  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ,
                                                6026:
                                        ,       LSGR1:
                                        ,               BUT(SUBRB),
                                                        RETURN6_TMSXT1,PAGE(6)
                                        ,               J/LSGR2
```

```
060674  034027  100000  060073          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6027:
                                ;       LSGR2:
                                ;               MD_EMIT,
                                ;               EMITH/0,EMITML/777,
                                ;               J/LSGR3

060702  030030  140050  004177          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6030:
                                ;       LSGR3
                                ;               D_MD,
                                ;               J/LSGR4

060710  030031  010000  127000          .WORD   UWRD1,UWRD2,UWRD3

                                ,
                                ,       6031
                                ,       LSGR4
                                ,               ENTER TMS, TMSPTR_STORE GRS(060),
                                ,               J/NULL0

060716  030032  000660  120004           WORD   UWRD1,UWRD2 UWRD3

                                :
                                ,       6032.
                                .       NULL0
                                ,               J/NULL1

060724  030033  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ,       6033
                                ,       NULL1:
                                ,               J/TMSXT0

060732  030034  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ,
                                .       6034:
                                .       TMSXT0
                                ,               BUT(RETURN)

060740  037000  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ,
                                ,       6035.
                                        TMSXT1:
                                ,               BUT(SERVICE),
                                ,               J/NOSVC3

060746  020036  000000  000000           WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6036:
                                        ;       NOSVC3:
                                        ;               GOTO-PAGE(0),
                                        ;               J/FET01

060754  034702  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6037
                                        ;       SVC3
                                        ;               GOTO-PAGE(0),
                                        ;               J/SER02

060762  034703  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
060770  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************
                                        ;       ;LOAD LS INTO GR'S
                                        ;       ;*****************************************
                                        ;
060772                                  MLSGR
                                        ;       6002
                                        ;       UDISP
                                        ;               J/GRLS1

060772  030136  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;
                                        ;       6136
                                        ;       GRLS1:
                                        ;               BUT(SUBRB),
                                        ;               RETURN6_TMSXT3, PAGE(6),
                                        ;               J/GRLS2

061000  034137  100000  060313           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6137
                                        ;       GRLS2
                                        ;               MD_EMIT,
                                        ;               EMITH/0,EMITML/2524,
                                        ;               J/GRLS3

061006  030140  000050  004525           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6140
                                        ;       GRLS3
                                        ;               D_MD,
                                        ;               J/GRLS4
```

```
061014  030141  010000  127000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6141:
                                ;       GRLS4:
                                ;               ENTER.TMS, TMSPTR_LOAD.GRS(042),
                                ;               J/NULL2

061022  030142  000660  020404           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6142.
                                ;       NULL2.
                                ;               J/NULL3

061030  030143  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6143.
                                ;       NULL3
                                ;               J/TMSXT2

061036  030144  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6144
                                        TMSXT2
                                ;               BUT(RETURN)

061044  037000  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6145
                                ;       TMSXT3
                                ;               BUT(SERVICE),
                                ;               J/NOSVC4

061052  020146  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6146:
                                ;       NOSVC4
                                ;               GOTO-PAGE(0),
                                ;               J/FETO1

061060  034702  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6147
                                ;       SVC4:
                                ;               GOTO-PAGE(0),
                                ;               J/SERO2

061066  034703  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
```

```
061074  125252                  UWDEND
                                ;
                                ;       ;*************************************************************
                                ;       ;STORE WFP REGISTERS INTO LS
                                ;       ;*************************************************************
                                ;
061076                          MFPLS.
                                ;       6002:
                                ;       UDISP.
                                ;               J/LSWFP1

061076  030046  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6046.
                                ;       LSWFP1
                                ;               BUT(SUBRB),
                                ;               RETURN6_TMSXT5, PAGE(6),
                                ;               J/LSWFP2

061104  034047  100000  060133          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                        6047.
                                ;       LSWFP2
                                ;               MD_EMIT,
                                                EMITH/0,EMITML/1177,
                                ;               J/LSWFP3

061112  030050  140050  004237          WORD    UWRD1,UWRD2,UWRD3

                                ;
                                ;       6050:
                                ;       LSWFP3
                                ;               D_MD,
                                ;               J/LSWFP4

061120  030051  010000  127000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6051
                                ;       LSWFP4:
                                ;               ENTER.TMS, TMSPTR_STOPE.FP(133),
                                ;               J/NULL4

061126  030052  000660  122610          WORD    UWRD1,UWRD2,UWRD3

                                ;
                                ;       6052.
                                ;       NULL4.
                                ;               J/NULL5

061134  030053  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                ;
                                ;       6053
```

```
                                        ;       NULL5:
                                        ;               J/TMSXT4

061142  030054  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6054:
                                        ;       TMSXT4:
                                        ;               BUT(RETURN)

061150  037000  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6055.
                                        ;       TMSXT5
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC5

061156  020056  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6056.
                                        ;       NOSVC5.
                                        ;               GOTO-PAGE(0),
                                        ;               J/FETO1

061164  034702  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6057:
                                        ;
                                        ;       SVC5·
                                        ;               GOTO-PAGE(0),
                                        ;               J/SERO2

061172  034703  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
061200  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************************
                                        ;       ;LOAD LS INTO WFP REGISTERS
                                        ;       ;*****************************************************
                                        ;
061202                                  MLSFP
                                        ;       6002·
                                        ;       UDISP.
                                        ;               J/WFLS1

061202  030256  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6256·
                                        ;       WFLS1:
                                                        BUT(SUBRB),
                                        ;               RETURN6_TMSXT7, PAGE(6).
```

```
                                        ;               J/WFLS2
061210  034257  100000  060553                  .WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6257:
                                        ;       WFLS2.
                                        ;               MD_EMIT,
                                        ;               EMITH/0,EMITML/1077,
                                        ;               J/WFLS3
061216  030260  140050  004217                  .WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6260:
                                        ;       WFLS3
                                        ;               D_MD,
                                        ;               J/WFLS4
061224  030261  010000  127000                   WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6261
                                        ;       WFLS4
                                        ;               ENTER TMS, TMSPTR_LOAD FP(076),
                                        ;               J/NULL6
061232  030262  000660  123404                   WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6262
                                        ;       NULL6
                                        ;               J/NULL7
061240  030263  000000  000000                   WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6263
                                        ;       NULL7:
                                        ;               J/TMSXT6
061246  030264  000000  000000                   WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6264.
                                        ;       TMSXT6.
                                        ;               BUT(RETURN)
061254  037000  000000  000000                   WORD   UWRD1,UWRD2,UWRD3
                                        ;
                                        ;       6265:
                                        ;       TMSXT7:
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC6
```

```
061262  020266  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6266:
                                ;       NOSVC6:
                                ;               GOTO-PAGE(0),
                                ;               J/FETO1

061270  034702  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6267
                                ;       SVC6:
                                ;               GOTO-PAGE(0),
                                ;               J/SERO2

061276  034703  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
061304  125252                  UWDEND
                                ;
                                ;       ;*****************************************************
                                ;       ;STORE CSP IN LS
                                ;       ;*****************************************************
                                ;
061306                          MCSLS
                                        6002
                                ;       UDISP.
                                ;               J/LSCSP1

061306  030066  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6066
                                ;       LSCSP1
                                ;               BUT(SUBRB),
                                ;               RETURN6_TMSXT9, PAGE(6
                                ;               J/LSCSP2

061314  034067  100000  060173          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ;       6067
                                        LSCSP2
                                ;               MD_EMIT,
                                ;               EMITH/0,EMITML/1037
                                ;               J/LSCSP3

061322  030070  140050  004207           WORD   UWRD1,UWRD2,UWRD3


                                        6070
                                        LSCSP3
                                                D_MD,
                                                J/LSCSP4
```

```
061330  030071  010000  127000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ,       6071
                                ,       LSCSP4
                                ,               ENTER.TMS, TMSPTR_STORE CSP(210),
                                ;               J/NULL8

061336  030072  040660  022000           WORD   UWRD1,UWRD2,UWRD3

                                ,
                                ,
                                ,       6072
                                ,       NULL8
                                ,               J/NULL9

061344  030073  000000  000000           WORD   UWRD1.UWRD2,UWRD3

                                ,
                                ;       6073
                                ,       NULL9
                                .               J/TMSXT8

061352  030074  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ,
                                .       6074
                                .       TMSXT8
                                                BUT(RETURN)

061360  037000  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ,
                                ;       6075
                                ,       TMSXT9.
                                ;               BUT(SERVICE),
                                ,               J/NSVC7

061366  020076  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ,
                                .       6076
                                        NSVC7
                                                GOTO-PAGE(0),
                                ,               J/FET01

061374  034702  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                ,
                                ,       6077·
                                ;       SVC7.
                                ,               GOTO-PAGE(0),
                                ,               J/SER02

061402  034703  000000  000000           WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
061410  125252                          UWDEND
                                        ;
                                        ;       ;*************************************************************
                                        ;       ;LOAD LS IN CSP
                                        ;       ;*************************************************************
                                        ;
061412                                  MLSCS
                                        ;       6002.
                                        ;       CDISP
                                        ;               J/CSPLS1

061412  030476  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6476
                                        ;       CSPLS1
                                        ;               BUT(SUBRB),
                                        ;               RETURN6_TMSXT11, PAGE(6),
                                        ;               J/CSPLS2

061420  034477  100000  061213           WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6477
                                        ;       CSPLS2.
                                        ;               MD_EMIT,
                                        ;               EMITH/0,EMITML/1017,
                                        ;               J/CSPLS3

061426  030500  140050  004203           WORD   UWRD1,UWRD2,UWRD3


                                        ;       6500
                                        ;       CSPLS3
                                        ;               D_MD,
                                        ;               J/CSPLS4

061434  030501  010000  127000           .WORD  UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6501
                                        ;       CSPLS4.
                                        ;               ENTER TMS, TMSPTR_LOAD CSP(170),
                                        ;               J/NULL10

061442  030502  000660  122014           .WORD  UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6502
                                        ;       NULL10.
                                        ;               J/NULL11

061450  030503  000000  000000           WORD   UWRD1,UWRD2,UWRD3

                                        ;
```

```
                                        ;       6503
                                        ;       NULL11:
                                        ;               J/TMSXT10

061456  030504  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6504.
                                        ;       TMSXT10.
                                        ;               BUT(RETURN)

061464  037000  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6505
                                        ;       TMSXT11
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC8

061472  020506  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6506
                                        ;       NOSVC8
                                        ;               GOTO-PAGE(0),
                                        ;               J/FETO1

061500  034702  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6507
                                        ;       SWC8
                                        ;               GOTO-PAGE(0),
                                        ;               J/SERO2

061506  034703  000000  000000           WORD    UWRD1,UWRD2 UWRD3

                                        ;
061514  125252                          UWDEND
                                        ;
                                        ;       ************************************************************
                                        ;       ;STORE WCS USEP SP IN LS
                                        ;
                                        ;       ;************************************************************

061516                                  MWSLS
                                        ;       6002
                                        ;       UDISP
                                        ;               J/LSWS1

061516  030106  000000  000000           WORD    UWRD1,UWRD2,UWRD3


                                        ;       6106
                                        ;       LSWS1
                                        ;               BUT(SUBRB)
```

```
                                        ;               RETURN6_TMSXT13, PAGE(6),
                                        ;               J/LSWS2

061524  034107  100000  060233          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6107
                                        ;       LSWS2:
                                        ;               MD_EMIT,
                                        ;               EMITH/0,EMITML/1007,
                                        ;               J/LSWS3

061532  030110  140050  004201          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6110
                                        ;       LSWS3:
                                        ;               D_MD,
                                        ;               J/LSWS4

061540  030111  010000  127000          WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6111
                                        ;       LSWS4
                                        ;               ENTER TMS, TMSPTR_STORE WCS AB(241)
                                        ;               J/NULL12

061546  030112  040660  023204          WORD    UWRD1 UWRD2,UWRD3

                                        ;
                                        ;       6112
                                        ;       NULL12
                                        ;               J/NULL12

061554  030113  000000  000000          WORD    UWRD1,UWRD2 UWRD3

                                        ;
                                        ;       6113
                                        ;       NULL13
                                        ;               J, TMSXT12

061562  030114  000000  000000          WORD    UWRD1,UWRD2 UWRD3


                                        ;       6114
                                        ;       TMSXT12
                                        ;               BUT(RETURN)

061570  037000  000000  000000          WORD    UWRD1,UWRD2 UWRD3


                                        ;       6115
                                        ;       TMSXT13.
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC10
```

```
061576  020116  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                 ;
                                 ;       6116:
                                 ,       NOSVC10:
                                 ,               GOTO-PAGE(0),
                                 ,               J/FETO1

061604  034702  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                 ,
                                 ,       6117
                                 ,       SVC10
                                 ,               GOTO-PAGE(0),
                                 ,               J/SERO2

061612  034703  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                 ,
061620  125252                   UWDEND
                                 ,
                                 ,       ,*****************************************************
                                 ,       ,LOAD LS IN WCS USER SP
                                 ,       ,*****************************************************
                                 ,
061622                           MLSWS
                                         6002
                                         UDISP
                                 ,               J/WSLS1

061622  030716  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                 ,
                                 ,       6716
                                 ,       WSLS1:
                                 ;               BUT(SUBRB),
                                 ;               RETURN6_TMSXT15, PAGE 61,
                                 ,               J/WSLS2

061630  034717  100000  061653          .WORD   UWRD1,UWRD2,UWRD3

                                 ,
                                         6717
                                         WSLS2
                                 ,               MD_EMIT,
                                 ;               EMITH/0 EMITML 1002
                                 ,               J/WSLS3

061636  030720  140050  004200          WORD    UWRD1,UWRD2 UWRD3


                                 ,       6720
                                         WSLS3
                                                 D_MC
                                 ,               J WSLS4
```

```
061644  030721  010000  127000          WORD    UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6721
                                  ;       WSLS4.
                                  ;
                                  ;               ENTER TMS, TMSPTR_LOAD WCS AB(231),
                                  ;               J/NULL14

061652  030722  040660  122200          WORD    UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6722
                                  ;       NULL14.
                                  ;               J/NULL15

061660  030723  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6723
                                  ;       NULL15
                                                  J/TMSXT14

061666  030724  000000  000000          WORD    UWRD1,UWRD2,UWRD3


                                          6724
                                  ;       TMSXT14
                                  ;               BUT(RETURN)

061674  037000  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6725.
                                  ;       TMSXT15
                                  ;               BUT(SERVICE)
                                  ;               J/NOSVC9

061702  020726  000000  000000          .WORD   UWRD1,UWRD2 UWRD3


                                          6726
                                          NOSVC9
                                                  GOTO-PAGE(0),
                                  ;               J/FETO1

061710  034702  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                  ;
                                  ;       6727:
                                          SVC9.
                                  ;               GOTO-PAGE(0),
                                  ;               J/SERO2

061716  034703  000000  000000          .WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
061724  125252                          UWDEND
                                        ,
                                        ,       ,*********************************************************************
                                        ,       ,USER DISPATCH-XFC  WCS ENTRY POINT 6002
                                        ,       ,*********************************************************************
                                        ,
061726                                  MXFC2
                                        ,       6002
                                        ,       UDISP
                                        ,               R3_MD,
                                        ,               J/CHSVCO

061726  130241  010001  127032                  WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6241
                                        ,       CHSVCO
                                        ;               BUT(SERVICE),
                                        .               J NOSVCO

061734  020242  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ,
                                        ,       6242:
                                        ,       NOSVCO
                                        .               GOTO-PAGE(0),
                                        .               J/FETO1

061742  034702  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        .
                                        ,       6243
                                        ,       SVCO
                                        ,               GOTO-PAGE(0),
                                        ,               J/SERO2

061750  034703  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        .
061756  125252                          UWDEND
                                        ,
                                        ;*********************************************************************************
                                                                                                                        **
                                        ,       ,OTHER USER DISPATCHES-XFC  WCS ENTRY POINTS 6001,6011,  ,6015
                                        .       ,*********************************************************************************
                                                                                                                        **
                                        ,
061760                                  MXFC1
                                        ,       6001
                                                OTHDIS
                                                        R3_MD,
                                        .               J/CHSVC1

061760  130151  010001  127032                  WORD    UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6151:
                                        ;       CHSVC1:
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC1

061766  020152  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6152
                                        ;
                                        ;       NOSVC1:
                                        ;               GOTO-PAGE(0),
                                        ;               J/FETO1

061774  034702  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6153
                                        ;       SVC1
                                        ;               GOTO-PAGE(0),
                                        ;               J/SERO2

062002  034703  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
062010  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************
                                        ;       ;XFC OPCODE ENTRY AT 6011
                                        ;       ;*****************************************
                                        ;
062012                                  MXFC11
                                        ;       6011.
                                        ;       OTH11:
                                        ;               R3_MD,
                                        ;               J/CHSVC13

062012  130351  010001  127032                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6351:
                                        ;       CHSVC13.
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC13

062020  020352  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6352.
                                        ;       NOSVC13:
                                        ;               GOTO-PAGE(0),
                                        ;               J/FETO1

062026  034702  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3
```

```
                                        ;
                                        ;       6353:
                                        ;       SVC13:
                                        ;               GOTO-PAGE(0),
                                        ;               J/SER02

062034  034703  000000  000000           .WORD   UWRD1,UWRD2,UWRD3

                                        ;
062042  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************
                                        ;       ;XFC OPCODE ENTRY AT 6012
                                        ;       ;*****************************************
                                        ;
062044                                  MXFC12:
                                        ;       6012:
                                        ;       OTH12:
                                        ;               R3_MD,
                                        ;               J/CHSVC14

062044  130361  010001  127032           .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6361:
                                        ;       CHSVC14:
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC14

062052  020362  000000  000000           .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6362:
                                        ;       NOSVC14:
                                        ;               GOTO-PAGE(0),
                                        ;               J/FET01

062060  034702  000000  000000            WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6363
                                        ;       SVC14:
                                        ;               GOTO-PAGE(0),
                                        ;               J/SER02

062066  034703  000000  000000            WORD   UWRD1,UWRD2,UWRD3

                                        ;
062074  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************
                                        ;       ;XFC OPCODE ENTRY AT 6013
                                        ;       ;*****************************************
062076                                  MXFC13:
                                        ;       6013
```

```
                                        ;       OTH13:
                                                        R3_MD,
                                        ;               J/CHSVC15

062076  130371  010001  127032                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6371:
                                        ;       CHSVC15:
                                        ;               BUT(SERVICE),
                                        ;
                                        ;               J/NOSVC15

062104  020372  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6372:
                                        ;       NOSVC15
                                        ;               GOTO-PAGE(0),
                                        ;               J/FETO1

062112  034702  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6373.
                                        ;       SVC15.
                                        ;               GOTO-PAGE(0),
                                        ;               J/SERO2

062120  034703  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
062126  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************
                                        ;       ;XFC OPCODE ENTRY AT 6014
                                        ;       ;*****************************************
062130                                  MXFC14:
                                        ;       6014:
                                        ;       OTH14:
                                        ;               R3_MD,
                                        ;               J/CHSVC16

062130  130401  010001  127032                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6401.
                                        ;       CHSVC16.
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC16

062136  020402  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6402
                                        ;       NOSVC16
```

```
                                        ;               GOTO-PAGE(0),
                                        ;               J/FET01

062144  034702  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6403
                                        ;       SVC16.
                                        ;               GOTO-PAGE(0),
                                        ;               J/SER02

062152  034703  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
062160  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************
                                        ;       ;XFC OPCODE ENTRY AT 6015
                                        ;       ;*****************************************
062162                                  MXFC15:
                                        ;       6015:
                                        ;       OTH15:
                                        ;               R3_MD,
                                        ;               J/CHSVC16A

062162  130405  010001  127032                  .WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6405:
                                        ;       CHSVC16A:
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC16A

062170  020406  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6406:
                                        ;       NOSVC16A:
                                        ;               GOTO-PAGE(0),
                                        ;               J/FET01

062176  034702  000000  000000                   WORD   UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6407:
                                        ;       SVC16A:
                                        ;               GOTO-PAGE(0),
                                        ;               J/SER02

062204  034703  000000  000000                  .WORD   UWRD1,UWRD2,UWRD3


062212  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************************
                                        ;       ;ODD PC ENTRY INTO WCS AT 6004
```

```
                                        ;       ;*****************************************************************
                                        ;
                                        ;
062214                                  MODDPC
                                        ;       6004
                                        ;       ODDPC:
                                        ;               R3_R3 PLUS 1,
                                        ;               J/CHSVC17

062214  130161  010001  116232                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6161
                                        ;       CHSVC17:
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC17

062222  020162  000000  000000                  WORD    UWRD1 UWRD2,UWRD3

                                        ;
                                        ;       6162
                                        ;       NOSVC17
                                        ;               GOTO-PAGE(0),
                                        ;               J/FETO1

062230  034702  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6163:
                                        ;       SVC17:
                                        ;               GOTO-PAGE(0),
                                        ;               J/SERO2

062236  034703  000000  000000                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
062244  125252                          UWDEND
                                        ;
                                        ;       ;*****************************************************************
                                        ;       ;BASE MACHINE MICRO-BREAK ENTPY INTO WCS AT 6000
                                        ;       ;*****************************************************************
                                        ;
062246                                  MUBRK
                                        ;       6000
                                        ;       UBRK
                                        ;               R3_R3 PLUS 1.
                                        ;               J/CHSVC11

062246  130171  010001  116232                  WORD    UWRD1,UWRD2,UWRD3

                                        ;
                                        ;       6171
                                        ;       CHSVC11.
                                        ;               BUT(SERVICE),
                                        ;               J/NOSVC11
```

```
062254  020172  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ,       6172:
                                ;       NOSVC11:
                                ;               GOTO-PAGE(0),
                                ;               J/FETO1

062262  034702  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ,
                                ;       6173
                                ,       SVC11:
                                ;               GOTO-PAGE(0),
                                ,               J/SERO2

062270  034703  000000  000000          .WORD   UWRD1,UWRD2,UWRD3

                                ,
062276  125252                  UWDEND
                                ,
                                ;       ,*****************************************************************
                                ,       ,RESERVED INSTRUCTION ENTRY INTO WCS AT 6003
                                        ,*****************************************************************
                                ,
062300                          MRESIN
                                .       6003
                                .       UPESIN
                                                R3_MD,
                                ,               J/CHSVC12

062300  130201  010001  127032           WORD    UWRD1,UWRD2,UWRD3

                                .
                                ,       6201
                                ;       CHSVC12
                                ,               BUT(SERVICE)
                                ,               J/NOSVC12

062306  020202  000000  000000           WORD    UWRD1,UWRD2,UWRD3

                                ,
                                        6202

                                        NOSVC12
                                                GOTO-PAGE(0),
                                                J/FETO1

062314  034702  000000  000000           WORD    UWRD1,UWRD2,UWRD3


                                        6203.
                                .       SVC12
                                ,               GOTO-PAGE(0),
                                                J/SERO2
```

```
062322  034703  000000  000000          WORD    UWRD1,UWRD2,UWRD3

                                ;
062330  125252                  UWDEND
                                ,
                                ,
                                ;       ,*************************************************************
                                ;       ,FLAG(7) WCS-SERVICE ENTRY INTO WCS AT 6005
                                ,       ,*************************************************************
                                ,
062332                          MF7SVC
                                ;       6005.
                                ;       F7SVC:
                                ;               RETURN_FETO1,    , RETURN W/O SERVICE CHECK
                                ;               GOTO-PAGE(6),
                                ;               J/770

062332  034770  100000  001605          .WORD   UWRD1,UWRD2,UWRD3

                                ;
                                ,       6770.
                                ,               R3_R3 PLUS 1,
                                ,               BUT(RETURN)

062340  137000  010001  116232          WORD    UWRD1,UWRD2,UWRD3

                                ,
062346  125252                  UWDEND
                                ,
                                ,
                                ;       ,*************************************************
                                        , END OF MICROCODE
```

```
14254          000001                    END
```

```
ABASE = 000000          235     276
ACDW1 = 000000          235     278
ACDW2 = 000000          235     279
ACPUOP= 000000          235     250
ADDR 1= 001770         7028#   7032    7048    7058    7142#   7149    7257#   7261    7277    7287    7371#   7378    7487#
                       7497    7516    7605#   7613    7633    8457#   8494    8516    8536    8633#   8670    8689    8709
                       8807#   8843    8856    8960#   8969    8982    8987    8991    8995    9023    9047    9172#   9183
                       9194    9198    9202    9206    9234    9263    9389#   9402    9442    9457    9566#   9592    9619
                       9718#   9727    9762    9787
ADDR 2= 001333         7488#   7499    7513    7520    7606#   7615    7616    7637
ADDW0 = 000000          235     280
ADDW1 = 000000          235     281
ADDW10= 000000          235     290
ADDW11= 000000          235     291
ADDW12= 000000          235     292
ADDW13= 000000          235     293
ADDW14= 000000          235     294
ADDW15= 000000          235     295
ADDW2 = 000000          235     282
ADDW3 = 000000          235     283
ADDW4 = 000000          235     284
ADDW5 = 000000          235     285
ADDW6 = 000000          235     286
ADDW7 = 000000          235     287
ADDW8 = 000000          235     288
ADDW9 = 000000          235     289
ADEVCT= 000000          235     241
ADEVM = 000000          235     277
AENV  = 000000          235     246
AENVM = 000000          235     247
AFATAL= 000000          235     238
AMADR1= 000000          235     263
AMADR2= 000000          235     267
AMADR3= 000000          235     270
AMADR4= 000000          235     273
AMAMS1= 000000          235     257
AMAMS2= 000000          235     265
AMAMS3= 000000          235     268
AMAMS4= 000000          235     271
AMSGAD= 000000          235     243
AMSGLG= 000000          235     244
AMSGTY= 000000          235     237
AMTYP1= 000000          235     258
AMTYP2= 000000          235     266
AMTYP3= 000000          235     269
AMTYP4= 000000          235     272
ANLYSO  037350         3403    3550    3699    3847    3994    4141    10173#
APASS = 000000          235     240
APRIOR= 000000          235
APTCSU= 000040        10678   10783#
APTENV= 000001         1326   10435   10671   10739   10781#
APTSIZ= 000200        10780#
APTSPO= 000100        10673   10741   10782#
ASWREG= 000000          235     248
ATESTN= 000000          235     239
ATMPO   003042         1071*   1535*   1595*   1683*   1706
```

```
ATMP1   003044          1072#   1536*   1598*   1686*   1708
AUNIT = 000000           235     242
AUSWR = 000000           235     249
AVECT1= 000000           235     274
AVECT2= 000000           235     275
BADPAR  003344          1261#   1352    2072    2278    2329    2442    2550    2658    2733    2734    2737    2814    2815
                        2819    2896    2897    2901    2999    3043    3173    3217    3370    3389    3396    3518    3536
                        3543    3663    3679    3686    3813    3830    3837    3961    3976    3983    4108    4124    4130
                        4621    4636    4703    4705    4774    4795    4872    4893    4971    4992    5064    5085    5157
                        5178    5255    5276    5353    5374    5441    5463    5546    5559    5634    5647    5735    5807
                        5827    5847    5930    6080    6237    6369    6515    6650    6785    6913    7045    7163    7274
                        7392    7510    7628    7749    7874    7999    8123    8245    8367    8510    8683    8849    9033
                        9244    9452    9614    9781    9893   10850
BADTMO  003276          1234#   1351    1381    1388    5449    5472    9892
BITEPR  037036         10018#  10078
BIT0  = 000001           110#    1036    1355    2708    2710    2788    2790    2870    2873   10126
BIT00 = 000001           100#     110
BIT01 = 000002            99#     109
BIT02 = 000004            98#     108
BIT03 = 000010            97#     107
BIT04 = 000020            96#     106
BIT05 = 000040            95#     105
BIT06 = 000100            94#     104
BIT07 = 000200            93#     103
BIT08 = 000400            92#     102   10371
BIT09 = 001000            91#     101   10379   10445
BIT1  = 000002           109#    1035
BIT10 = 002000            90#    2959    3133    4662   10325   10423
BIT11 = 004000            89#    8811    9393   10325   10386
BIT12 = 010000            88#    5784
BIT13 = 020000            87#    5784   10430
BIT14 = 040000            86#    1037    5618    5627   10357
BIT15 = 100000            85#    1028    1264    4662    5528
BIT2  = 000004           108#    1034
BIT3  = 000010           107#    1033   10129
BIT4  = 000020           106#    1032
BIT5  = 000040           105#    1031    1262    1421
BIT6  = 000100           104#    1030    1262
BIT7  = 000200           103#    1029    1262    1427    5776    5850    8474    8504    8534    8535    8537    8538    8539
                        8542    8543    8544    8545    8546    8547    8548    8549    8550    8551    8553    8557    8558
                        8559    8560    8561    8562    8563    8564    8565    8650    8677    8707    8708    8710    8711
                        8712    8715    8716    8717    8718    8719    8720    8721    8722    8723    8724    8725    8729
                        8731    8732    8733    8734    8735    8736    8737    8738    8828    8877    8878    8879    8880
                        8881    8882    8883    8884    8885    8886    8887    8888    9002    9213    9426    9579    9581
                        9583    9585    9590    9591    9593    9594    9638    9639    9640    9641    9642    9643    9644
                        9645    9747
BIT8  = 000400           102#   10124
BIT9  = 001000           101#    1050    5523   10127
BPTVEC= 000014           117#
CESTAT  037252          1548*   1574*   1642*   1668*   1758*   2149*   2381*   2489*   2597*  10024   10075   10084   10092#
CHKSTA  037152          1551    1577    1645    1671    1761    2152    2384    2492    2600   10068#
CLRWCS  036624          3284    3429    3582    3729    3878    4024    9916#
CMASK   037256          1549*   1575*   1643*   1669*   1759*   2150*   2382*   2490*   2598*  10073   10080   10094#
COUNT   003052          1075#   3747*   3772*   3906*   3921*   4042*   4068*   4198*   4224*   4282*   4308*   4370*   4400*
                        4497*   4526*
COUNTO  003054          1076#   1862*   1878*   2949*   3035*   3050*   4199*   4251*   4283*   4335*   4371*   4424*   4498*
```

```
                        4550*
CPUERR= 177766          1044#   1236
CR    = 000015            25#  10717   10727   10906   10909   10911   10916   10923   10937   10942   10944   10945   10950
                       10955   10960   10963   10968
CRETRN  037260          1550*   1576*   1644*   1670*   1760*   2151*   2383*   2491*   2599*  10087   10095#
CRLF  = 000200            26#  10688   10727
CRSTAT  037254         10023   10074*  10093#
CSPOOW  003254          1201#   6485    6606    6656
DDISP = 177570            32#    198    1314
DH1     055536           321  11912#
DH100   057073           763    791   12048#
DH106   057132           805    819   12054#
DH11    055614           376    390   11921#
DH112   057250           833    847    861   12068#
DH12    055663           383    707   11928#
DH120   057211           875    889    903   12062#
DH126   057250           917    959   12068#
DH130   057250           931    973   12068#
DH132   057250           945    987    1001    1015   12069#
DH14    055722           397    474   11934#
DH15    055741           404  11937#
DH17    056000           411    418   11943#
DH2     055557           328  11915#
DH21    056027           432    439    460   11947#
DH23    056066           516    530    572    586    600    614    628    642    656    670    677    742    756
                         770    784    798    812    826    840    854    868    882    896    910    924    938
                         952    966    980    994   1008   1022  11953#
DH26    056075           467  11955#
DH3     055575           335    342    348    355    362    369    425    446    453  11918#
DH30    056134           481    495   11961#
DH31    056200           488    502    544    558    693  11967#
DH34    056221           509    523    735   11970#
DH40    056241           537  11973#
DH42    056310           551  11980#
DH44    056357           565  11987#
DH46    056406           579  11991#
DH50    056455           593  11998#
DH52    056524           607  12005#
DH54    056573           621  12012#
DH56    056642           635    649   12019#
DH62    056707           663  12026#
DH65    056731           685  12030#
DH67    056746           700  12033#
DH71    056775           714    721    728   12037#
DH76    057024           749    777   12041#
DISPLA  001142           198#  1314*   1322*  10401*  10422*
DISPRE  000174           133#  1322
DSWR  = 177570            31#    197    1313
DT1     057320           322    329    336    343    349    356    363    370    398    426    447    454    475
                         489    503    510    524    545    559    664    686    694    736  12080#
DT100   057342           764    792   12084#
DT106   057370           806    820   12090#
DT11    057326           377    391    918    932    946    960    974    988   1002   1016  12082#
DT112   057326           834    848    862   12081#
DT12    057342           384    433    440    461    468    708  12085#
DT120   057342           876    890    904   12084#
```

DT15	057354	405	412	419	482	496	566	701	715	722	729	12087#		
DT23	057364	517	531	573	587	601	615	629	643	657	671	678	743	757
		771	785	799	813	827	841	855	869	883	897	911	925	939
		953	967	981	995	1009	1023	12089#						
DT40	057326	538	552	580	594	608	622	636	650	12081#				
DT76	057326	750	778	12081#										
EMTVEC=	000030	120#	1297*	1298*										
EM1	043240	320	10979#											
EM10	043572	368	11018#											
EM100	051276	762	11526#											
EM101	051366	769	11536#											
EM102	051452	776	11545#											
EM103	051552	783	11556#											
EM104	051646	790	11566#											
EM105	051750	797	11577#											
EM106	052046	804	11588#											
EM107	052141	811	11598#											
EM11	043633	375	11024#											
EM110	052230	818	11608#											
EM111	052322	825	11618#											
EM112	052410	832	11627#											
EM113	052503	839	11637#											
EM114	052572	846	11647#											
EM115	052665	853	11657#											
EM116	052754	860	11667#											
EM117	053047	867	11677#											
EM12	043701	382	11031#											
EM120	053136	874	11687#											
EM121	053230	881	11697#											
EM122	053316	888	11706#											
EM123	053410	895	11716#											
EM124	053476	902	11725#											
EM125	053570	909	11735#											
EM126	053656	916	11744#											
EM127	053755	923	11755#											
EM13	043746	389	11038#											
EM130	054050	930	11765#											
EM131	054147	937	11776#											
EM132	054242	944	11786#											
EM133	054341	951	11797#											
EM134	054434	958	11807#											
EM135	054532	965	11818#											
EM136	054624	972	11828#											
EM137	054722	979	11839#											
EM14	044015	396	11045#											
EM140	055014	986	11849#											
EM141	055112	993	11860#											
EM142	055204	1000	11870#											
EM143	055274	1007	11880#											
EM144	055360	1014	11889#											
EM145	055451	1021	11899#											
EM15	044036	403	11048#											
EM16	044111	410	11056#											
EM17	044204	417	11066#											
EM2	043304	327	10985#											
EM20	044311	424	11078#											

EM21	044371	431	11087#											
EM22	044425	438	11092#											
EM23	044502	445	11100#											
EM24	044563	452	11109#											
EM25	044633	459	11116#											
EM26	044676	466	11122#											
EM27	044732	473	11127#											
EM3	043347	334	10991#											
EM30	044772	480	11133#											
EM31	045074	487	11144#											
EM32	045163	494	11154#											
EM33	045257	501	11165#											
EM34	045340	508	11174#											
EM35	045425	515	11183#											
EM36	045510	522	11192#											
EM37	045602	529	11202#											
EM4	043402	341	10996#											
EM40	045672	536	11212#											
EM41	045757	543	11221#											
EM42	046032	550	11229#											
EM43	046113	557	11238#											
EM44	046173	564	11247#											
EM45	046305	571	11260#											
EM46	046374	578	11270#											
EM47	046476	585	11281#											
EM5	043441	347	11002#											
EM50	046570	592	11291#											
EM51	046674	599	11303#											
EM52	046756	606	11312#											
EM53	047060	613	11323#											
EM54	047152	620	11333#											
EM55	047244	627	11343#											
EM56	047336	634	11353#											
EM57	047441	641	11365#											
EM6	043504	354	11008#											
EM60	047534	648	11375#											
EM61	047641	655	11387#											
EM62	047736	662	11398#											
EM63	050014	669	11406#											
EM64	050110	676	11416#											
EM65	050155	683	11423#											
EM66	050233	691	11431#											
EM67	050332	699	11442#											
EM7	043541	361	11013#											
EM70	050410	706	11450#											
EM71	050460	713	11457#											
EM72	050552	720	11467#											
EM73	050644	727	11477#											
EM74	050736	734	11487#											
EM75	051030	741	11497#											
EM76	051120	748	11507#											
EM77	051211	755	11517#											
ERCNTO	003064	1082#	1863*	1883	1885*	1955*	1977	1979*	2687*	2694*	2768*	2775*	2849*	2856*
		2951*	2975	2977*	3000	3002*	3021	3023*	3125*	3149	3151*	3174	3176*	3195
		3310*	3338*	3456*	3486*	3608*	3634*	3756*	3782*	3904*	3931*	4051*	4078*	
ERCNT1	003065	1083#	2688*	2721*	2769*	2801*	2850*	2883*	3309*	3377*	3457*	3524*	3609*	3757*

```
                        3819*   3905*   4052*   4114*
ERRVEC= 000004           113#    1311    1312*   1323*   10362   10363*  10365*  10368*
EXIT1   007506          2314    2324#
EXIT2   007512          2286    2326#
FAC05W  003174          1144#   6206    6325    6375
FP01XX  003144          1124#   7730    7751    8105    8125
FP05XX  003144          1122#   7720    7845    7970    8095    8217    8339
FP23XX  003154          1129#   7855    7876    8227    8247
FP45XX  003164          1134#   7980    8001    8349    8369
FW1   = 116220         12123#  12130#  12138#  12145#  12152#  12160#  12178#  12185#  12192#  12199#  12206#  12224#  12231#
                       12240#  12247#  12255#  12273#  12280#  12288#  12295#  12302#  12318#  12325#  12333#  12340#  12347#
                       12353#  12360#  12367#  12375#  12394#  12401#  12409#  12416#  12423#  12430#  12437#  12443#  12461#
                       12468#  12476#  12483#  12489#  12507#  12514#  12522#  12529#  12535#  12552#  12559#  12567#  12574#
                       12580#  12597#  12604#  12612#  12619#  12625#  12643#  12650#  12658#  12665#  12671#  12688#  12695#
                       12703#  12710#  12716#  12733#  12741#  12749#  12756#  12762#  12779#  12786#  12794#  12801#  12807#
                       12824#  12831#  12839#  12847#  12853#  12870#  12877#  12885#  12892#  12898#  12915#  12922#  12930#
                       12937#  12944#  12961#  12968#  12976#  12983#  12989#  13006#  13013#  13021#  13029#  13035#  13052#
                       13059#  13067#  13074#  13080#  13095#  13104#  13113#  13121#  13129#  13136#  13143#  13150#  13158#
                       13166#  13174#  13188#  13198#  13207#  13215#  13223#  13230#  13237#  13244#  13252#  13260#  13268#
                       13282#  13291#  13300#  13308#  13316#  13323#  13330#  13337#  13345#  13353#  13362#  13376#  13385#
                       13394#  13402#  13410#  13417#  13424#  13431#  13439#  13447#  13455#  13469#  13478#  13487#  13495#
                       13503#  13511#  13518#  13525#  13533#  13541#  13549#  13563#  13572#  13581#  13589#  13597#  13604#
                       13611#  13618#  13626#  13634#  13642#  13657#  13666#  13675#  13683#  13691#  13698#  13705#  13712#
                       13720#  13728#  13736#  13750#  13759#  13768#  13776#  13785#  13792#  13799#  13806#  13814#  13822#
                       13830#  13845#  13853#  13861#  13869#  13884#  13892#  13901#  13909#  13924#  13932#  13940#  13948#
                       13963#  13971#  13979#  13987#  14001#  14010#  14018#  14026#  14040#  14048#  14056#  14064#  14078#
                       14086#  14094#  14102#  14118#  14126#  14134#  14142#  14157#  14165#  14173#  14181#  14196#  14204#
                       14213#  14221#  14238#  14245#
FW2   = 000012         12123#  12130#  12138#  12145#  12152#  12160#  12178#  12185#  12192#  12199#  12206#  12224#  12231#
                       12240#  12247#  12255#  12273#  12280#  12288#  12295#  12302#  12318#  12325#  12333#  12340#  12347#
                       12353#  12360#  12367#  12375#  12394#  12401#  12409#  12416#  12423#  12430#  12437#  12443#  12461#
                       12468#  12476#  12483#  12489#  12507#  12514#  12522#  12529#  12535#  12552#  12559#  12567#  12574#
                       12580#  12597#  12604#  12612#  12619#  12625#  12643#  12650#  12658#  12665#  12671#  12688#  12695#
                       12703#  12710#  12716#  12733#  12741#  12749#  12756#  12762#  12779#  12786#  12794#  12801#  12807#
                       12824#  12831#  12839#  12847#  12853#  12870#  12877#  12885#  12892#  12898#  12915#  12922#  12930#
                       12937#  12944#  12961#  12968#  12976#  12983#  12989#  13006#  13013#  13021#  13029#  13035#  13052#
                       13059#  13067#  13074#  13080#  13095#  13104#  13113#  13121#  13129#  13136#  13143#  13150#  13158#
                       13166#  13174#  13188#  13198#  13207#  13215#  13223#  13230#  13237#  13244#  13252#  13260#  13268#
                       13282#  13291#  13300#  13308#  13316#  13323#  13330#  13337#  13345#  13353#  13362#  13376#  13385#
                       13394#  13402#  13410#  13417#  13424#  13431#  13439#  13447#  13455#  13469#  13478#  13487#  13495#
                       13503#  13511#  13518#  13525#  13533#  13541#  13549#  13563#  13572#  13581#  13589#  13597#  13604#
                       13611#  13618#  13626#  13634#  13642#  13657#  13666#  13675#  13683#  13691#  13698#  13705#  13712#
                       13720#  13728#  13736#  13750#  13759#  13768#  13776#  13785#  13792#  13799#  13806#  13814#  13822#
                       13830#  13845#  13853#  13861#  13869#  13884#  13892#  13901#  13909#  13924#  13932#  13940#  13948#
                       13963#  13971#  13979#  13987#  14001#  14010#  14018#  14026#  14040#  14048#  14056#  14064#  14078#
                       14086#  14094#  14102#  14118#  14126#  14134#  14142#  14157#  14165#  14173#  14181#  14196#  14204#
                       14213#  14221#  14238#  14245#
F7SVC = 006005          1052#   5615
GENPAR  036676          1873    1967    9944#
GENP1   036702          9942    9946#
GENWPA  036666          2967    3141    9940#
GNS   = ****** U         132    1334    10815   10816   10817   10818   10819   10822
HICHIP  003061          1079#
HICNT   003063          1081#
HT    = 000011            23#   10686   10727
ID    = 040000          1037#   1433
```

```
IOTVEC= 000020      118#   1295*  1296*
LDWCS   037472     4757    4855   4954   5047   5140   5238   5336   5429   5533   5612   5710   5914   6042
                   6222    6339   6500   6622   6770   6885   7021   7135   7250   7364   7481   7599   7714
                   7839    7964   8089   8211   8333   8460   8636   8814   8963   9175   9396   9569   9721
                  10257#
LF    = 000012      24#  10721  10727  10906  10909  10911  10916  10923  10937  10942  10944  10945  10950
                  10955   10960  10963  10968
LOCHIP  003060    1078#
LOCNT   003062    1080#
MAINT = 001000    1050#    4613   4620   4765   4773   4863   4871   4962   4970   5055   5063   5148   5156
                   5246    5254   5344   5352   5433   5440   5537   5545   5619   5633   5717   5721   5795
                   5799    5805   5918   5929   6071   6079   6227   6236   6359   6368   6505   6514   6641
                   6649    6775   6784   6904   6912   7038   7044   7156   7162   7267   7273   7385   7391
                   7503    7509   7621   7627   7742   7748   7867   7873   7992   7998   8116   8122   8238
                   8244    8360   8366   8466   8509   8642   8682   8820   8848   9026   9032   9237   9243
                   9445    9451   9575   9613   9740   9780
MASPLS  060326    8462   12774#
MBKREG= 177770    1045#    5520*
MBSPLS  060426    8638   12865#
MCSLS   061306    6502   13465#
MCSPLS  060526    8816   12956#
MED   = 076600    1039#    1353   1356   1419   1428   4663   5521   5524   5526   5529   5617   5622   5630
                   5774    5777   5848   5851   6214   6330   6383   6491   6613   6667   6762   6876   6927
                   7491    7725   7735   7850   7860   7975   7985   8100   8132   8222   8254   8344   8376
                   8476    8498   8501   8652   8674   8810   8812   8830   8981   8986   9005   9056   9197
                   9216    9272   9392   9394   9429   9464   9580   9582   9584   9586   9596   9598   9600
                   9602    9750   9771   9773   9775   9777   9791   9846  10849
MEMERR  003032    1066#    1262   1264
MFPLS   061076    6224   13278#
MF01LS  060026    7716   12501#
MF23LS  060126    7841   12592#
MF45LS  060226    7966   12683#
MF7SVC  062332    5614   14232#
MGRLS   060666    5916   13091#
MICRD2  057614    7366   12313#
MLDRD2  057406    7137   12118#
MLDWR2  057454    7023   12173#
MLSASP  060266    8965   12728#
MLSBSP  060366    9177   12819#
MLSCS   061412    6624   13559#
MLSCSP  060466    9398   12910#
MLSFP   061202    6341   13372#
MLSF01  057766    8091   12456#
MLSF23  060066    8213   12547#
MLSF45  060166    8335   12638#
MLSGR   060772    6044   13184#
MLSTMP  060566    9723   13001#
MLSWS   061622    6887   13746#
MODDPC  062214    5431   14113#
MRDIND  057514    7601   12219#
MRESIN  062300    5712   14191#
MSG10   042470   10043   10906#
MSG11   042505   10046   10909#
MSG12   042520    1592    1680  10001  10911#
MSG13   042552    1235    1594   1682  10916#
MSG14   042617    1597    1685  10923#
```

```
MSG17   042652          1242    1276    2324    2432    2540    2648    10335   10928#
MSG2    042264          1085    10875#
MSG20   042670          10931#
MSG21   042701          10182   10933#
MSG22   042725          3401    10937#
MSG23   042757          10195   10942#
MSG24   042766          10202   10944#
MSG25   042774          3548    3697    10945#
MSG26   043026          3845    3992    10950#
MSG27   043060          4139    10955#
MSG28   043112          1384    1713    10960#
MSG29   043134          1268    10963#
MSG3    042271          1086    10876#
MSG30   043172          1271    10968#
MSG31   043233          1238    1272    10002   10974#
MSG4    042276          1087    10877#
MSG5    042303          1088    10878#
MSG6    042322          1089    10881#
MSG7    042345          1090    10885#
MSG8    042362          1091    10888#
MSG80   042403          1092    10891#
MSG81   042410          1093    10892#
MSG82   042415          1094    10893#
MSG83   042423          1095    10895#
MSG84   042431          1096    10897#
MSG85   042437          1097    10899#
MSG86   042445          1098    10901#
MSG9    042453          1099    10903#
MTMPLS  060626          9571    13047#
MUBRK   062246          5535    14152#
MWRIND  057554          7483    12268#
MWR2    057704          7252    12389#
MWSLS   061516          6772    13653#
MXFC1   061760          4759    13879#
MXFC11  062012          4857    13919#
MXFC12  062044          4956    13958#
MXFC13  062076          5049    13996#
MXFC14  062130          5142    14035#
MXFC15  062162          5240    14073#
MXFC2   061726          5338    13840#
NEWPAS  004054          1350#   9882
NXTST   003056          1077#   1243    1277    1370*   1418*   1462*   1533*   1634*   1739*   1853*   1943*   2032*   2135*
                        2368*   2476*   2584*   2678*   2759*   2840*   2928*   3103*   3278*   3428*   3581*   3728*   3876*
                        4023*   4150*   4197*   4280*   4369*   4495*   4609*   4643*   4754*   4852*   4951*   5044*   5137*
                        5235*   5333*   5424*   5518*   5609*   5703*   5770*   5904*   6041*   6202*   6320*   6481*   6600*
                        6753*   6866*   7019*   7133*   7248*   7362*   7479*   7597*   7711*   7837*   7962*   8087*   8209*
                        8331*   8455*   8631*   8805*   8958*   9170*   9387*   9564*   9716*   10339
ODDPC  = 006004         1060#   5432
OTHDIS= 006001          1051#   4760
OTH11  = 006011         1053#   4858
OTH12  = 006012         1054#   4957
OTH13  = 006013         1055#   5050
OTH14  = 006014         1056#   5143
OTH15  = 006015         1057#   5241
PARDIS= 000020          1032#   1440    1467    1469    1490    1491    1504    1543    1638    1744    1857    1950    2033
                        2142    2168    2172    2207    2268    2326    2375    2390    2439    2483    2498    2547    2591
```

```
                        2606   2655   2724   2805   2887   2956   2992   3044   3130   3166   3218   3297   3376
                        3445   3523   3669   3744   3818   3893   3966   4039   4113   4153   4200   4281   4372
                        4496   4634   4648   4684   4796   4894   4993   5086   5179   5277   5465   5561   5649
                        5736   5828   5986   6152   6270   6427   6550   6701   6815   6960   7073   7187   7302
                        7416   7533   7650   7776   7901   8026   8148   8270   8392   8571   8744   8893   9110
                        9326   9501   9650   9821   9917
PARERR= 100000          1028#  1266   1482   2208   2718   2798   2881   3372   3519   3665   3814   3962   4109
PARGEN= 000200          1029#  1870   1963   2037   2047   2139   2282
PARPAT  006252          1859   1911#  1952   2945   3120
PAR0  = 000002          1035#  2140   2284   2421   2490   2598   2942   3117   4375   4501
PAR1  = 000004          1034#  1549   1575   1643   1669   2150   2382   2529   2598
PAR2  = 000010          1033#  1549   1575   1643   1669   2150   2382   2490   2637
PAT A = 111000          7026#  7030   7049   7052   7140#  7151   7166   7169   7255#  7259   7278   7281   7369#
                        7380   7395   7398   7486#  7490   7514   7524   7604#  7617   7631   8458#  8474   8504
                        8534   8535   8537   8538   8539   8542   8543   8544   8545   8546   8547   8548   8549
                        8550   8551   8553   8557   8558   8559   8560   8561   8562   8563   8564   8565   8961#
                        8970   9073   9074   9075   9076   9077   9078   9081   9082   9083   9084   9085   9086
                        9087   9088   9089   9090   9092   9096   9097   9098   9099   9100   9101   9102   9103
                        9104
PAT.B = 050000          7027#  7031   7059   7062   7141#  7153   7174   7177   7256#  7260   7288   7291   7370#
                        7382   7403   7406   8634#  8650   8677   8707   8708   8710   8711   8712   8715   8716
                        8717   8718   8719   8720   8721   8722   8723   8724   8725   8729   8731   8732   8733
                        8734   8735   8736   8737   8738   9173#  9184   9289   9290   9291   9292   9293   9294
                        9297   9298   9299   9300   9301   9302   9303   9304   9305   9306   9311   9313   9314
                        9315   9316   9317   9318   9319   9320
PAT.C = 134000          8808#  8828   8877   8878   8879   8880   8881   8882   8883   8884   8885   8886   8887
                        8888   9390#  9413   9485   9486   9487   9488   9489   9490   9491   9492   9493   9494
                        9495   9496
PAT.T = 076000          9567#  9579   9581   9583   9585   9590   9591   9593   9594   9638   9639   9640   9641
                        9642   9643   9644   9645   9719#  9732   9809   9810   9811   9812   9813   9314   9815
                        9816
PATO    006036          1740   1749   1769   1821#
PC    =%000007            44#  1546*  1551*  1563*  1577*  1621*  1641*  1645*  1658*  1671*  1710*  1761*  1866*
                       1873*  1959*  1967*  2152*  2295*  2312*  2322*  2384*  2431*  2492*  2539*  2600*  2647*
                       2961*  2967*  3135*  3141*  3284*  3403*  3429*  3550*  3582*  3699*  3729*  3847*  3878*
                       3994*  4024*  4141*  9863*  9866*  9876*  9881   9895*  9926*  9957*  9992*  10006* 10054*
                      10078* 10090* 10134* 10212* 10432* 10438* 10494* 10676* 10695* 10702* 10709* 10723* 10725*
                      10758* 10775* 10863
PFAC05  003224        1172#  6207   6243   6349   6376
PIRQ  = 177772          30#
PIRQVE= 000240         124#
PMSG2   003066        1085#  10036
PR0   = 000000          47#
PR1   = 000040          48#
PR2   = 000100          49#
PR3   = 000140          50#
PR4   = 000200          51#
PR5   = 000240          52#
PR6   = 000300          53#
PR7   = 000340          54#
PS    = 177776          27#     28
PSW   = 177776          28#  5921*  5923*  6131*  6133*
PWRVEC= 000024         119#  1301*  1302*  10827* 10828* 10837* 10843* 10859* 10860*
RDFLAG= 000144        1047#  5527   5617   8810   9392
RDWHAM= 000022        1040#  1354   1420   5522   5775   5849
RESINS= 000210        1049#
```

```
RESTAR  004006      1339#  10864
RESVEC= 000010       114#
R0    =%000000        35#  1355*  1372*  1377   1378   1391   1421   1423   1427*  1431*  1432*  1433   1435
                    1440   1443   1446   1448   1464*  1465*  1467*  1469   1471   1476   1478   1482   1484
                    1490*  1491   1493   1497*  1498   1500   1504   1506   1511*  1512   1514   1740*  1741*
                    1742*  1743*  1749*  1753   1755   1757   1763   1769*  1772   1774   1780   1785   1787
                    1793   1797   1799   1805   1806   1807   1808   1809*  1813   1859*  1864   1877*  1952*
                    1953*  1956   1971*  2038*  2045   2050   2063*  2068   2079   2137*  2147   2154   2200
                    2223   2245   2256   2261   2280   2298   2369*  2379   2386   2402   2410   2413   2419
                    2477*  2487   2494   2510   2518   2521   2527   2585*  2595   2602   2618   2626   2629
                    2635   2682*  2690   2692   2697   2705*  2708*  2713*  2727   2763*  2771   2773   2778
                    2785*  2788*  2793*  2808   2844*  2852   2854   2859   2867*  2870*  2876*  2890   2945*
                    2958   3049*  3120*  3121*  3132   3210*  3223*  3286*  3288   3290*  3298*  3313   3325*
                    3341   3379   3399*  3432*  3435   3437*  3446*  3461   3474*  3489   3526   3546*  3584*
                    3587   3589*  3598*  3612   3622*  3636   3671   3689*  3691*  3693*  3694*  3732*  3735
                    3737*  3745*  3760   3770*  3784   3821   3840*  3842*  3880*  3884   3886*  3894*  3909
                    3919*  3933   3967   3986*  3988*  3989*  4027*  4030   4032*  4040*  4055   4066*  4080
                    4116   4134*  4136*  4218*  4236*  4245*  4262*  4301*  4320*  4330*  4346*  4375*  4398
                    4422   4434*  4501*  4524   4548   4559*  4662*  4671*  4673   4675*  4676   4691   4755*
                    4786*  4853*  4884*  4952*  4983*  5045*  5076*  5138*  5169*  5236*  5267*  5334*  5365*
                    5523*  5528*  5539*  5618*  5627*  5708*  5731*  5772*  5776*  5779   5811*  5812   5814
                    5850*  5906*  5935*  5936   5941   5946*  5947   5951   5955*  5956   5961   5965*  5968
                    5971   5973   5978*  6048*  6051*  6053*  6055*  6057*  6059*  6061*  6063*  6065*  6067*
                    6083   6087   6212*  6243*  6247   6329*  6346*  6356*  6390   6397   6489*  6522*  6525
                    6540*  6612*  6629*  6638*  6670   6676   6760*  6790*  6792   6875*  6892*  6901*  6930
                    6936   7033*  7146*  7262*  7375*  7490*  7492*  7516*  7517   7518   7608*  7633*  7634
                    7635   7724*  7732*  7733*  7734   7849*  7857*  7858*  7859   7974*  7982*  7983*  7984
                    8099*  8109*  8110*  8111   8134   8138   8221*  8231*  8232*  8233   8256   8260   8343*
                    8353*  8354*  8355   8378   8382   8472*  8474*  8475   8499   8502   8504*  8648*  8650*
                    8651   8675   8677*  8811*  8826*  8828*  8829   8970*  8973   8975*  8983   8984   8988
                    8989   9000*  9002*  9003   9004*  9036*  9059   9184*  9187   9189*  9199   9200   9211*
                    9213*  9214   9215*  9247   9248*  9275   9393*  9413*  9415   9417*  9424*  9426*  9427
                    9428*  9467   9469   9579*  9581*  9583*  9585*  9590*  9597*  9599*  9601*  9603*  9730*
                    9732*  9733   9745*  9747*  9748   9749*  9763*  9772   9774   9776   9778   9794   9796
                    9845*  9873*  9876   9916   9918*  9919   9921*  9922   9925*  10018  10028* 10030* 10033
                    10040  10053* 10173  10203  10257  10264* 10266* 10267* 10268  10284* 10306* 10314* 10466
                    10467* 10468* 10475* 10476* 10477* 10478* 10479* 10480  10485  10490* 10492* 10496  10498
                    10594  10604* 10608  10624  10625  10638* 10669  10670* 10675  10680  10683* 10735  10743*
                    10747  10748  10750* 10751* 10752  10774* 10792  10793* 10794  10795* 10796* 10797* 10798*
                    10829  10848* 10858*
F1    =`000001        36#  1373*  1379*  1805*  1809   2035*  2048   2066*  2138*  2149   2281   2370*  2381
                    2422*  2478*  2489   2530*  2586*  2597   2638*  2685*  2689   2766*  2770   2847*  2851
                    2934*  2957   2959   2978   2993   3003   3024   3045   3070*  3071   3109*  3131   3133
                    3152   3167   3177   3199   3219   3245*  3246   3287*  3289   3291*  3292   3299*  3322
                    3326*  3327   3342   3352   3380   3400*  3433*  3436   3438*  3439   3447*  3471   3475*
                    3476   3490   3500   3527   3547*  3586*  3588   3590*  3591   3599*  3620   3623*  3624
                    3637   3645   3672   3690*  3692*  3695*  3696*  3733*  3736   3738*  3746*  3768   3771*
                    3786   3794   3822   3841*  3843*  3882*  3885   3887*  3895*  3917   3920*  3934   3942
                    3968   3987*  3990*  3991*  4028*  4031   4033*  4041*  4064   4067*  4082   4089   4117
                    4135*  4137*  4138*  4155*  4156   4157   4158*  4159   4162*  4163   4165   4169   4170
                    4174*  4175   4207*  4211*  4219*  4221   4226   4235*  4244*  4247   4253   4261*  4290*
                    4294*  4302*  4304   4310   4319*  4329*  4332   4337   4345*  4380*  4382   4384*  4393*
                    4395   4402   4407*  4416*  4419   4426   4430*  4506*  4508   4510*  4519*  4521   4528
                    4532*  4542*  4545   4552   4556*  4649*  4650   4652*  4653   4674*  4756*  4762   4775
                    4778   4785*  4798   4854*  4860   4873   4876   4883*  4896   4953*  4959   4972   4975
                    4982*  4995   5046*  5052   5065   5068   5075*  5088   5139*  5145   5158   5161   5168*
```

		5181	5237*	5243	5256	5259	5266*	5279	5335*	5341	5354	5357	5364*	5375
		5709*	5715	5722	5726	5730*	5779*	5780*	5781	5782*	5783*	5784*	5785	5907*
		5967*	5968	5972	6047*	6049*	6052*	6054*	6056*	6058*	6060*	6062*	6064*	6066*
		6091	6095	6204*	6217*	6245*	6249	6256	6263*	6325*	6327	6347*	6351	6355*
		6374*	6415*	6483*	6495*	6523*	6527	6534	6542*	6606*	6609	6630*	6634	6637*
		6655*	6692*	6756*	6765*	6791*	6793	6800	6807*	6871*	6873	6893*	6897	6900*
		6918*	6951*	7034*	7147*	7263*	7376*	7493*	7520*	7521	7522	7609*	7637*	7638
		7639	7757*	7758*	7760	7764	7882*	7883*	7885	7889	8007*	8008*	8010	8014
		8129*	8130*	8131	8134	8137	8251*	8252*	8253	8256	8259	8373*	8374*	8375
		8378	8381	8971*	8976*	9037*	9185*	9190*	9249	9250*	9459*	9460	9462	9471
		9591*	9597	9604*	9764*	9772*	10019	10023*	10026*	10033	10052*	10068	10071*	10072
		10073*	10074	10075	10080*	10081*	10083	10089*	10174	10196	10258	10263*	10264	10265
		10269*	10270	10272	10274*	10275	10279*	10308	10313*	10595	10608*	10609	10613	10637*
		10736	10773*	10830	10857*									
R2	=^000002	37#	1375*	1382	1390*	1806*	1807*	1808*	1875	1886	1969	1980	2044*	2060
		2062*	2139*	2259	2283*	2371*	2424*	2479*	2532*	2587*	2640*	2691*	2692	2698
		2710*	2711	2772*	2773	2779	2790*	2791	2853*	2854	2860	2873*	2874	2942*
		2943	2969	2971*	2972	3117*	3118	3143	3145*	3146	3244*	3314*	3315	3316*
		3318	3320*	3322	3343	3354	3359	3361*	3363	3462*	3464	3465*	3467	3469*
		3471	3491	3502	3508	3509*	3511	3613*	3614	3615*	3617	3619*	3620	3638
		3647	3653	3655*	3657	3734*	3739*	3761*	3762	3763*	3765	3767*	3768	3787
		3796	3802	3804*	3806	3883*	3888*	3910*	3911	3912*	3914	3916*	3917	3935
		3944	3950	3952*	3954	4029*	4034*	4056*	4057	4059*	4061	4063*	4064	4083
		4091	4097	4099*	4101	4164*	4165	4171	4222*	4228	4248*	4249	4255	4305*
		4306	4312	4333*	4339	4396*	4420*	4441*	4442*	4443*	4444	4458*	4459*	4460*
		4461	4522*	4546*	4566*	4567*	4568*	4569	4583*	4584*	4585*	4586	4611*	4616*
		4644*	4688	5706*	5738*	5908*	6099	6103	6206*	6210	6247*	6251	6257	6259
		6324*	6333*	6349*	6352	6375*	6380	6485*	6487	6525*	6529	6535	6605*	6616*
		6632*	6635	6636*	6656*	6664	6757*	6758	6760	6792*	6795	6801	6803*	6804
		6870*	6879*	6895*	6898	6919*	6924	7032*	7149*	7150	7261*	7378*	7379	7497*
		7498	7613*	7614	7739*	7754	7763	7768*	7864*	7879	7888	7893*	7989*	8004
		8013	8018*	8107*	8108	8127*	8229*	8230	8249*	8351*	8352	8371*	8471*	8472
		8494*	8647*	8648	8670*	8825*	8826	8843*	8999*	9000	9023*	9038*	9210*	9211
		9234*	9251	9252*	9423*	9424	9442*	9461*	9467	9470	9592*	9744*	9745	9762*
		9774*	9948*	9951*	9954*	10020	10024*	10026	10040	10051*	10186*	10187*	10190	10192
		10259	10281*	10289	10295	10296	10299	10300	10302	10312*	10327	10596	10607*	10611*
		10614	10621*	10622*	10623	10628*	10636*	10831	10856*					
R3	=^000003	38#	1745*	1758	1810	1886*	1888*	1889*	1891	1980*	1982*	1983*	1986	2039*
		2070*	2140*	2197	2242	2285*	2680*	2703*	2761*	2784*	2842*	2865*	2964*	2965*
		2966	3138*	3139*	3140	3308*	3358*	3397	3506*	3544	3651*	3687	3800*	3838
		3948*	3984	4025*	4095*	4132	4154*	4167*	4203*	4233	4249	4254	4286*	4292
		4306	4311	4344	4373*	4405	4499*	4509	4555	4775	4779	4873	4877	4972
		4976	5065	5069	5158	5162	5256	5260	5354	5358	5425*	5442	5444	5519*
		5547	5549	5610*	5635	5637	5722	5727	5909*	6107	6111	6207*	6212	6250*
		6251	6258	6352*	6353*	6354	6376*	6386	6486*	6489	6494*	6528*	6529	6536
		6659*	6673	6794*	6795	6802	7030*	7144*	7166	7170	7259*	7373*	7395	7399
		7494*	7610*	7631	7641	7755*	7760	7765	7880*	7885	7890	8005*	8010	8015
		9039*	9253	9254*	9593*	9599	9605*	9765*	9776*	9940	9941*	9944	9945*	9950*
		9952*	9956*	9979	9983*	9984*	9985*	9986*	9989	9990*	10021	10027*	10032*	10035*
		10036	10037*	10050*	10115	10117*	10118*	10119	10120*	10123*	10126*	10129*	10131	10133*
		10260	10289*	10290	10311*	10537	10546*	10552*	10553*	10556*	10561*	10562*	10563	10572*
		10597	10605*	10606*	10620*	10623*	10632*	10633*	10635*	10832	10855*			
R4	=%000004	39#	1747*	1750*	1754*	1756*	1770*	1783*	1795*	1858*	1859	1864*	1867	1890
		1951*	1952	1956*	1960	1984	2037*	2066	2681*	2706	2711*	2762*	2786	2791*
		2843*	2868	2874*	2944*	2945	2958*	2962	2979	3004	3019	3025	3046	3119*
		3120	3132*	3136	3153	3178	3193	3200	3220	3300*	3315*	3448*	3464*	3600*

		3614*	3748*	3762*	3896*	3911*	4043*	4057*	4151*	4156*	4163*	4201*	4208*	4210*
		4221*	4247*	4284*	4291*	4293*	4304*	4332*	4381*	4385*	4392*	4408*	4417*	4431*
		4507*	4511*	4518*	4533*	4543*	4557*	5705*	5706	5724*	5771*	5840*	5841	5910*
		6115	6119	6241*	6264*	6386*	6387*	6390	6393	6394*	6395	6519*	6544*	6657*
		6670	6675	6691*	6789*	6809*	6924*	6925*	6926	6930	6934	6935	7031*	7145*
		7174	7178	7260*	7374*	7403	7407	7495*	7611*	7721*	7727*	7731*	7737*	7752*
		7769*	7846*	7852*	7856*	7862*	7877*	7894*	7971*	7977*	7981*	7987*	8002*	8019*
		8096*	8102*	8106*	8113*	8126*	8141*	8218*	8224*	8228*	8235*	8248*	8263*	8340*
		8346*	8350*	8357*	8370*	8385*	8514*	8528*	8687*	8701*	8853*	8867*	9040*	9255
		9256*	9412*	9418*	9456*	9475*	9594*	9601	9606*	9618*	9631*	9766*	9778*	9947
		9949*	9955*	9980	9983	9987*	9988*	9989*	10117	10124	10127	10130*	10131*	10173*
		10174*	10175*	10176*	10178	10538	10540*	10541*	10542*	10543	10544*	10558	10560*	10568*
		10571*	10833	10854*										
R5	=%000005	40#	1748*	1753*	1755*	1757*	1771	1784	1796	1868*	1870*	1875	1961*	1963*
		1969	2046*	2047*	2048	2195*	2196*	2197	2201*	2240*	2241*	2242	2246*	2257*
		2258*	2259	2282*	2283	2284*	2285	2393*	2410	2414	2421*	2422	2501*	2518
		2522	2529*	2530	2609*	2626	2630	2637*	2638	2684*	2709*	2765*	2789*	2846*
		2872*	2963*	2966*	2972	2994*	3019	3026	3053*	3054	3137*	3140*	3146	3168*
		3193	3201	3227*	3228	3302*	3306	3317*	3318*	3319*	3450*	3454	3466*	3467*
		3468*	3602*	3606	3616*	3617*	3618*	3750*	3754	3764*	3765*	3766*	3898*	3902
		3913*	3914*	3915*	4045*	4049	4060*	4061*	4062*	4152*	4157*	4164	4202*	4209*
		4222	4233*	4248	4260*	4285*	4292*	4305	4318*	4333	4344*	4397*	4398	4403
		4421*	4422	4427	4523*	4524	4529	4547*	4548	4553	4757*	4855*	4954*	5047*
		5140*	5238*	5336*	5429*	5533*	5612*	5710*	5773*	5792	5800	5808*	5809	5816*
		5830	5911*	5914*	6042*	6123	6127	6222*	6339*	6378*	6398	6414*	6500*	6520*
		6537	6541*	6622*	6660*	6677	6690*	6770*	6885*	6920*	6937	6950*	7021*	7035*
		7135*	7148*	7250*	7264*	7364*	7377*	7481*	7496*	7599*	7612*	7714*	7720*	7722
		7730*	7732	7751*	7757	7762	7839*	7845*	7847	7855*	7857	7876*	7882	7887
		7964*	7970*	7972	7980*	7982	8001*	8007	8012	8089*	8095*	8097	8105*	8109
		8125*	8129	8136	8211*	8217*	8219	8227*	8231	8247*	8251	8258	8333*	8339*
		8341	8349*	8353	8369*	8373	8380	8460*	8513*	8519	8636*	8686*	8692	8814*
		8852*	8859	8963*	9041*	9175*	9257	9258*	9396*	9455*	9459	9461	9569*	9607*
		9617*	9622	9623	9721*	9728*	9730	9785*	9789	9790	9978	9980*	9981*	9982*
		9988	9991*	10069	10082*	10083*	10084*	10085	10088*	10116	10119*	10121*	10122*	10123
		10132*	10178*	10188*	10279	10281	10283	10320*	10339*	10539	10545*	10547*	10549*	10550*
		10551*	10552	10570*	10598	10600*	10602*	10609*	10613*	10628	10634*	10834	10853*	
R6	=%000006	41#	1289*	1290*	1291	1339*	1340*	1341	5922*	5924*	6074*	6081	6082*	6132
R7	=%000007	42#												
SP	=%000006	43#	1234	1236*	1239*	1240*	1243*	1261	1273*	1274*	1277*	1281*	1293*	1311*
		1319*	1323	1343*	1350*	1387	1600*	1601	1602	1688*	1689	1690	2186	2293
		2294	2310	2311	2320	2321	2429	2430	2435	2537	2538	2543	2645	2646
		2651	2720	2800	2885	3042	3216	3352*	3353*	3354*	3355*	3356	3374	3401*
		3402*	3500*	3501*	3502*	3503*	3504	3521	3548*	3549*	3645*	3646*	3647*	3648*
		3649	3667	3697*	3698*	3794*	3795*	3796*	3797*	3798	3816	3845*	3846*	3942*
		3943*	3944*	3945*	3946	3964	3992*	3993*	4089*	4090*	4091*	4092*	4093	4111
		4139*	4140*	4633	4686	4793	4891	4990	5083	5176	5274	5372	5450	5451
		5464	5560	5648	5734	5748	5804	5826	5987	6153	6269	6426	6549	6700
		6814	6959	7074	7188	7303	7417	7534	7651	7777	7902	8027	8149	8271
		8393	8496	8572	8672	8745	8894	8978	8992	8993	9042*	9068	9111	9180
		9203	9204	9247*	9248	9249*	9250	9251*	9252	9253*	9254	9255*	9256	9257*
		9258	9284	9327	9502	9651	9822	9870*	9907	9910*	9916*	9925	9940*	9944*
		9947*	9955	9956	9978*	9979*	9990	9991	10003*	10004*	10018*	10019*	10020*	10021*
		10050	10051	10052	10053	10068*	10069*	10087*	10088	10089	10115*	10116*	10132	10133
		10176	10181	10190*	10196*	10197*	10203*	10204*	10209*	10210	10257*	10258*	10259*	10260*
		10311	10312	10313	10314	10336*	10362*	10365	10367	10368	10397	10398	10402*	10427
		10447*	10450*	10466*	10471*	10492	10496*	10529*	10530	10531	10532*	10537*	10538*	10539*

```
                        10545   10570   10571   10572   10573*  10574*  10594*  10595*  10596*  10597*  10598*  10599*  10600
                        10603*  10616   10618*  10620   10630   10632   10634   10635   10636   10637   10638   10640*  10641*
                        10669*  10670   10680*  10682   10683   10684*  10686   10688   10690   10696   10698*  10700*  10708*
                        10712   10716   10717   10721   10735*  10736*  10743   10744*  10755   10756*  10757*  10767   10768*
                        10773   10774   10792*  10793   10803*  10804*  10829*  10830*  10831*  10832*  10833*  10834*  10835*
                        10836   10844*  10848   10852   10853   10854   10855   10856   10857   10858   10863*
STACK  = 001100            18#   1293    1343    1350
START    003450           136   1289#
STKLMT= 177774             29#
STWRDO   006044          1745   1825#
SWB01  = 000071          1048#   5520
SWP      001140           197#   1291    1313*   1315    1321*   1328*   1341    9905    9998   10357   10371   10373   10379
                        10386   10423   10430   10442   10445   10835   10852*
SWPEG    000176           134#   1321
SW0    = 000001            82#
SW00   = 000001            72#     82
SW01   = 000002            71#     81
SW02   = 000004            70#     80
SW03   = 000010            69#     79
SW04   = 000020            68#     78
SW05   = 000040            67#     77
SW06   = 000100            66#     76
SW07   = 000200            65#     75
SW08   = 000400            64#     74
SW09   = 001000            63#     73
SW1    = 010000            81#  12123#  12130#  12138#  12145#  12152#  12160#  12178#  12185#   2192#  12199#  12206#  12224#
                        12231#  12240#  12247#  12255#  12273#  12280#  12288#  12295#  12302    2318#  12325#  12333#  12340#
                        12347#  12353#  12360#  12367#  12375#  12394#  12401#  12409#  12416#  12423#  12430#  12437#  12443#
                        12461#  12468#  12476#  12483#  12489#  12507#  12514#  12522#  12529#  12535#  12552#  12559#  12567#
                        12574#  12580#  12597#  12604#  12612#  12619#  12625#  12643#  12650#  12658#  12665#  12671#  12688#
                        12695#  12703#  12710#  12716#  12733#  12741#  12749#  12756#  12762#  12779#  12786#  12794#  12801#
                        12807#  12824#  12831#  12839#  12847#  12853#  12870#  12877#  12885#  12892#  12898#  12915#  12922#
                        12930#  12937#  12944#  12961#  12968#  12976#  12983#  12989#  13006#  13013#  13021#  13029#  13035#
                        13052#  13059#  13067#  13074#  13080#  13095#  13104#  13113#  13121#  13129#  13136#  13143#  13150#
                        13158#  13166#  13174#  13188#  13198#  13207#  13215#  13223#  13230#  13237#  13244#  13252#  13260#
                        13268#  13282#  13291#  13300#  13308#  13316#  13323#  13330#  13337#  13345#  13353#  13362#  13376#
                        13385#  13394#  13402#  13410#  13417#  13424#  13431#  13439#  13447#  13455#  13469#  13478#  13487#
                        13495#  13503#  13511#  13518#  13525#  13533#  13541#  13549#  13563#  13572#  13581#  13589#  13597#
                        13604#  13611#  13618#  13626#  13634#  13642#  13657#  13666#  13675#  13683#  13691#  13698#  13705#
                        13712#  13720#  13728#  13736#  13750#  13759#  13768#  13776#  13785#  13792#  13799#  13806#  13814#
                        13822#  13830#  13845#  13853#  13861#  13869#  13884#  13892#  13901#  13909#  13924#  13932#  13940#
                        13948#  13963#  13971#  13979#  13987#  14001#  14010#  14018#  14026#  14040#  14048#  14056#  14064#
                        14078#  14086#  14094#  14102#  14118#  14126#  14134#  14142#  14157#  14165#  14173#  14181#  14196#
                        14204#  14213#  14221#  14238#  14245#
SW10   = 002000            62#
SW11   = 004000            61#
SW12   = 010000            60#
SW13   = 020000            59#   9905    9998
SW14   = 040000            58#
SW15   = 100000            57#
SW2    = 000001            80#  12123#  12130#  12138#  12145#  12152#  12160#  12178#  12185#  12192#  12199#  12206#  12224#
                        12231#  12240#  12247#  12255#  12273#  12280#  12288#  12295#  12302#  12318#  12325#  12333#  12340#
                        12347#  12353#  12360#  12367#  12375#  12394#  12401#  12409#  12416#  12423#  12430#  12437#  12443#
                        12461#  12468#  12476#  12483#  12489#  12507#  12514#  12522#  12529#  12535#  12552#  12559#  12567#
                        12574#  12580#  12597#  12604#  12612#  12619#  12625#  12643#  12650#  12658#  12665#  12671#  12688#
                        12695#  12703#  12710#  12716#  12733#  12741#  12749#  12756#  12762#  12779#  12786#  12794#  12801#
```

```
                        12807#  12824#  12831#  12839#  12847#  12853#  12870#  12877#  12885#  12892#  12898#  12915#  12922#
                        12930#  12937#  12944#  12961#  12968#  12976#  12983#  12989#  13006#  13013#  13021#  13029#  13035#
                        13052#  13059#  13067#  13074#  13080#  13095#  13104#  13113#  13121#  13129#  13136#  13143#  13150#
                        13158#  13166#  13174#  13188#  13198#  13207#  13215#  13223#  13230#  13237#  13244#  13252#  13260#
                        13268#  13282#  13291#  13300#  13308#  13316#  13323#  13330#  13337#  13345#  13353#  13362#  13376#
                        13385#  13394#  13402#  13410#  13417#  13424#  13431#  13439#  13447#  13455#  13469#  13478#  13487#
                        13495#  13503#  13511#  13518#  13525#  13533#  13541#  13549#  13563#  13572#  13581#  13589#  13597#
                        13604#  13611#  13618#  13626#  13634#  13642#  13657#  13666#  13675#  13683#  13691#  13698#  13705#
                        13712#  13720#  13728#  13736#  13750#  13759#  13768#  13776#  13785#  13792#  13799#  13806#  13814#
                        13822#  13830#  13845#  13853#  13861#  13869#  13884#  13892#  13901#  13909#  13924#  13932#  13940#
                        13948#  13963#  13971#  13979#  13987#  14001#  14010#  14018#  14026#  14040#  14048#  14056#  14064#
                        14078#  14086#  14094#  14102#  14118#  14126#  14134#  14142#  14157#  14165#  14173#  14181#  14196#
                        14204#  14213#  14221#  14238#  14245#
SW3     = 000010           79#
SW4     = 000020           78#
SW5     = 000040           77#
SW6     = 000100           76#
SW7     = 000200           75#
SW8     = 000400           74#
SW9     = 001000           73#
TBITVE= 000014            115#
TKVEC = 000060            122#
TMP0    003046         1073#   1854*   1858    1903    1907*   1944*   1951    2000    2004*   2930*   2944    3054*   3105*
                        3119    3228*   3304*   3359*   3399    3452*   3508*   3546    3604*   3653*   3689    3752*   3802*
                        3840    3900*   3950*   3986    4047*   4097*   4134    4374*   4435*   4436    4441    4458    4500*
                        4560*   4561    4566    4583    6081*   6141    6145
TMP1    003050         1074#   2943*   2964    2971    3069*   3118*   3138    3145    3243*   3244    3306*   3362*   3363*
                        3364*   3400    3454*   3510*   3511*   3512*   3547    3606*   3656*   3657*   3658*   3690    3754*
                        3805*   3806*   3807*   3841    3902*   3953*   3954*   3955*   3987    4049*   4100*   4101*   4102*
                        4135    4376*   4380    4393    4433*   4502*   4506    4519    4558*   6132*   6134    6138
TPATRN  007542         2137    2332#
TPVEC = 000064          123#
TRAPC   037034         1234*   1239    1261*   1273    1281    2293*   2310*   2320*   2429*   2537*   2645*   10003   10008#
TRAPVE= 000034          121#   1299*   1300*
TRPMSG  037000         2295    2312    2322    2431    2539    2647    9998#
TRP2    007474         2221    2316#
TRP3    007460         2187    2310#
TRTVEC= 000014          116#
TSTAT   007546         2138    2335#
TST1    004110         1369#
TST10   006256         1853    1906    1942#
TST100  031712         8331    8387    8454#
TST101  032314         8455    8530    8630#
TST102  032710         8631    8703    8804#
TST103  033220         8805    8869    8957#
TST104  034100         8958    9069    9169#
TST105  034762         9170    9285    9386#
TST106  035440         9387    9477    9563#
TST107  036004         9564    9634    9715#
TST11   006444         1943    2003    2031#
TST110  036404         9716    9805    9840#
TST12   006632         2032    2073    2134#
TST13   007552         2135    2330    2367#
TST14   010076         2368    2475#
TST15   010422         2476    2583#
TST16   010746         2584    2677#
```

TST17	011224	2678	2758#										
TST2	004224	1370	1383	1417#									
TST20	011514	2759	2839#										
TST21	012000	2840	2927#										
TST22	012434	2928	3072	3102#									
TST23	013056	3103	3247	3277#									
TST24	013464	3278	3398	3427#									
TST25	014074	3428	3545	3580#									
TST26	014520	3581	3688	3727#									
TST27	015146	3728	3839	3875#									
TST3	004342	1418	1447	1461#									
TST30	015576	3876	3985	4022#									
TST31	016240	4023	4133	4149#									
TST32	016360	4150	4196#										
TST33	016576	4197	4252	4279#									
TST34	017014	4280	4336	4368#									
TST35	017372	4369	4425	4438	4494#								
TST36	017750	4495	4551	4564	4608#								
TST37	020052	4609	4629	4642#									
TST4	004532	1462	1513	1532#									
TST40	020250	4643	4753#										
TST41	020420	4754	4787	4851#									
TST42	020570	4852	4885	4950#									
TST43	020740	4951	4984	5043#									
TST44	021110	5044	5077	5136#									
TST45	021260	5137	5170	5234#									
TST46	021430	5235	5268	5332#									
TST47	021566	5333	5366	5423#									
TST5	005076	1533	1633#										
TST50	021754	5424	5458	5517#									
TST51	022136	5518	5548	5554	5608#								
TST52	022304	5609	5636	5642	5702#								
TST53	022502	5703	5725	5732	5739	5769#							
TST54	023040	5770	5903#										
TST55	023450	5904	5981	6040#									
TST56	024276	6041	6150	6201#									
TST57	024506	6202	6319#										
TST6	005476	1634	1712	1738#									
TST60	024776	6320	6417	6480#									
TST61	025216	6481	6545	6599#									
TST62	025474	6600	6694	6752#									
TST63	025700	6753	6865#										
TST64	026142	6866	6953	7018#									
TST65	026400	7019	7068	7132#									
TST66	026616	7133	7182	7247#									
TST67	027054	7248	7297	7361#									
TST7	006052	1739	1819	1852#									
TST70	027272	7362	7411	7478#									
TST71	027524	7479	7528	7596#									
TST72	027750	7597	7645	7710#									
TST73	030220	7711	7771	7836#									
TST74	030464	7837	7896	7961#									
TST75	030730	7962	8021	8086#									
TST76	031176	8087	8143	8208#									
TST77	031444	8209	8265	8330#									
TW1 =	130000	12123#	12130#	12138#	12145#	12152#	12160#	12178#	12185#	12192#	12199#	12206#	12224#	12231#

```
                        12240#  12247#  12255#  12273#  12280#  12288#  12295#  12302#  12318#  12325#  12333#  12340#  12347#
                        12353#  12360#  12367#  12375#  12394#  12401#  12409#  12416#  12423#  12430#  12437#  12443#  12461#
                        12468#  12476#  12483#  12489#  12507#  12514#  12522#  12529#  12535#  12552#  12559#  12567#  12574#
                        12580#  12597#  12604#  12612#  12619#  12625#  12643#  12650#  12658#  12665#  12671#  12688#  12695#
                        12703#  12710#  12716#  12733#  12741#  12749#  12756#  12762#  12779#  12786#  12794#  12801#  12807#
                        12824#  12831#  12839#  12847#  12853#  12870#  12877#  12885#  12892#  12898#  12915#  12922#  12930#
                        12937#  12944#  12961#  12968#  12976#  12983#  12989#  13006#  13013#  13021#  13029#  13035#  13052#
                        13059#  13067#  13074#  13080#  13095#  13104#  13113#  13121#  13129#  13136#  13143#  13150#  13158#
                        13166#  13174#  13188#  13198#  13207#  13215#  13223#  13230#  13237#  13244#  13252#  13260#  13268#
                        13282#  13291#  13300#  13308#  13316#  13323#  13330#  13337#  13345#  13353#  13362#  13376#  13385#
                        13394#  13402#  13410#  13417#  13424#  13431#  13439#  13447#  13455#  13469#  13478#  13487#  13495#
                        13503#  13511#  13518#  13525#  13533#  13541#  13549#  13563#  13572#  13581#  13589#  13597#  13604#
                        13611#  13618#  13626#  13634#  13642#  13657#  13666#  13675#  13683#  13691#  13698#  13705#  13712#
                        13720#  13728#  13736#  13750#  13759#  13768#  13776#  13785#  13792#  13799#  13806#  13814#  13822#
                        13830#  13845#  13853#  13861#  13869#  13884#  13892#  13901#  13909#  13924#  13932#  13940#  13948#
                        13963#  13971#  13979#  13987#  14001#  14010#  14018#  14026#  14040#  14048#  14056#  14064#  14078#
                        14086#  14094#  14102#  14118#  14126#  14134#  14142#  14157#  14165#  14173#  14181#  14196#  14204#
                        14213#  14221#  14238#  14245#
TYPDS  = 104405          9871   10191   10819#
TYPE   = 104401          1235    1238    1242    1268    1271    1272    1276    1332    1384    1713    9869    9872    9908
                        10001   10002   10335   10425   10433   10465   10482   10484   10487   10489   10493   10500   10564
                        10639   10691   10815#  10861
TYPMSG= 104406           1592    1594    1597    1680    1682    1685    2324    2432    2540    2648   10038   10043   10046
                        10182   10183   10195   10202   10822#
TYPOC  = 104402          1237    1241    1275   10005   10337   10473   10497   10816#
TYPON  = 104404         10818#
TYPOS  = 104403         10198   10205   10817#
TY MSG  036574           9905#  10822
UBRK   = 006000          1061#   5536
UDISP  = 006002          1059#   5339    5917    6045    6225    6342    6503    6625    6773    6888    7024    7138    7253
                         7367    7484    7602    7717    7842    7967    8092    8214    8336    8463    8639    8817    8966
                         9178    9399    9572    9724
URESIN= 006003           1058#   5713
UWDEND= 125252           1063#  10302   12164   12210   12259   12306   12380   12447   12493   12539   12584   12630   12675
                        12720   12766   12811   12857   12902   12948   12993   13039   13084   13178   13272   13366   13459
                        13553   13646   13740   13834   13873   13913   13952   13991   14030   14068   14106   14146   14185
                        14225   14249
UWRD1  = 137000         12123#  12124   12130#  12131   12138#  12139   12145#  12146   12152#  12153   12160#  12161   12178#
                        12179   12185#  12186   12192#  12193   12199#  12200   12206#  12207   12224#  12225   12231#  12232
                        12240#  12241   12247#  12248   12255#  12256   12273#  12274   12280#  12281   12288#  12289   12295#
                        12296   12302#  12303   12318#  12319   12325#  12326   12333#  12334   12340#  12341   12347#  12348
                        12353#  12354   12360#  12361   12367#  12368   12375#  12376   12394#  12395   12401#  12402   12409#
                        12410   12416#  12417   12423#  12424   12430#  12431   12437#  12438   12443#  12444   12461#  12462
                        12468#  12469   12476#  12477   12483#  12484   12489#  12490   12507#  12508   12514#  12515   12522#
                        12523   12529#  12530   12535#  12536   12552#  12553   12559#  12560   12567#  12568   12574#  12575
                        12580#  12581   12597#  12598   12604#  12605   12612#  12613   12619#  12620   12625#  12626   12643#
                        12644   12650#  12651   12658#  12659   12665#  12666   12671#  12672   12688#  12689   12695#  12696
                        12703#  12704   12710#  12711   12716#  12717   12733#  12734   12741#  12742   12749#  12750   12756#
                        12757   12762#  12763   12779#  12780   12786#  12787   12794#  12795   12801#  12802   12807#  12808
                        12824#  12825   12831#  12832   12839#  12840   12847#  12848   12853#  12854   12870#  12871   12877#
                        12878   12885#  12886   12892#  12893   12898#  12899   12915#  12916   12922#  12923   12930#  12931
                        12937#  12938   12944#  12945   12961#  12962   12968#  12969   12976#  12977   12983#  12984   12989#
                        12990   13006#  13007   13013#  13014   13021#  13022   13029#  13030   13035#  13036   13052#  13053
                        13059#  13060   13067#  13068   13074#  13075   13080#  13081   13095#  13096   13104#  13105   13113#
                        13114   13121#  13122   13129#  13130   13136#  13137   13143#  13144   13150#  13151   13158#  13159
                        13166#  13167   13174#  13175   13188#  13189   13198#  13199   13207#  13208   13215#  13216   13223#
```

	13224	13230#	13231	13237#	13238	13244#	13245	13252#	13253	13260#	13261	13268#	13269
	13282#	13283	13291#	13292	13300#	13301	13308#	13309	13316#	13317	13323#	13324	13330#
	13331	13337#	13338	13345#	13346	13353#	13354	13362#	13363	13376#	13377	13385#	13386
	13394#	13395	13402#	13403	13410#	13411	13417#	13418	13424#	13425	13431#	13432	13439#
	13440	13447#	13448	13455#	13456	13469#	13470	13478#	13479	13487#	13488	13495#	13496
	13503#	13504	13511#	13512	13518#	13519	13525#	13526	13533#	13534	13541#	13542	13549#
	13550	13563#	13564	13572#	13573	13581#	13582	13589#	13590	13597#	13598	13604#	13605
	13611#	13612	13618#	13619	13626#	13627	13634#	13635	13642#	13643	13657#	13658	13666#
	13667	13675#	13676	13683#	13684	13691#	13692	13698#	13699	13705#	13706	13712#	13713
	13720#	13721	13728#	13729	13736#	13737	13750#	13751	13759#	13760	13768#	13769	13776#
	13777	13785#	13786	13792#	13793	13799#	13800	13806#	13807	13814#	13815	13822#	13823
	13830#	13831	13845#	13846	13853#	13854	13861#	13862	13869#	13870	13884#	13885	13892#
	13893	13901#	13902	13909#	13910	13924#	13925	13932#	13933	13940#	13941	13948#	13949
	13963#	13964	13971#	13972	13979#	13980	13987#	13988	14001#	14002	14010#	14011	14018#
	14019	14026#	14027	14040#	14041	14048#	14049	14056#	14057	14064#	14065	14078#	14079
	14086#	14087	14094#	14095	14102#	14103	14118#	14119	14126#	14127	14134#	14135	14142#
	14143	14157#	14158	14165#	14166	14173#	14174	14181#	14182	14196#	14197	14204#	14205
	14213#	14214	14221#	14222	14238#	14239	14245#	14246					
UWRD2 = 010001	12123#	12124	12130#	12131	12138#	12139	12145#	12146	12152#	12153	12160#	12161	12178#
	12179	12185#	12186	12192#	12193	12199#	12200	12206#	12207	12224#	12225	12231#	12232
	12240#	12241	12247#	12248	12255#	12256	12273#	12274	12280#	12281	12288#	12289	12295#
	12296	12302#	12303	12318#	12319	12325#	12326	12333#	12334	12340#	12341	12347#	12348
	12353#	12354	12360#	12361	12367#	12368	12375#	12376	12394#	12395	12401#	12402	12409#
	12410	12416#	12417	12423#	12424	12430#	12431	12437#	12438	12443#	12444	12461#	12462
	12468#	12469	12476#	12477	12483#	12484	12489#	12490	12507#	12508	12514#	12515	12522#
	12523	12529#	12530	12535#	12536	12552#	12553	12559#	12560	12567#	12568	12574#	12575
	12580#	12581	12597#	12598	12604#	12605	12612#	12613	12619#	12620	12625#	12626	12643#
	12644	12650#	12651	12658#	12659	12665#	12666	12671#	12672	12688#	12689	12695#	12696
	12703#	12704	12710#	12711	12716#	12717	12733#	12734	12741#	12742	12749#	12750	12756#
	12757	12762#	12763	12779#	12780	12786#	12787	12794#	12795	12801#	12802	12807#	12808
	12824#	12825	12831#	12832	12839#	12840	12847#	12848	12853#	12854	12870#	12871	12877#
	12878	12885#	12886	12892#	12893	12898#	12899	12915#	12916	12922#	12923	12930#	12931
	12937#	12938	12944#	12945	12961#	12962	12968#	12969	12976#	12977	12983#	12984	12989#
	12990	13006#	13007	13013#	13014	13021#	13022	13029#	13030	13035#	13036	13052#	13053
	13059#	13060	13067#	13068	13074#	13075	13080#	13081	13095#	13096	13104#	13105	13113#
	13114	13121#	13122	13129#	13130	13136#	13137	13143#	13144	13150#	13151	13158#	13159
	13166#	13167	13174#	13175	13188#	13189	13198#	13199	13207#	13208	13215#	13216	13223#
	13224	13230#	13231	13237#	13238	13244#	13245	13252#	13253	13260#	13261	13268#	13269
	13282#	13283	13291#	13292	13300#	13301	13308#	13309	13316#	13317	13323#	13324	13330#
	13331	13337#	13338	13345#	13346	13353#	13354	13362#	13363	13376#	13377	13385#	13386
	13394#	13395	13402#	13403	13410#	13411	13417#	13418	13424#	13425	13431#	13432	13439#
	13440	13447#	13448	13455#	13456	13469#	13470	13478#	13479	13487#	13488	13495#	13496
	13503#	13504	13511#	13512	13518#	13519	13525#	13526	13533#	13534	13541#	13542	13549#
	13550	13563#	13564	13572#	13573	13581#	13582	13589#	13590	13597#	13598	13604#	13605
	13611#	13612	13618#	13619	13626#	13627	13634#	13635	13642#	13643	13657#	13658	13666#
	13667	13675#	13676	13683#	13684	13691#	13692	13698#	13699	13705#	13706	13712#	13713
	13720#	13721	13728#	13729	13736#	13737	13750#	13751	13759#	13760	13768#	13769	13776#
	13777	13785#	13786	13792#	13793	13799#	13800	13806#	13807	13814#	13815	13822#	13823
	13830#	13831	13845#	13846	13853#	13854	13861#	13862	13869#	13870	13884#	13885	13892#
	13893	13901#	13902	13909#	13910	13924#	13925	13932#	13933	13940#	13941	13948#	13949
	13963#	13964	13971#	13972	13979#	13980	13987#	13988	14001#	14002	14010#	14011	14018#
	14019	14026#	14027	14040#	14041	14048#	14049	14056#	14057	14064#	14065	14078#	14079
	14086#	14087	14094#	14095	14102#	14103	14118#	14119	14126#	14127	14134#	14135	14142#
	14143	14157#	14158	14165#	14166	14173#	14174	14181#	14182	14196#	14197	14204#	14205
	14213#	14214	14221#	14222	14238#	14239	14245#	14246					
UWRD3 = 116232	12123#	12124	12130#	12131	12138#	12139	12145#	12146	12152#	12153	12160#	12161	12178#

		12179	12185#	12186	12192#	12193	12199#	12200	12206#	12207	12224#	12225	12231#	12232
		12240#	12241	12247#	12248	12255#	12256	12273#	12274	12280#	12281	12288#	12289	12295#
		12296	12302#	12303	12318#	12319	12325#	12326	12333#	12334	12340#	12341	12347#	12348
		12353#	12354	12360#	12361	12367#	12368	12375#	12376	12394#	12395	12401#	12402	12409#
		12410	12416#	12417	12423#	12424	12430#	12431	12437#	12438	12443#	12444	12461#	12462
		12468#	12469	12476#	12477	12483#	12484	12489#	12490	12507#	12508	12514#	12515	12522#
		12523	12529#	12530	12535#	12536	12552#	12553	12559#	12560	12567#	12568	12574#	12575
		12580#	12581	12597#	12598	12604#	12605	12612#	12613	12619#	12620	12625#	12626	12643#
		12644	12650#	12651	12658#	12659	12665#	12666	12671#	12672	12688#	12689	12695#	12696
		12703#	12704	12710#	12711	12716#	12717	12733#	12734	12741#	12742	12749#	12750	12756#
		12757	12762#	12763	12779#	12780	12786#	12787	12794#	12795	12801#	12802	12807#	12808
		12824#	12825	12831#	12832	12839#	12840	12847#	12848	12853#	12854	12870#	12871	12877#
		12878	12885#	12886	12892#	12893	12898#	12899	12915#	12916	12922#	12923	12930#	12931
		12937#	12938	12944#	12945	12961#	12962	12968#	12969	12976#	12977	12983#	12984	12989#
		12990	13006#	13007	13013#	13014	13021#	13022	13029#	13030	13035#	13036	13052#	13053
		13059#	13060	13067#	13068	13074#	13075	13080#	13081	13095#	13096	13104#	13105	13113#
		13114	13121#	13122	13129#	13130	13136#	13137	13143#	13144	13150#	13151	13158#	13159
		13166#	13167	13174#	13175	13188#	13189	13198#	13199	13207#	13208	13215#	13216	13223#
		13224	13230#	13231	13237#	13238	13244#	13245	13252#	13253	13260#	13261	13268#	13269
		13282#	13283	13291#	13292	13300#	13301	13308#	13309	13316#	13317	13323#	13324	13330#
		13331	13337#	13338	13345#	13346	13353#	13354	13362#	13363	13376#	13377	13385#	13386
		13394#	13395	13402#	13403	13410#	13411	13417#	13418	13424#	13425	13431#	13432	13439#
		13440	13447#	13448	13455#	13456	13469#	13470	13478#	13479	13487#	13488	13495#	13496
		13503#	13504	13511#	13512	13518#	13519	13525#	13526	13533#	13534	13541#	13542	13549#
		13550	13563#	13564	13572#	13573	13581#	13582	13589#	13590	13597#	13598	13604#	13605
		13611#	13612	13618#	13619	13626#	13627	13634#	13635	13642#	13643	13657#	13658	13666#
		13667	13675#	13676	13683#	13684	13691#	13692	13698#	13699	13705#	13706	13712#	13713
		13720#	13721	13728#	13729	13736#	13737	13750#	13751	13759#	13760	13768#	13769	13776#
		13777	13785#	13786	13792#	13793	13799#	13800	13806#	13807	13814#	13815	13822#	13823
		13830#	13831	13845#	13846	13853#	13854	13861#	13862	13869#	13870	13884#	13885	13892#
		13893	13901#	13902	13909#	13910	13924#	13925	13932#	13933	13940#	13941	13948#	13949
		13963#	13964	13971#	13972	13979#	13980	13987#	13988	14001#	14002	14010#	14011	14018#
		14019	14026#	14027	14040#	14041	14048#	14049	14056#	14057	14064#	14065	14078#	14079
		14086#	14087	14094#	14095	14102#	14103	14118#	14119	14126#	14127	14134#	14135	14142#
		14143	14157#	14158	14165#	14166	14173#	14174	14181#	14182	14196#	14197	14204#	14205
		14213#	14214	14221#	14222	14238#	14239	14245#	14246					
VECTRS	036550	1546	1563	1621	1641	1658	1710	9892#						
WCSAP	003036	1068#	1544*	1561*	1573*	1639*	1656*	1667*	1747	1867*	1960*	2045*	2146*	2161*
		2174*	2194*	2238*	2256*	2327*	2378*	2392*	2440*	2486*	2500*	2548*	2594*	2608*
		2656*	2689*	2770*	2851*	2957*	2993*	3045*	3131*	3167*	3219*	3288*	3313*	3435*
		3461*	3587*	3612*	3735*	3760*	3884*	3909*	4030*	4055*	4151	4201	4284	4382*
		4395*	4419*	4508*	4521*	4545*	4650*	4673*	5781*	5787*	5789*	5931*	5939	5945*
		5949	5954*	5959	5966*	5970	6047	6249*	6351*	6527*	6634*	6793*	6897*	7048*
		7054	7058*	7064	7150*	7152*	7277*	7283	7287*	7293	7379*	7381*	7498*	7500*
		7513*	7518*	7522*	7614*	7616*	7618*	7635*	7639*	7754*	7879*	8004*	8108*	8112*
		8230*	8234*	8352*	8356*	8516*	8523	8527*	8689*	8696	8700*	8856*	8862	8866*
		8969*	8974*	8982*	8987*	8991*	8995*	9183*	9188*	9194*	9198*	9202*	9206*	9402*
		9404*	9406*	9408*	9410*	9416*	9420*	9619*	9627	9630*	9727*	9734*	9737*	9919*
		10265*	10272*	10283*	10285*	10294*	10298*	10305*	10308*	10324	10325			
WCSAOW	003270	1214#	6757	6790	6871	6895	6919							
WCSDR	003040	1069#	1545*	1562	1640*	1657	1748	2147*	2162	2175	2328*	2379*	2393	2441*
		2487*	2501	2549*	2595*	2609	2657*	2690*	2691	2771*	2772	2852*	2853	2962*
		2994	3046*	3136*	3168	3220*	3289*	3314	3436*	3462	3588*	3613	3736*	3761
		3885*	3910	4031*	4056	4152	4202	4285	4383*	4396	4405*	4420	4429*	4509*
		4522	4531*	4546	4555*	4615	4651*	4674	4766	4864	4963	5056	5149	5247
		5345	5434	5538	5620	5718	5785*	5788*	5790*	5796	5935	5946	5955	5967

```
                        6048    6250    6354*   6528    6635*   6794    6898*   6899*   7049    7053    7059    7063    7151*
                        7153*   7278    7282    7288    7292    7380*   7382*   7499*   7514    7519    7523    7615*   7617*
                        7636    7640    7755    7880    8005    8111*   8233*   8355*   8518    8691    8858    8973*   8983*
                        8988*   8992*   8996*   9187*   9195*   9199*   9203*   9207*   9403*   9405*   9407*   9409*   9415*
                        9621    9733*   9920*   10268*  10273*  10291*  10292   10295*  10296   10299*  10300   10328
WCSENT  003124          1108#   5779
WCSPRS= 000001          1036#
WCSST   003034          1067#   1266    1372    1431    1439*   1464    1543*   1638*   1744*   1857*   1868    1950*   1961
                        2033*   2046    2051    2078    2142*   2168*   2172*   2188    2190    2195    2201    2207*   2208
                        2210    2224    2229    2231    2240    2246    2257    2262    2268*   2270    2272    2297    2326*
                        2375*   2390*   2403    2439*   2483*   2498*   2511    2547*   2591*   2606*   2619    2655*   2679*
                        2718    2723    2724*   2725*   2760*   2798    2804    2805*   2806*   2841*   2881    2886    2887*
                        2888*   2956*   2963    2980    2992*   3005    3044*   3130*   3137    3154    3166*   3179    3218*
                        3285*   3297*   3372    3375    3376*   3431*   3445*   3519    3522    3523*   3583*   3597*   3665
                        3668    3669*   3670*   3731*   3744*   3814    3817    3818*   3879*   3893*   3962*   3965    3966*
                        4026*   4039*   4109    4112    4113*   4131*   4153*   4178*   4200*   4281*   4372*   4397    4421
                        4496*   4523    4547    4613*   4620*   4634*   4635*   4648*   4655*   4670*   4682    4684*   4685*
                        4687    4765*   4773*   4796*   4797*   4863*   4871*   4894*   4895*   4962*   4970*   4993*   4994*
                        5055*   5063*   5086*   5087*   5148*   5156*   5179*   5180*   5246*   5254*   5277*   5278*   5344*
                        5352*   5433*   5440*   5465*   5466*   5537*   5545*   5561*   5562*   5619*   5633*   5649*   5650*
                        5717*   5721*   5736*   5737*   5795*   5799*   5805*   5828*   5829*   5918*   5929*   5986*   5988*
                        6071*   6079*   6152*   6154*   6227*   6236*   6270*   6271*   6359*   6368*   6427*   6428*   6505*
                        6514*   6550*   6551*   6641*   6649*   6701*   6702*   6775*   6784*   6815*   6816*   6904*   6912*
                        6960*   6961*   7038*   7044*   7073*   7075*   7156*   7162*   7187*   7189*   7267*   7273*   7302*
                        7304*   7385*   7391*   7416*   7418*   7503*   7509*   7533*   7535*   7621*   7627*   7650*   7652*
                        7742*   7748*   7776*   7778*   7867*   7873*   7901*   7903*   7992*   7998*   8026*   8028*   8116*
                        8122*   8148*   8150*   8238*   8244*   8270*   8272*   8360*   8366*   8392*   8394*   8466*   8509*
                        8571*   8573*   8642*   8682*   8744*   8746*   8820*   8848*   8893*   8895*   9026*   9032*   9110*
                        9112*   9237*   9243*   9326*   9328*   9445*   9451*   9501*   9503*   9575*   9613*   9650*   9652*
                        9740*   9780*   9821*   9823*   9917*   9924*   10071
WRFLAG= 000344          1046#   5530    5622    5630    8812    9394
WRLWHA= 000305          1042#
WRPAT   006622          2038    2096#   2369    2477    2585
WRTEN = 000100          1030#
WRWHAM= 000222          1041#   1357    1429    5525    5778    5852
WWP   = 000040          1031#   1446    1476    1497    1498    1511    1512    2033    2142    2270    2375    2483    2591
                        2956    3130    4648    4655
XFCUDI= 076700          1062#   5926    5989    6075    6155    6230    6362    6508    6643    6778    6906    7041    7159
                        7270    7388    7506    7624    7745    7870    7995    8119    8241    8363    8506    8679    8845
                        8875    9029    9240    9448    9609    9769
XFRCHK  037262          2961    3135    10115#
XFRPGN  036734          1866    1959    9978#
$APTHD  000204           147     153#
$ASTAT= ****** U       10761   10776
$ATYC   041572         10732   10734#
$ATY1   041546         10730#
$ATY3   041554         10676   10731#
$ATY4   041564         10438   10733#
$AUTOB  001134           194#
$BASE   001312           276#
$BDADR  001122           189#
$BDDAT  001126           191#
$BELL   001226           227#  10425   10457
$CDW1   001316           278#
$CDW2   001320           279#
$CHARC  041542         10693*  10703*  10710   10719*  10724#
```

```
$CKSWR= ****** U        10822
$CMTAG  001100            177#   1289    1339
$CM1  = 000010            209#    210#    211#    212#    213#    214#    215#    216#    217#
$CM2  = 000020            209#    210#    211#    212#    213#    214#    215#    216#    217#
$CM3  = 000010            207#    209
$CM4  = 000010            217#    218#    219#    220#    221#    222#    223#    224#    225#
$CPUOP  001264            250#
$CRLF   001233            229#  10433   10457   10465   10484   10489   10493   10692   10727
$DBLK   041254          10605   10639   10647#
$DDW0   001322            280#
$DDW1   001324            281#
$DDW10  001346            290#
$DDW11  001350            291#
$DDW12  001352            292#
$DDW13  001354            293#
$DDW14  001356            294#
$DDW15  001360            295#
$DDW2   001326            282#
$DDW3   001330            283#
$DDW4   001332            284#
$DDW5   001334            285#
$DDW6   001336            286#
$DDW7   001340            287#
$DDW8   001342            288#
$DDW9   001344            289#
$DEVCT  001246            241#
$DEVM   001314            277#
$DOAGN  036524           9865    9874    9880#
$DTBL   041244          10608   10643#
$ENDAD  036514            166    9876#  10452
$ENDCT  036462           1303    9867#
$ENDMG  036533           9869    9884#
$ENULL  036530           9872    9883#
$ENV    001256            246#   1326   10435   10671   10739   10763
$ENVM   001257            247#  10673   10678   10741
$EOP    036426           1385    1714    9857#
$EOPCT  036454           1303*   9864#   9868
$ERFLG  001103            180#   9843*  10347   10375   10377   10383*  10405   10420*  10457
$ERMAX  001115            186#   1305*   1345*  10377   10400*  10405
$ERROR  040262           1297   10419#
$ERRPC  001116            187#  10427*  10428*  10429   10457   10471   12080   12082   12085   12087   12089   12090
$ERRTB  001362            314#  10479
$ERRTY  040456          10432   10464#
$ERTTL  001112            184#  10426*  10457
$ESCAP  001224            226#   1304*   1344*  10399*  10448   10450   10457
$ETABL  001256            245#
$ETEND  001362            159     298#
$FATAL  001240            238#  10767*
$FFLG   042012          10730*  10733*  10761   10770*  10778#
$FILLC  001156            205#  10696   10727
$FILLS  001155            204#  10727
$GDADR  001120            188#
$GDDAT  001124            190#
$GET42  036504           9873#
$GTSWR= ****** U        10821
$HD   = 000000             14
```

```
$HIBTS  000204          154#
$ICNT   001104          181#  10390*  10391   10393*  10404
$ILLUP  042246        10827   10843   10866#
$INTAG  001135          195#
$ITEMB  001114          185#  10429*  10437   10457   10468
$LF     001234          230#  10457   10727
$LFLG   042011        10771*  10777#
$LPADR  001106          182#   1307*   1346*  10381*  10397*  10402   10404
$LPERR  001110          183#   1308*   1347*   1374*   1466*   1746*   1768*   1781*   1794*   1861*   1954*   2040*   2144*
                       2165*   2237*   2255*   2373*   2408*   2481*   2516*   2589*   2624*   2686*   2767*   2848*   2948*
                       3123*   3311*   3458*   3610*   3758*   3907*   4053*   4220*   4246*   4303*   4331*   4394*   4418*
                       4520*   4544*  10381   10398*  10404   10447
$MADR1  001270          263#
$MADR2  001274          267#
$MADR3  001300          270#
$MADR4  001304          273#
$MAIL   001236          155     159     236#   1325   10396   10435   10671
$MAMS1  001266          257#
$MAMS2  001272          265#
$MAMS3  001276          268#
$MAMS4  001302          271#
$MBADR  000206          155#
$MFLG   042010        10731*  10737   10772*  10776#
$MSGAD  001252          243#  10747*  10750
$MSGLG  001254          244#  10752*
$MSGTY  001236          237#  10745   10753*  10765   10769*
$MTYP1  001267          258#
$MTYP2  001273          266#
$MTYP3  001277          269#
$MTYP4  001303          272#
$MXCNT  040260        10394   10404#
$NULL   001154          203#  10698   10727
$NWTST= 000001         1360#   1362    1400#   1402    1454#   1456    1519#   1521    1625#   1627    1716#   1718    1830#
                       1832    1916#   1918    2010#   2012    2107#   2109    2340#   2342    2449#   2451    2557#   2559
                       2664#   2666    2740#   2742    2821#   2823    2903#   2905    3078#   3080    3251#   3253    3405#
                       3407    3554#   3556    3701#   3703    3849#   3851    3996#   3998    4144#   4146    4180#   4182
                       4264#   4266    4348#   4350    4474#   4476    4599#   4601    4639#   4713#   4715    4811#   4813
                       4909#   4911    5002#   5004    5095#   5097    5193#   5195    5291#   5293    5386#   5388    5478#
                       5480    5573#   5575    5662#   5664    5757#   5759    5861#   5863    5997#   5999    6162#   6164
                       6276#   6278    6439#   6441    6556#   6558    6711#   6713    6822#   6824    6969#   6971    7084#
                       7086    7198#   7200    7313#   7315    7427#   7429    7544#   7546    7661#   7663    7787#   7789
                       7912#   7914    8037#   8039    8159#   8161    8281#   8283    8406#   8408    8582#   8584    8755#
                       8757    8909#   8911    9121#   9123    9337#   9339    9514#   9516    9666#   9668    9837#
$OCNT   041034        10536*  10565*  10578#
$OMODE  041036        10531*  10535*  10540   10543*  10554*  10580#
$OVER   040244        10358   10374   10382   10392   10401#
$PASS   001244          240#   1325*   9861*   9862*   9870    9883   10388   10405
$PASTM  000212          157#
$POWER  042254        10862   10869#
$PWRAD  042242        10864#
$PWRDN  042066         1301   10827#  10859
$PWRMG  042236        10862#
$PWRUP  042140        10837   10843#
$QUES   001232          228#  10457   10727
$RDCHR= ****** U      10822
$RDDEC= ****** U      10822
```

```
$RDLIN= ****** U        10822
$RDOCT= ****** U        10822
$REGAD  001160           207#
$REGO   001162           209#   1391*  1423*  1435*  1443*  1448*  1471*  1478*  1484*  1493*  1500*  1506*  1514*
                        1568*  1601*  1603   1661*  1689*  1692   1775*  1788*  1800*  1890*  1984*  2051*  2078*
                        2190*  2199*  2210*  2222*  2231*  2244*  2262*  2272*  2297*  2401*  2412*  2509*  2520*
                        2617*  2628*  2696*  2726*  2777*  2807*  2858*  2889*  2978*  3003*  3024*  3152*  3177*
                        3199*  3341*  3379*  3489*  3526*  3636*  3671*  3784*  3821*  3933*  3967*  4080*  4116*
                        4169*  4226*  4253*  4310*  4337*  4402*  4426*  4528*  4552*  4687*  4778*  4798*  4876*
                        4896*  4975*  4995*  5068*  5088*  5161*  5181*  5259*  5279*  5357*  5375*  5444*  5450*
                        5549*  5637*  5726*  5800*  5830*  5939*  5949*  5959*  5970*  5989*  6088*  6096*  6104*
                        6112*  6120*  6128*  6139*  6146*  6155*  6256*  6395*  6534*  6673*  6800*  6937*  7051*
                        7061*  7168*  7176*  7280*  7290*  7397*  7405*  7517*  7634*  7712*  7762*  7887*  8012*
                        8136*  8258*  8380*  8515*  8526*  8688*  8699*  8854*  8865*  9049*  9051   9054   9265*
                        9267   9270   9471*  9622*  9797*  9798*  10085* 10324* 12080  12082  12085  12087  12090
*PEG!   001164           210#   1567*  1662*  1774*  1787*  1799*  1891*  1986*  2050*  2079*  2200*  2223*  2245*
                        2261*  2298*  2402*  2413*  2510*  2521*  2618*  2629*  2697*  2727*  2778*  2808*  2859*
                        2890*  2979*  3004*  3025*  3153*  3178*  3200*  3342*  3380*  3490*  3527*  3637*  3672*
                        3786*  3822*  3934*  3968*  4082*  4117*  4170*  4227*  4254*  4311*  4338*  4403*  4427*
                        4529*  4553*  4691*  4779*  4877*  4976*  5069*  5162*  5260*  5358*  5727*  5940*  5950*
                        5960*  5971*  6086*  6094*  6102*  6110*  6118*  6126*  6137*  6144*  6257*  6393*  6535*
                        6675*  6801*  6935*  7052*  7062*  7169*  7177*  7281*  7291*  7398*  7406*  7519*  7636*
                        7763*  7888*  8013*  8137*  8259*  8381*  8523*  8696*  8862*  9047*  9064*  9263*  9280*
                        9457*  9474*  9627*  9787*  9801*  10072* 10082  10288* 10290* 10291  10292  10327* 12082
                       12085  12087  12090
$REG2   001166           211#   1552*  1562*  1565   1578*  1646*  1657*  1659   1672*  1762*  1771*  1772   1784*
                        1785   1796*  1797   2153*  2224*  2385*  2403*  2414*  2493*  2511*  2522*  2601*  2619*
                        2630*  2698*  2723*  2779*  2804*  2860*  2886*  2980*  3005*  3026*  3154*  3179*  3201*
                        3343*  3375*  3491*  3522*  3638*  3668*  3787*  3817*  3935*  3965*  4083*  4112*  4171*
                        4228*  4255*  4312*  4339*  5941*  5951*  5961*  5972*  6087*  6095*  6103*  6111*  6119*
                        6127*  6138*  6145*  6258*  6397*  6536*  6676*  6802*  6936*  7053*  7063*  7170*  7178*
                        7282*  7292*  7399*  7407*  7521*  7638*  7764*  7889*  8014*  8138*  8260*  8382*  8519*
                        8521   8692*  8694   8859*  8860   9052*  9060   9268*  9276   9470*  9623*  9625   9790*
                        9794   9797   10328* 12082  12085  12090
$REG3   001170           212#   1553*  1579*  1647*  1673*  1763*  2154*  2386*  2494*  2602*  5942*  5952*  5962*
                        5973*  6085*  6093*  6101*  6109*  6117*  6125*  6136*  6143*  6259*  6398*  6537*  6677*
                        6804*  6934*  7054*  7064*  7283*  7293*  7524*  7640*  7765*  7890*  8015*  8518*  8521
                        8691*  8694   8858*  8860   9059*  9060   9275*  9276   9469*  9621*  9625   9796*  12082
                       12090
$REG4   001172           213#   7523*  7641*  12090
$REG5   001174           214#
$REG6   001176           215#
$REG7   001200           216#
$RTNAD  036526          9882#
$R2A  = ****** U        10822
$SAVRE= ****** U        10822
$SAVR6  042252          10836* 10844  10845* 10846* 10868#
$SCOPE  040004           1295   10356#
$SETUP= 000037           125#   1288   1294   1295   1297   1299   1301   1303   1304   1306   1307   1344   1346
                        9859   10357  10420  10445  10452
$STUP = 177777           125#
$SVLAD  040210          10366   10395#
$SVPC = 000220           164#   169
$SWR  = 167400             1#     14     225    226    227    1304   1306   1307   1308   1344   1346   1347   1370
                        1418   1462   1533   1634   1739   1853   1943   2032   2135   2368   2476   2584   2678
                        2759   2840   2928   3103   3278   3428   3581   3728   3876   4023   4150   4197   4280
```

```
                          4369   4495   4609   4643   4754   4852   4951   5044   5137   5235   5333   5424   5518
                          5609   5703   5770   5904   6041   6202   6320   6481   6600   6753   6866   7019   7133
                          7248   7362   7479   7597   7711   7837   7962   8087   8209   8331   8455   8631   8805
                          8958   9170   9387   9564   9716   9841   9854   9860   9875   9881   9883  10348  10349
                         10350  10351  10352  10357  10369  10371  10372  10375  10376  10377  10384  10385  10386
                         10398  10401  10404  10411  10412  10413  10414  10415  10423  10430  10442  10445  10457
                         10865
$SWREG   001260            248#   1328
$SWRMK=  000000          10352  10353  10373
$TESTN   001242            239#  10396*
$TIMES   001222            225#   1306*   9842*   9860*  10384*  10391  10394*  10404
$TKB     001146            200#
$TKS     001144            199#
$TMP0    001202            217#   9045*   9049   9050*   9052   9053*   9261*   9265   9266*   9268   9269*   9786*   9802*
$TMP1    001204            218#   9046*   9065*   9262*   9281*
$TMP2    001206            219#
$TMP3    001210            220#
$TMP4    001212            221#
$TMP5    001214            222#
$TMP6    001216            223#
$TMP7    001220            224#
$TN    = 000111              1#     14   1360   1370#   1383   1400   1418#   1447   1454   1462#   1513   1519   1533#
                           1625   1634#   1712   1716   1739#   1819   1830   1853#   1906   1916   1943#   2003   2010
                           2032#  2073   2107   2135#   2330   2340   2368#   2449   2476#   2557   2584#   2664   2678#
                           2740   2759#   2821   2840#   2903   2928#   3072   3078   3103#   3247   3251   3278#   3398
                           3405   3428#   3545   3554   3581#   3688   3701   3728#   3839   3849   3876#   3985   3996
                           4023#  4133   4144   4150#   4180   4197#   4252   4264   4280#   4336   4348   4369#   4425
                           4438   4474   4495#   4551   4564   4599   4609#   4629   4639   4643#   4713   4754#   4787
                           4811   4852#   4885   4909   4951#   4984   5002   5044#   5077   5095   5137#   5170   5193
                           5235#  5268   5291   5333#   5366   5386   5424#   5458   5478   5518#   5548   5554   5573
                           5609#  5636   5642   5662   5703#   5725   5732   5739   5757   5770#   5861   5904#   5981
                           5997   6041#   6150   6162   6202#   6276   6320#   6417   6439   6481#   6545   6556   6600#
                           6694   6711   6753#   6822   6866#   6953   6969   7019#   7068   7084   7133#   7182   7198
                           7248#  7297   7313   7362#   7411   7427   7479#   7528   7544   7597#   7645   7661   7711#
                           7771   7787   7837#   7896   7912   7962#   8021   8037   8087#   8143   8159   8209#   8265
                           8281   8331#   8387   8406   8455#   8530   8582   8631#   8703   8755   8805#   8869   8909
                           8958#  9069   9121   9170#   9285   9337   9387#   9477   9514   9564#   9634   9666   9716#
                           9805   9837   9841#
$TPB     001152            202#  10716*  10727
$TPFLG   001157            206#  10665   10727
$TPS     001150            201#  10714   10727
$TRAP    042014           1299   10792#
$TRAP2   042036          10803#  10814
$TRP   = 000007          10807#  10816#  10817#  10818#  10819#  10820#  10822   10823#
$TRPAD   042050          10797   10814#
$TSTM    000210            156#
$TSTNM   001102            179#   9859*  10336   10347   10373  10395*  10396   10401   10405   10422   10457
$TYPBN=  ****** U        10820
$TYPDS   041040          10593#  10819
$TYPE    041264          10665#  10758   10807   10815
$TYPEC   041476          10695   10702   10709   10714#  10715
$TYPEX   041544          10720   10722   10725#
$TYPOC   040636          10534#  10816
$TYPON   040652          10533   10536#  10818
$TYPOS   040612          10529#  10817
$UNIT    001250            242#
```

```
$UNITM  000214          158#
$USWR   001262          249#
$VECT1  001306          274#
$VECT2  001310          275#
$XTSTR  040014        10360#
$$GET4= 000000         9875#
$OFILL  041035        10530*  10534*  10544   10579#
$40CAT= ****** U      10357   10432
      = 062350          128#    132#    143     144#    146#    148#    164     165#    167#    169#    176#    231     1292
                       1307    1308    1342    1346    1347    2802    8492#   8668#   8841#   9021#   9232#   9440#   9760#
                       9883    9887   10404   10405   10457   10503#  10647#  10727   10779#  10839   10867   12079#
 .40TA= ****** U      10731   10734
 .    - 000204          143#    148
```

COMENT	1359#	1362	1399#	1402	1453#	1456	1518#	1521	1624#	1627	1715#	1718	1829#	1832	1915#
	1918	2009#	2012	2106#	2109	2339#	2342	2448#	2451	2556#	2559	2663#	2666	2739#	2742
	2820#	2823	2902#	2905	3076#	3080	3251#	3253	3404#	3407	3554#	3556	3701#	3703	3849#
	3851	3996#	3998	4143#	4146	4180#	4182	4264#	4266	4348#	4350	4474#	4476	4599#	4601
	4638#	4713#	4715	4811#	4813	4909#	4911	5002#	5004	5095#	5097	5193#	5195	5291#	5293
	5386#	5388	5478#	5480	5573#	5575	5662#	5664	5757#	5759	5861#	5863	5996#	5999	6162#
	6164	6275#	6278	6435#	6441	6554#	6558	6711#	6713	6822#	6824	6969#	6971	7084#	7086
	7198#	7200	7313#	7315	7427#	7429	7544#	7546	7661#	7663	7787#	7789	7912#	7914	8037#
	8039	8159#	8161	8281#	8283	8406#	8408	8582#	8584	8755#	8757	8909#	8911	9121#	9123
	9337#	9339	9514#	9516	9666#	9668									
COMMEN	125#														
ENDCOM	125#														
ERROR	19#	1393	1424	1436	1444	1449	1472	1479	1485	1494	1501	1507	1515	1554	1569
	1580	1609	1615	1648	1663	1674	1695	1702	1764	1776	1789	1801	1892	1988	2052
	2080	2155	2191	2202	2211	2225	2232	2247	2263	2273	2299	2387	2404	2415	2495
	2512	2523	2603	2620	2631	2699	2728	2780	2809	2861	2891	2981	3006	3027	3155
	3180	3202	3344	3381	3492	3528	3639	3673	3788	3823	3936	3969	4084	4118	4172
	4229	4256	4313	4340	4445	4449	4453	4462	4466	4470	4570	4574	4578	4587	4591
	4595	4622	4692	4780	4799	4878	4897	4977	4996	5070	5089	5163	5182	5261	5280
	5359	5376	5445	5452	5467	5550	5563	5638	5651	5728	5740	5750	5801	5831	5943
	5953	5963	5975	5990	6089	6097	6105	6113	6121	6129	6140	6147	6156	6260	6272
	6400	6429	6538	6552	6679	6704	6805	6817	6939	6963	7055	7065	7076	7171	7179
	7190	7284	7294	7305	7400	7408	7419	7525	7536	7642	7653	7766	7779	7891	7904
	8016	8029	8139	8151	8261	8273	8383	8395	8524	8574	8697	8747	8863	8896	9062
	9113	9278	9329	9472	9504	9628	9653	9799	9824	10329					
ESCAPE	125#														
GETPRI	125#														
GETSWR	125#														
GTNXTN	1225#	1370	1418	1462	1533	1634	1739	1853	1943	2032	2135	2368	2476	2584	2678
	2759	2840	2928	3103	3278	3428	3581	3728	3876	4023	4150	4197	4280	4369	4495
	4609	4643	4754	4852	4951	5044	5137	5235	5333	5424	5518	5609	5703	5770	5904
	6041	6202	6320	6481	6600	6753	6866	7019	7133	7248	7362	7479	7597	7711	7837
	7962	8087	8209	8331	8455	8631	8805	8958	9170	9387	9564	9716			
GTNXTS	1225#	1370	1418	1462	1533	1634	1739	1853	1943	2032	2135	2368	2476	2584	2678
	2759	2840	2928	3103	3278	3428	3581	3728	3876	4023	4150	4197	4280	4369	4495
	4609	4643	4754	4852	4951	5044	5137	5235	5333	5424	5518	5609	5703	5770	5904
	6041	6202	6320	6481	6600	6753	6866	7019	7133	7248	7362	7479	7597	7711	7837
	7962	8087	8209	8331	8455	8631	8805	8958	9170	9387	9564	9716			
MULT	125#														
NEWTST	125#	1360	1400	1454	1519	1625	1716	1830	1916	2010	2107	2340	2449	2557	2664
	2740	2821	2903	3078	3251	3405	3554	3701	3849	3996	4144	4180	4264	4348	4474
	4599	4639	4713	4811	4909	5002	5095	5193	5291	5386	5478	5573	5662	5757	5861
	5997	6162	6276	6439	6556	6711	6822	6969	7084	7198	7313	7427	7544	7661	7787
	7912	8037	8159	8281	8406	8582	8755	8909	9121	9337	9514	9666	9837		
POP	125#	10634	10773	10774	10852	10853									
PUSH	125#	10593	10734	10736	10757	10829	10835								
REPORT	125#														
SCOPE	20#	1369	1417	1461	1532	1633	1738	1852	1942	2031	2134	2367	2475	2583	2677
	2758	2839	2927	3102	3277	3427	3580	3727	3875	4022	4149	4196	4279	4368	4494
	4608	4642	4753	4851	4950	5043	5136	5234	5332	5423	5517	5608	5702	5769	5903
	6040	6201	6319	6480	6599	6752	6865	7018	7132	7247	7361	7478	7596	7710	7836
	7961	8086	8208	8330	8454	8630	8804	8957	9169	9386	9563	9715	9840	9858	
SETPRI	125#														
SETTRA	10807#	10816	10817	10818	10819	10822									
SETUP	125#														
SKIP	125#	1383	1447	1513	1712	1819	1906	2003	2073	2330	3072	3247	3398	3545	3688

	3839	3985	4133	4252	4336	4425	4438	4551	4564	4629	4787	4885	4984	5077	5170
	5268	5366	5458	5548	5554	5636	5642	5725	5732	5739	5981	6149	6417	6545	6694
	6953	7067	7181	7296	7410	7527	7644	7771	7896	8021	8143	8265	8387	8530	8703
	8869	9069	9285	9477	9634	9803									
SLASH	125#														
SPACE	125#														
STARS	125#	140	142	149	162	172	231	234	1360	1368	1400	1416	1454	1460	1519
	1531	1625	1632	1716	1737	1830	1851	1916	1941	2010	2030	2107	2133	2340	2366
	2449	2474	2557	2582	2664	2676	2740	2757	2821	2838	2903	2926	3078	3101	3251
	3276	3405	3426	3554	3579	3701	3726	3849	3874	3996	4021	4144	4148	4180	4195
	4264	4278	4348	4367	4474	4493	4599	4607	4639	4641	4713	4752	4811	4850	4909
	4949	5002	5042	5095	5135	5193	5233	5291	5331	5386	5422	5478	5516	5573	5607
	5662	5701	5757	5768	5861	5902	5997	6039	6162	6200	6276	6318	6439	6479	6556
	6598	6711	6751	6822	6864	6969	7017	7084	7131	7198	7246	7313	7360	7427	7477
	7544	7595	7661	7709	7787	7835	7912	7960	8037	8085	8159	8207	8281	8329	8406
	8453	8582	8629	8755	8803	8909	8956	9121	9168	9337	9385	9514	9562	9666	9714
	9837	9839	9851	10344	10407	10459	10506	10583	10650	10729	10786	10825	10841		
SWRSU	125#	1309#													
TRMTRP	10807#														
TYPBIN	125#														
TYPDEC	125#	9870													
TYPNAM	125#														
TYPNUM	125#														
TYPOCS	125#														
TYPOCT	125#	10471	10495												
TYPTXT	125#	1332													
U	1219#	12123	12130	12138	12145	12152	12160	12178	12185	12192	12199	12206	12224	12231	12240
	12247	12255	12273	12280	12288	12295	12302	12318	12325	12333	12340	12347	12353	12360	12367
	12375	12394	12401	12409	12416	12423	12430	12437	12443	12461	12468	12476	12483	12489	12507
	12514	12522	12529	12535	12552	12559	12567	12574	12580	12597	12604	12612	12619	12625	12643
	12650	12658	12665	12671	12688	12695	12703	12710	12716	12733	12741	12749	12756	12762	12779
	12786	12794	12801	12807	12824	12831	12839	12847	12853	12870	12877	12885	12892	12898	12915
	12922	12930	12937	12944	12961	12968	12976	12983	12989	13006	13013	13021	13029	13035	13052
	13059	13067	13074	13080	13095	13104	13113	13121	13129	13136	13143	13150	13158	13166	13174
	13188	13198	13207	13215	13223	13230	13237	13244	13252	13260	13268	13282	13291	13300	13308
	13316	13323	13330	13337	13345	13353	13362	13376	13385	13394	13402	13410	13417	13424	13431
	13439	13447	13455	13469	13478	13487	13495	13503	13511	13518	13525	13533	13541	13549	13563
	13572	13581	13589	13597	13604	13611	13618	13626	13634	13642	13657	13666	13675	13683	13691
	13698	13705	13712	13720	13728	13736	13750	13759	13768	13776	13785	13792	13799	13806	13814
	13822	13830	13845	13853	13861	13869	13884	13892	13901	13909	13924	13932	13940	13948	13963
	13971	13979	13987	14001	14010	14018	14026	14040	14048	14056	14064	14078	14086	14094	14102
	14118	14126	14134	14142	14157	14165	14173	14181	14196	14204	14213	14221	14238	14245	
UPCODE	10823#	10848													
$$CMRE	170#	209	210	211	212	213	214	215	216						
$$CMTM	170#	217	218	219	220	221	222	223	224						
$$ESCA	125#														
$$NEWT	125#	1360	1400	1454	1519	1625	1716	1830	1916	2010	2107	2340	2449	2557	2664
	2740	2821	2903	3078	3251	3405	3554	3701	3849	3996	4144	4180	4264	4348	4474
	4599	4639	4713	4811	4909	5002	5095	5193	5291	5386	5478	5573	5662	5757	5861
	5997	6162	6276	6439	6556	6711	6822	6969	7084	7198	7313	7427	7544	7661	7787
	7912	8037	8159	8281	8406	8582	8755	8909	9121	9337	9514	9666	9837		
$$SET	10807#	10816	10817	10818	10819	10822									
$$SETM	1325#														
$$SKIP	125#	1383	1447	1513	1712	1819	1906	2003	2073	2330	3072	3247	3398	3545	3688
	3839	3985	4133	4252	4336	4425	4438	4551	4564	4629	4787	4885	4984	5077	5170
	5268	5366	5458	5548	5554	5636	5642	5725	5732	5739	5981	6150	6417	6545	6694

	6953	7068	7182	7297	7411	7528	7645	7771	7896	8021	8143	8265	8387	8530	8703	
	8869	9069	9285	9477	9634	9805										
EQUAT	3#	15														
HEADE	3#	4														
SETUP	3#	125														
$ACT1	3#	160														
$APTB	232#															
$APTH	3#	138														
$APTY	3#	10727														
$CATC	3#	126														
$CMTA	3#	170														
$EOP	3#	9849														
$ERPO	3#	10405														
$ERPT	3#	10457														
$POWE	3#	10823														
$SCOP	3#	10342														
$TRAP	3#	10784														
$TYPD	3#	10581														
$TYPE	3#	10648														
$TYPO	3#	10504														

ADC	9950														
ADD	1877	1907	2004	3049	3070	3245	3589	3622	3738	3771	3886	3887	3919	3920	4033
	4067	4433	4558	5787	5789	5811	9050	9053	9266	9269	9910	10294	10298	10479	10532
	10542	10613	10684	10744	10756	10768									
ASH	4136	4137													
ASL	2705	2785	2867	3069	3243	4434	4442	4443	4459	4460	4559	4567	4568	4584	4585
	9984	9985	10035	10118	10121	10476	10477	10478	10796						
ASLB	10618														
ASR	3693	3694	3695	3696	3988	3989	3990	3991	4138	10037	10751				
BCL	9953	10189	10619												
BEQ	1267	1383	1441	1447	1477	1483	1492	1505	1513	1566	1660	1707	1709	1773	1786
	1798	1884	1978	2049	2198	2209	2243	2260	2411	2519	2627	2693	2695	2707	2712
	2719	2722	2774	2776	2787	2792	2799	2855	2857	2869	2875	2882	2884	2960	2970
	2973	2976	3001	3020	3022	3057	3072	3134	3144	3147	3150	3175	3194	3196	3231
	3247	3339	3357	3373	3378	3398	3487	3505	3520	3525	3545	3635	3650	3666	3688
	3783	3799	3815	3820	3839	3932	3947	3963	3985	4079	4094	4110	4115	4133	4166
	4223	4250	4307	4334	4399	4549	4777	4875	4974	5067	5160	5258	5356	5443	5548
	5636	5723	5937	5948	5957	5969	6084	6092	6100	6108	6116	6124	6135	6142	6254
	6392	6532	6672	6798	6932	7050	7060	7167	7175	7279	7289	7396	7404	7515	7632
	7761	7886	8011	8135	8257	8379	8520	8522	8693	8695	8861	9061	9277	9468	9626
	9795	9874	10031	10034	10076	10125	10128	10303	10326	10372	10374	10376	10380	10389	10421
	10424	10446	10449	10481	10486	10499	10559	10674	10687	10722	10738	10742	10762	10764	
BGE	5813	10392													
BGT	9066	9282	9632	9803	9865	10566	10627								
BHI	4689	5842	10378												
BHIS	1604	1693													
BIC	1490	1511	1870	1963	2047	2172	2196	2241	2258	2390	2498	2606	2966	2992	3140
	3166	3353	3355	3501	3503	3646	3648	3795	3797	3943	3945	4090	4092	4140	4620
	4655	4773	4871	4970	5063	5156	5254	5352	5440	5523	5545	5627	5633	5721	5776
	5780	5783	5799	5805	5929	6079	6236	6368	6381	6394	6514	6649	6665	6784	6803
	6899	6912	6925	7044	7162	7273	7391	7509	7627	7748	7873	7998	8122	8244	8366
	8509	8682	8848	9032	9243	9451	9613	9780	9798	9862	9982	9986	9987	10073	10083
	10120	10122	10130	10176	10197	10267	10285	10556							
BIS	1355	1427	2168	2207	2268	2708	2788	2870	3315	3318	3359	3363	3464	3467	3508
	3511	3614	3617	3653	3657	3762	3765	3802	3806	3911	3914	3950	3954	3962	4057
	4061	4097	4101	5528	5618	5784	5850	6353	6387	7733	7758	7858	7883	7983	8008
	8110	8130	8232	8252	8354	8374	8474	8650	8811	8828	9393	9732	9988	9989	10084
	10123	10126	10129	10131	10204	10561	10562	10621	10622						
BISB	7723	7848	7973	8098	8220	8342	9002	9213	9426	9747	10468				
BIT	1262	1264	1266	1421	1433	1440	1446	1469	1476	1482	1491	1498	1504	1512	2208
	2270	2718	2798	2881	2959	3133	3372	3519	3665	3814	4109	4398	4422	4524	4548
	5809	9905	9998	10033	10040	10124	10127	10325	10357	10371	10379	10386	10423	10430	10445
BITB	10673	10678	10710	10741											
BLOS	10193														
BLT	10567	10610	10626	10701											
BMI	2189	2230	8473	8649	8827	9001	9055	9212	9271	9425	9463	9731	9746	10617	
BNE	1263	1265	1292	1316	1327	1342	1380	1422	1434	1470	1499	1814	1876	1879	1906
	1970	1973	2003	2061	2071	2271	2286	2425	2533	2641	2802	3051	3224	3293	3323
	3328	3440	3472	3477	3592	3621	3625	3769	3773	3918	3922	4065	4069	4160	4176
	4423	4437	4525	4562	4617	4654	4677	5810	5815	9906	9923	9999	10041	10271	10276
	10293	10297	10301	10307	10358	10387	10431	10436	10453	10469	10491	10557	10615	10672	10679
	10681	10689	10697	10711	10718	10740	10746	10749	10766	10847					
BPL	4168	4225	4252	4309	4336	4401	4425	4527	4551	4683	5725	5739	5979	10443	10555
	10601	10631	10666	10715											
BPT	5435														
BR	1269	1318	1333	1397	1585	1593	1596	1613	1678	1681	1684	1730	1712	1819	1880

	1899	1974	1996	2064	2073	2091	2166	2179	2214	2314	2330	2427	2433	2445	2535
	2541	2552	2643	2649	2660	2714	2732	2794	2813	2877	2895	3032	3036	3207	3211
	3226	3330	3366	3387	3478	3513	3534	3626	3659	3677	3774	3808	3828	3923	3956
	3974	4070	4103	4122	4404	4428	4438	4448	4452	4456	4465	4469	4473	4530	4554
	4564	4573	4577	4581	4590	4594	4598	4629	4678	4699	4787	4885	4984	5077	5170
	5268	5366	5448	5458	5554	5642	5732	5746	5802	5817	5843	5981	6150	6265	6417
	6545	6694	6810	6953	7068	7182	7297	7411	7528	7645	7771	7896	8021	8143	8265
	8387	8478	8530	8654	8703	8832	8869	9007	9069	9218	9285	9431	9477	9634	9735
	9752	9805	9942	10044	10048	10086	10309	10340	10360	10366	10369	10382	10385	10441	10474
	10501	10533	10548	10569	10612	10629	10668	10694	10704	10713	10720	10732	10754	10839	10867
	1887	1981													
	1290	1304	1306	1325	1340	1344	1375	1432	1439	1465	1535	1536	1544	1545	1552
	1553	1561	1567	1568	1578	1579	1639	1646	1656	1661	1672	1759	1854	1944	2035
	2044	2328	2441	2549	2657	2679	2680	2681	2685	2696	2725	2726	2760	2761	2762
	2806	2841	2842	2843	2888	2930	2934	3105	3109	3285	3286	3287	3298	3299	3300
	3304	3308	3431	3433	3447	3448	3452	3583	3586	3597	3599	3600	3604	3670	3731
	3733	3746	3748	3752	3879	3882	3895	3896	3900	4025	4026	4028	4041	4043	4047
	4131	4155	4162	4178	4208	4209	4219	4227	4260	4291	4302	4318	4338	4374	4376
	4383	4429	4500	4502	4531	4635	4644	4649	4651	4670	4671	4685	4797	4895	4994
	5087	5180	5278	5425	5466	5519	5562	5610	5650	5737	5771	5772	5788	5790	5829
	5906	5923	5988	6133	6154	6205	6271	6326	6329	6377	6428	6484	6520	6551	6607
	6612	6658	6659	6702	6816	6875	6961	7033	7034	7035	7075	7144	7145	7146	7147
	7148	7189	7262	7263	7264	7304	7373	7374	7375	7376	7377	7418	7492	7493	7494
	7495	7496	7500	7535	7608	7609	7610	7611	7612	7618	7652	7712	7724	7778	7849
	7903	7974	8028	8099	8150	8221	8272	8343	8394	8515	8573	8746	8895	9004	9112
	9195	9215	9328	9420	9428	9503	9603	9604	9605	9606	9607	9652	9737	9749	9763
	9764	9765	9766	9823	9842	9859	9860	9918	9920	9924	9945	10028	10263	10273	10384
	10399	10467	10546	10604	10607	10845									
CLRB	9843	10383	10633	10693	10719	10770	10771	10772							
CMP	1291	1315	1341	1387	1602	1603	1659	1690	1692	1706	1708	1772	1785	1797	1813
	1875	1969	2048	2186	2197	2242	2259	2294	2311	2321	2410	2430	2435	2518	2538
	2543	2626	2646	2651	2692	2720	2773	2800	2854	2885	2972	3019	3042	3071	3146
	3193	3216	3246	3292	3322	3327	3356	3374	3439	3471	3476	3504	3521	3591	3620
	3624	3649	3667	3768	3798	3816	3917	3946	3964	4064	4093	4111	4159	4165	4175
	4249	4306	4436	4561	4633	4653	4676	4686	4688	4775	4793	4873	4891	4972	4990
	5065	5083	5158	5176	5256	5274	5354	5372	5442	5451	5464	5547	5560	5635	5648
	5722	5734	5748	5804	5812	5814	5826	5841	5936	5947	5956	5968	5987	6083	6091
	6099	6107	6115	6123	6134	6141	6153	6251	6269	6390	6426	6529	6549	6670	6700
	6795	6814	6930	6959	7049	7059	7074	7166	7174	7188	7278	7288	7303	7395	7403
	7417	7514	7534	7631	7651	7760	7777	7885	7902	8010	8027	8134	8149	8256	8271
	8378	8393	8521	8572	8694	8745	8860	8894	8978	9060	9068	9111	9180	9276	9284
	9327	9467	9502	9625	9651	9794	9822	9922	10075	10192	10210	10270	10275	10292	10296
	10300	10302	10367	10391	10452	10625									
CMPB	1326	10373	10377	10435	10671	10686	10688	10696	10717	10721	10739				
COM	2063	2965	3139	3316	3317	3319	3320	3361	3362	3364	3465	3466	3468	3469	3509
	3510	3512	3615	3616	3618	3619	3655	3656	3658	3763	3764	3766	3767	3804	3805
	3807	3912	3913	3915	3916	3952	3953	3955	4059	4060	4062	4063	4099	4100	4102
	5782	10081	10175	10266											
DEC	3772	3921	4068	4261	4345	4416	4430	4542	4556	8865	9065	9281	9417	9631	9802
	9863	10475													
DECB	10554	10565	10700	10703											
EMT	19														
HALT	132	6076	10444	10454	10667	10838	10866								
INC	1379	1390	1595	1598	1683	1686	1878	2062	2070	2424	2532	2640	2703	2784	2865
	3050	3290	3291	3325	3326	3358	3437	3438	3474	3475	3506	3590	3623	3651	3737
	3770	3800	3948	4032	4066	4095	4158	4167	4174	4210	4224	4235	4251	4293	4308

	4319	4335	4384	4400	4407	4424	4435	4510	4526	4532	4550	4560	4616	4652	4675
	4785	4883	4982	5075	5168	5266	5364	5724	5730	5738	5808	5816	5840	5945	5954
	5966	6052	6054	6056	6058	6060	6062	6064	6066	6263	6355	6414	6494	6540	6541
	6542	6636	6637	6690	6691	6807	6900	6950	7152	7381	7768	7893	8018	8112	8234
	8356	8526	8527	8699	8700	8866	8974	8975	9064	9188	9189	9280	9404	9406	9408
	9410	9416	9474	9630	9734	9801	9861	9921	10032	10187	10269	10274	10306	10390	10426
	10560	10568	10611	10769	10846										
INCB	1885	1971	1979	2694	2721	2775	2801	2856	2883	2977	3002	3023	3151	3176	3223
	3338	3377	3486	3524	3634	3782	3819	3931	4078	4114	10395	10420	10723		
IOT	20														
.MF	136	1385	1714	1908	2005	2287	2305	2734	2803	2815	2897	3058	3073	3232	3248
	3389	3536	3679	3830	3976	4124	4444	4461	4569	4586	4703	9881			
.F	1546	1551	1563	1577	1621	1641	1645	1658	1671	1710	1761	1866	1873	1959	1967
	2152	2295	2312	2322	2384	2431	2492	2539	2600	2647	2961	2967	3135	3141	3284
	3403	3429	3550	3582	3699	3729	3847	3878	3994	4024	4141	4757	4855	4954	5047
	5140	5238	5336	5429	5533	5612	5710	5914	6042	6222	6339	6500	6622	6770	6885
	7021	7135	7250	7364	7481	7599	7714	7839	7964	8089	8211	8333	8460	8636	8814
	8963	9175	9396	9569	9721	9876	10078	10432	10438	10676	10695	10702	10709	10758	
MOV	1234	1236	1239	1243	1261	1273	1277	1281	1289	1293	1295	1296	1297	1298	1299
	1300	1301	1302	1303	1307	1308	1311	1312	1313	1314	1319	1321	1322	1323	1328
	1339	1343	1346	1347	1350	1351	1352	1370	1372	1373	1374	1376	1381	1388	1391
	1418	1423	1431	1435	1443	1448	1462	1464	1466	1467	1471	1478	1484	1493	1497
	1500	1506	1514	1533	1539	1540	1541	1543	1548	1549	1550	1558	1559	1560	1562
	1573	1574	1575	1576	1601	1634	1635	1636	1637	1638	1640	1642	1643	1644	1647
	1653	1654	1655	1657	1662	1667	1668	1669	1670	1673	1689	1739	1740	1741	1742
	1743	1744	1745	1746	1747	1748	1749	1750	1753	1754	1755	1756	1757	1758	1760
	1762	1763	1768	1769	1770	1771	1774	1775	1781	1783	1784	1787	1788	1794	1795
	1796	1799	1800	1805	1806	1807	1808	1809	1853	1857	1858	1859	1861	1862	1864
	1867	1868	1886	1890	1891	1943	1950	1951	1952	1954	1956	1960	1961	1980	1984
	1986	2032	2033	2037	2038	2039	2040	2042	2045	2046	2050	2051	2072	2078	2079
	2135	2137	2138	2139	2140	2142	2143	2144	2146	2147	2149	2150	2151	2153	2154
	2161	2165	2171	2174	2187	2190	2194	2195	2199	2200	2201	2210	2221	2222	2223
	2224	2231	2237	2238	2240	2244	2245	2246	2255	2256	2257	2261	2262	2272	2278
	2282	2284	2293	2297	2298	2310	2320	2326	2327	2329	2368	2369	2370	2371	2373
	2375	2376	2378	2379	2381	2382	2383	2385	2386	2389	2392	2393	2400	2401	2402
	2403	2408	2412	2413	2414	2421	2429	2439	2440	2442	2476	2477	2478	2479	2481
	2483	2484	2486	2487	2489	2490	2491	2493	2494	2497	2500	2501	2508	2509	2510
	2511	2516	2520	2521	2522	2529	2537	2547	2548	2550	2584	2585	2586	2587	2589
	2591	2592	2594	2595	2597	2598	2599	2601	2602	2605	2608	2609	2616	2617	2618
	2619	2624	2628	2629	2630	2637	2645	2655	2656	2658	2678	2682	2683	2684	2686
	2689	2690	2691	2697	2698	2710	2713	2723	2724	2727	2733	2737	2759	2763	2764
	2765	2766	2767	2770	2771	2772	2777	2778	2779	2790	2793	2804	2805	2807	2808
	2814	2819	2840	2844	2845	2846	2847	2848	2851	2852	2853	2858	2859	2860	2873
	2876	2886	2887	2889	2890	2896	2901	2928	2942	2943	2944	2945	2948	2949	2956
	2957	2958	2962	2963	2964	2971	2978	2979	2980	2991	2993	2994	2999	3003	3004
	3005	3024	3025	3026	3035	3043	3044	3045	3046	3053	3103	3117	3118	3119	3120
	3123	3130	3131	3132	3136	3137	3138	3145	3152	3153	3154	3165	3167	3168	3173
	3177	3178	3179	3199	3200	3201	3217	3218	3219	3220	3227	3244	3278	3288	3289
	3297	3302	3306	3311	3312	3313	3314	3341	3342	3343	3352	3354	3370	3375	3376
	3379	3380	3396	3399	3400	3401	3402	3428	3432	3435	3436	3445	3446	3450	3454
	3458	3459	3461	3462	3489	3490	3491	3500	3502	3518	3522	3523	3526	3527	3543
	3546	3547	3548	3549	3581	3584	3587	3588	3598	3602	3606	3610	3611	3612	3613
	3636	3637	3638	3645	3647	3663	3668	3669	3671	3672	3686	3689	3690	3697	3698
	3728	3732	3734	3735	3736	3744	3745	3747	3750	3754	3758	3759	3760	3761	3784
	3786	3787	3794	3796	3813	3817	3818	3821	3822	3837	3840	3841	3845	3846	3876
	3880	3883	3884	3885	3893	3894	3898	3902	3906	3907	3908	3909	3910	3933	3934

3935	3942	3944	3961	3965	3966	3967	3968	3983	3986	3987	3992	3993	4023	4027
4029	4030	4031	4039	4040	4042	4045	4049	4053	4054	4055	4056	4080	4082	4083
4089	4091	4108	4112	4113	4116	4117	4130	4134	4135	4139	4150	4151	4152	4153
4154	4156	4157	4163	4164	4169	4170	4171	4197	4198	4199	4200	4201	4202	4203
4207	4218	4220	4221	4222	4226	4228	4233	4244	4245	4246	4247	4248	4253	4254
4255	4280	4281	4282	4283	4284	4285	4286	4290	4292	4301	4303	4304	4305	4310
4311	4312	4329	4330	4331	4332	4333	4337	4339	4344	4369	4370	4371	4372	4373
4375	4380	4381	4382	4392	4393	4394	4395	4396	4397	4402	4403	4405	4417	4418
4419	4420	4421	4426	4427	4441	4458	4495	4496	4497	4498	4499	4501	4506	4507
4508	4509	4518	4519	4520	4521	4522	4523	4528	4529	4543	4544	4545	4546	4547
4552	4553	4555	4566	4583	4609	4611	4612	4613	4621	4634	4636	4643	4648	4650
4662	4669	4673	4674	4684	4687	4691	4705	4754	4755	4756	4762	4763	4765	4774
4778	4779	4795	4796	4798	4852	4853	4854	4860	4861	4863	4872	4876	4877	4893
4894	4896	4951	4952	4953	4959	4960	4962	4971	4975	4976	4992	4993	4995	5044
5045	5046	5052	5053	5055	5064	5068	5069	5085	5086	5088	5137	5138	5139	5145
5146	5148	5157	5161	5162	5178	5179	5181	5235	5236	5237	5243	5244	5246	5255
5259	5260	5276	5277	5279	5333	5334	5335	5341	5342	5344	5353	5357	5358	5374
5375	5424	5426	5427	5428	5433	5441	5444	5449	5450	5463	5465	5472	5518	5520
5531	5537	5546	5549	5559	5561	5609	5611	5619	5634	5637	5647	5649	5703	5705
5706	5707	5708	5709	5715	5716	5717	5726	5727	5735	5736	5749	5770	5773	5779
5781	5785	5792	5793	5794	5795	5800	5806	5807	5827	5828	5830	5846	5847	5904
5907	5908	5909	5910	5911	5912	5918	5921	5922	5924	5930	5931	5935	5939	5940
5941	5942	5946	5949	5950	5951	5952	5955	5959	5960	5961	5962	5965	5967	5970
5971	5972	5973	5986	5989	6041	6047	6048	6049	6051	6053	6055	6057	6059	6061
6063	6065	6067	6068	6071	6074	6080	6081	6082	6085	6086	6087	6088	6093	6094
6095	6096	6101	6102	6103	6104	6109	6110	6111	6112	6117	6118	6119	6120	6125
6126	6127	6128	6131	6132	6136	6137	6138	6139	6143	6144	6145	6146	6152	6155
6202	6204	6206	6207	6226	6227	6237	6241	6243	6245	6249	6250	6256	6257	6258
6259	6270	6320	6324	6325	6346	6347	6349	6351	6354	6358	6359	6369	6374	6375
6376	6378	6393	6395	6397	6398	6427	6481	6483	6485	6486	6489	6504	6505	6515
6519	6522	6523	6525	6527	6528	6534	6535	6536	6537	6550	6600	6605	6606	6629
6630	6632	6634	6635	6640	6641	6650	6655	6656	6657	6660	6673	6675	6676	6677
6701	6753	6756	6757	6758	6760	6774	6775	6785	6789	6790	6791	6792	6793	6790
6800	6801	6802	6804	6815	6866	6870	6871	6873	6892	6893	6895	6897	6898	6903
6904	6913	6918	6919	6920	6924	6926	6934	6935	6936	6937	6960	7019	7030	7031
7032	7037	7038	7045	7048	7051	7052	7053	7054	7058	7061	7062	7063	7064	7073
7133	7149	7150	7151	7153	7155	7156	7163	7168	7169	7170	7176	7177	7178	7187
7248	7259	7260	7261	7266	7267	7274	7277	7280	7281	7282	7283	7287	7290	7291
7292	7293	7302	7362	7378	7379	7380	7382	7384	7385	7392	7397	7398	7399	7405
7406	7407	7416	7479	7490	7497	7498	7499	7502	7503	7510	7513	7516	7517	7518
7519	7520	7521	7522	7523	7524	7533	7597	7613	7614	7615	7616	7617	7620	7621
7628	7633	7634	7635	7636	7637	7638	7639	7640	7641	7650	7711	7720	7721	7730
7731	7739	7741	7742	7749	7751	7752	7754	7755	7763	7764	7765	7776	7837	7845
7846	7855	7856	7864	7866	7867	7874	7876	7877	7879	7880	7888	7889	7890	7901
7962	7970	7971	7980	7981	7989	7991	7992	7999	8001	8002	8004	8005	8013	8014
8015	8026	8087	8095	8096	8105	8106	8107	8108	8111	8115	8116	8123	8125	8126
8127	8137	8138	8148	8209	8217	8218	8227	8228	8229	8230	8233	8237	8238	8245
8247	8248	8249	8259	8260	8270	8331	8339	8340	8349	8350	8351	8352	8355	8359
8360	8367	8369	8370	8371	8381	8382	8392	8455	8465	8466	8471	8494	8496	8499
8502	8504	8510	8513	8514	8516	8518	8519	8523	8571	8631	8641	8642	8647	8670
8672	8675	8677	8683	8686	8687	8688	8689	8691	8692	8696	8744	8805	8819	8820
8825	8843	8849	8852	8853	8854	8856	8858	8859	8862	8893	8958	8969	8970	8971
8973	8982	8983	8984	8987	8988	8989	8991	8992	8993	8995	8996	8999	9023	9025
9026	9033	9036	9037	9038	9039	9040	9041	9042	9045	9046	9047	9049	9052	9059
9110	9170	9183	9184	9185	9187	9194	9198	9199	9200	9202	9203	9204	9206	9207
9210	9234	9236	9237	9244	9247	9248	9249	9250	9251	9252	9253	9254	9255	9256

	9257	9258	9261	9262	9263	9265	9268	9275	9326	9387	9402	9403	9405	9407	9409
	9412	9413	9415	9423	9442	9444	9445	9452	9455	9456	9457	9459	9461	9469	9470
	9471	9501	9564	9574	9575	9579	9581	9583	9585	9590	9591	9592	9593	9594	9597
	9599	9601	9614	9617	9618	9619	9621	9622	9623	9627	9650	9716	9727	9728	9733
	9739	9740	9744	9762	9772	9774	9776	9778	9781	9785	9786	9787	9789	9790	9796
	9797	9821	9845	9866	9870	9873	9892	9893	9894	9907	9916	9917	9919	9925	9940
	9941	9944	9947	9948	9954	9955	9956	9978	9979	9980	9983	9990	9991	10003	10018
	10019	10020	10021	10023	10024	10027	10036	10050	10051	10052	10053	10068	10069	10071	10072
	10074	10080	10082	10085	10087	10088	10089	10115	10116	10117	10119	10132	10133	10173	10178
	10181	10186	10190	10196	10203	10209	10257	10258	10259	10260	10264	10265	10268	10272	10279
	10281	10283	10284	10288	10289	10291	10295	10299	10308	10311	10312	10313	10314	10324	10327
	10328	10336	10339	10362	10363	10365	10368	10381	10393	10394	10397	10398	10401	10402	10422
	10427	10447	10450	10466	10471	10480	10485	10490	10492	10496	10529	10537	10538	10539	10545
	10552	10570	10571	10572	10573	10574	10594	10595	10596	10597	10598	10599	10600	10605	10608
	10628	10634	10635	10636	10637	10638	10640	10641	10669	10670	10675	10683	10698	10735	10736
	10743	10747	10752	10753	10755	10757	10767	10773	10774	10792	10793	10797	10803	10804	10827
	10828	10829	10830	10831	10832	10833	10834	10835	10836	10837	10843	10844	10848	10850	10852
	10853	10854	10855	10856	10857	10858	10859	10860	10863						
MOVB	1305	1345	1863	1955	2687	2688	2768	2769	2849	2850	2951	3125	3210	3309	3310
	3456	3457	3608	3609	3756	3757	3904	3905	4051	4052	6210	6212	6247	6327	6352
	6380	6386	6487	6609	6664	7722	7732	7734	7757	7762	7847	7857	7859	7882	7887
	7972	7982	7984	8007	8012	8097	8109	8129	8131	8136	8219	8231	8251	8253	8258
	8341	8353	8373	8375	8380	8472	8475	8648	8651	8826	8829	9000	9003	9051	9211
	9214	9267	9424	9427	9460	9730	9745	9748	10396	10400	10429	10437	10530	10531	10534
	10535	10536	10540	10543	10544	10563	10603	10606	10620	10623	10632	10680	10708	10716	10730
	10731	10733	10795												
NEG	10541	10602													
NOP	2163	2176	2177	2394	2395	2502	2503	2610	2611	2995	3169	9877	9878	9879	
RESET	9875														
ROL	9949	10030	10547	10549	10550	10551	10553								
ROLB	1888	1889	1982	1983											
ROR	9952	10188													
RTI	1245	1279	1282	1320	9911	10403	10456	10575	10642	10685	10805	10865			
RTS	9895	9926	9957	9992	10006	10054	10090	10134	10212	10320	10494	10725	10775	10798	
SEC	10029														
SOB	2709	2789	2872	3739	3888	4034	4211	4236	4262	4294	4320	4346	4385	4408	4431
	4511	4533	4557	4786	4884	4983	5076	5169	5267	5365	5731	6217	6264	6333	6356
	6415	6495	6544	6616	6638	6692	6765	6809	6879	6901	6951	7727	7737	7769	7852
	7862	7894	7977	7987	8019	8102	8113	8141	8224	8235	8263	8346	8357	8385	8528
	8701	8867	8976	9190	9418	9475	9951								
SUB	1240	1274	1600	1688	5978	10004	10305	10428	10609	10750					
SWAB	1953	3121	3691	3692	3842	3843	5539	9981							
TRAP	10807	10816	10817	10818	10819	10822									
TST	1377	1378	1382	1565	1780	1793	1810	1903	2000	2060	2068	2162	2175	2188	2229
	2280	2281	2419	2527	2635	2706	2786	2868	2969	3143	3397	3544	3687	3838	3984
	4132	4615	4682	4766	4864	4963	5056	5149	5247	5345	5434	5538	5620	5718	5796
	9054	9270	9462	10364	10388	10442	10448	10498	10558	10614	10624	10682	10690	10712	10745
	10763	10765	10794												
TSTB	1883	1977	2975	3000	3021	3149	3174	3195	10375	10616	10630	10665	10714	10737	10748
	10761														
XOR	2066	2283	2285	2422	2530	2638	2711	2791	2874	3054	3228	10026	10174	10290	
ASCII	228	229	10931	10933											
ASCIZ	227	230	1335	9884	10502	10869	10875	10876	10877	10878	10881	10885	10888	10891	10892
	10893	10895	10897	10899	10901	10903	10906	10909	10911	10916	10923	10928	10937	10942	10944
	10945	10950	10955	10960	10963	10968	10974	10979	10985	10991	10996	11002	11008	11013	11018
	11024	11031	11038	11045	11048	11056	11066	11078	11087	11092	11100	11109	11116	11122	11127

	11133	11144	11154	11165	11174	11183	11192	11202	11212	11221	11229	11238	11247	11260	11270
	11281	11291	11303	11312	11323	11333	11343	11353	11365	11375	11387	11398	11406	11416	11423
	11431	11442	11450	11457	11467	11477	11487	11497	11507	11517	11526	11536	11545	11556	11566
	11577	11588	11598	11608	11618	11627	11637	11647	11657	11667	11677	11687	11697	11706	11716
	11725	11735	11744	11755	11765	11776	11786	11797	11807	11818	11828	11839	11849	11860	11870
	11880	11889	11899	11912	11915	11918	11921	11928	11934	11937	11943	11947	11953	11955	11961
	11967	11970	11973	11980	11987	11991	11998	12005	12012	12019	12026	12030	12033	12037	12041
	12048	12054	12062	12069											
BLKW	10647														
BYTE	179	180	185	186	194	195	203	204	205	206	246	247	257	258	265
	266	268	269	271	272	1078	1079	1080	1081	1082	1083	1124	1126	1129	1131
	1134	1136	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156
	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1172	1173	1174	1175
	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190
	1191	1192	1193	1194	1195	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210
	1211	1212	8481	8483	8486	8488	8491	8657	8659	8662	8664	8667	8835	8838	8840
	9010	9012	9015	9017	9020	9221	9223	9226	9228	9231	9434	9437	9439	9755	9757
	9759	9883	10199	10200	10206	10207	10439	10440	10576	10577	10578	10579	10776	10777	10778
ENABL	1														
END	14254														
ENDC	9	19	111	125	137	141	143	150	163	167	169	173	177	179	207
	217	225	226	227	228	232	235	257	265	268	271	274	275	276	277
	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292
	293	294	295	296	300	1297	1299	1301	1303	1304	1306	1307	1309	1330	1335
	1346	1348	1361	1362	1368	1369	1370	1384	1401	1402	1416	1417	1418	1448	1455
	1456	1460	1461	1462	1514	1520	1521	1531	1532	1533	1626	1627	1632	1633	1634
	1713	1717	1718	1737	1738	1739	1820	1831	1832	1851	1852	1853	1907	1917	1918
	1941	1942	1943	2004	2011	2012	2030	2031	2032	2074	2108	2109	2133	2134	2135
	2331	2341	2342	2366	2367	2368	2450	2451	2474	2475	2476	2558	2559	2582	2583
	2584	2665	2666	2676	2677	2678	2741	2742	2757	2758	2759	2822	2823	2838	2839
	2840	2904	2905	2926	2927	2928	3073	3079	3080	3101	3102	3103	3248	3252	3253
	3276	3277	3278	3399	3406	3407	3426	3427	3428	3546	3555	3556	3579	3580	3581
	3689	3702	3703	3726	3727	3728	3840	3850	3851	3874	3875	3876	3986	3997	3998
	4021	4022	4023	4134	4145	4146	4148	4149	4150	4181	4182	4195	4196	4197	4253
	4265	4266	4278	4279	4280	4337	4349	4350	4367	4368	4369	4426	4439	4475	4476
	4493	4494	4495	4552	4565	4600	4601	4607	4608	4609	4630	4640	4641	4642	4643
	4714	4715	4752	4753	4754	4788	4812	4813	4850	4851	4852	4886	4910	4911	4949
	4950	4951	4985	5003	5004	5042	5043	5044	5078	5096	5097	5135	5136	5137	5171
	5194	5195	5233	5234	5235	5269	5292	5293	5331	5332	5333	5367	5387	5388	5422
	5423	5424	5459	5479	5480	5516	5517	5518	5549	5555	5574	5575	5607	5608	5609
	5637	5643	5663	5664	5701	5702	5703	5726	5733	5740	5758	5759	5768	5769	5770
	5862	5863	5902	5903	5904	5982	5998	5999	6039	6040	6041	6151	6163	6164	6200
	6201	6202	6277	6278	6318	6319	6320	6418	6440	6441	6479	6480	6481	6546	6557
	6558	6598	6599	6600	6695	6712	6713	6751	6752	6753	6823	6824	6864	6865	6866
	6954	6970	6971	7017	7018	7019	7069	7085	7086	7131	7132	7133	7183	7199	7200
	7246	7247	7248	7298	7314	7315	7360	7361	7362	7412	7428	7429	7477	7478	7479
	7529	7545	7546	7595	7596	7597	7646	7662	7663	7709	7710	7711	7772	7788	7789
	7835	7836	7837	7897	7913	7914	7960	7961	7962	8022	8038	8039	8085	8086	8087
	8144	8160	8161	8207	8208	8209	8266	8282	8283	8329	8330	8331	8388	8407	8408
	8453	8454	8455	8531	8583	8584	8629	8630	8631	8704	8756	8757	8803	8804	8805
	8870	8910	8911	8956	8957	8958	9070	9122	9123	9168	9169	9170	9286	9338	9339
	9385	9386	9387	9478	9515	9516	9562	9563	9564	9635	9667	9668	9714	9715	9716
	9806	9838	9839	9840	9841	9852	9853	9854	9856	9859	9865	9868	9869	9873	9875
	9881	9883	9884	9887	10345	10348	10353	10357	10359	10370	10373	10374	10375	10377	10379
	10386	10390	10395	10397	10401	10404	10405	10408	10411	10420	10427	10432	10433	10434	10442
	10452	10456	10457	10460	10475	10504	10507	10584	10651	10680	10730	10731	10734	10761	10776

	10787	10793	10796	10815	10816	10817	10818	10819	10820	10821	10822	10826	10835	10836	10842
	10852	10853	10863	10865	10872										
EQUIV	19	20	28	73	74	75	76	77	78	79	80	81	82	101	102
	103	104	105	106	107	108	109	110							
EVEN	235	1025	1219	1335	8492	8668	8841	9021	9232	9440	9760	10503	10779	10871	12079
IF	5	17	83	111	125	135	140	142	149	162	165	167	172	176	178
	207	217	225	226	227	231	232	234	257	265	268	271	274	275	276
	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291
	292	293	294	295	296	300	1295	1297	1299	1301	1303	1304	1306	1307	1325
	1334	1344	1346	1360	1362	1368	1370	1383	1400	1402	1416	1418	1447	1454	1456
	1460	1462	1513	1519	1521	1531	1533	1625	1627	1632	1634	1712	1716	1718	1737
	1739	1819	1830	1832	1851	1853	1906	1916	1918	1941	1943	2003	2010	2012	2030
	2032	2073	2107	2109	2133	2135	2330	2340	2342	2366	2368	2449	2451	2474	2476
	2557	2559	2582	2584	2664	2666	2676	2678	2740	2742	2757	2759	2821	2823	2838
	2840	2903	2905	2926	2928	3072	3078	3080	3101	3103	3247	3251	3253	3276	3278
	3398	3405	3407	3426	3428	3545	3554	3556	3579	3581	3688	3701	3703	3726	3728
	3839	3849	3851	3874	3876	3985	3996	3998	4021	4023	4133	4144	4146	4148	4150
	4180	4182	4195	4197	4252	4264	4266	4278	4280	4336	4348	4350	4367	4369	4425
	4438	4474	4476	4493	4495	4551	4564	4599	4601	4607	4609	4629	4639	4641	4643
	4713	4715	4752	4754	4787	4811	4813	4850	4852	4885	4909	4911	4949	4951	4984
	5002	5004	5042	5044	5077	5095	5097	5135	5137	5170	5193	5195	5233	5235	5268
	5291	5293	5331	5333	5366	5386	5388	5422	5424	5458	5478	5480	5516	5518	5548
	5554	5573	5575	5607	5609	5636	5642	5662	5664	5701	5703	5725	5732	5739	5757
	5759	5768	5770	5861	5863	5902	5904	5981	5997	5999	6039	6041	6150	6162	6164
	6200	6202	6276	6278	6318	6320	6417	6439	6441	6479	6481	6545	6556	6558	6598
	6600	6694	6711	6713	6751	6753	6822	6824	6864	6866	6953	6969	6971	7017	7019
	7068	7084	7086	7131	7133	7182	7198	7200	7246	7248	7297	7313	7315	7360	7362
	7411	7427	7429	7477	7479	7528	7544	7546	7595	7597	7645	7661	7663	7709	7711
	7771	7787	7789	7835	7837	7896	7912	7914	7960	7962	8021	8037	8039	8085	8087
	8143	8159	8161	8207	8209	8265	8281	8283	8329	8331	8387	8406	8408	8453	8455
	8530	8582	8584	8629	8631	8703	8755	8757	8803	8805	8869	8909	8911	8956	8958
	9069	9121	9123	9168	9170	9285	9337	9339	9385	9387	9477	9514	9516	9562	9564
	9634	9666	9668	9714	9716	9805	9837	9839	9841	9851	9852	9853	9854	9855	9856
	9858	9864	9867	9869	9873	9875	9881	9883	9884	10344	10347	10352	10357	10369	10371
	10372	10373	10375	10376	10377	10386	10388	10396	10398	10403	10404	10405	10407	10410	10420
	10423	10430	10432	10433	10435	10442	10445	10452	10456	10457	10459	10474	10490	10506	10583
	10650	10671	10729	10731	10734	10761	10776	10786	10792	10796	10807	10816	10817	10818	10819
	10820	10821	10822	10825	10835	10836	10841	10848	10853	10861	10863	10865	10869		
IFF	17	141	143	150	163	167	169	173	176	179	207	232	235	1361	1362
	1369	1370	1384	1401	1402	1417	1418	1448	1455	1456	1461	1462	1514	1520	1521
	1532	1533	1626	1627	1633	1634	1713	1717	1718	1738	1739	1820	1831	1832	1852
	1853	1907	1917	1918	1942	1943	2004	2011	2012	2031	2032	2074	2108	2109	2134
	2135	2331	2341	2342	2367	2368	2450	2451	2475	2476	2558	2559	2583	2584	2665
	2666	2677	2678	2741	2742	2758	2759	2822	2823	2839	2840	2904	2905	2927	2928
	3073	3079	3080	3102	3103	3248	3252	3253	3277	3278	3399	3406	3407	3427	3428
	3546	3555	3556	3580	3581	3689	3702	3703	3727	3728	3840	3850	3851	3875	3876
	3986	3997	3998	4022	4023	4134	4145	4146	4149	4150	4181	4182	4196	4197	4253
	4265	4266	4279	4280	4337	4349	4350	4368	4369	4426	4439	4475	4476	4494	4495
	4552	4565	4600	4601	4608	4609	4630	4640	4641	4642	4643	4714	4715	4753	4754
	4788	4812	4813	4851	4852	4886	4910	4911	4950	4951	4985	5003	5004	5043	5044
	5078	5096	5097	5136	5137	5171	5194	5195	5234	5235	5269	5292	5293	5332	5333
	5367	5387	5388	5423	5424	5459	5479	5480	5517	5518	5549	5555	5574	5575	5608
	5609	5637	5643	5663	5664	5702	5703	5726	5733	5740	5758	5759	5769	5770	5862
	5863	5903	5904	5982	5998	5999	6040	6041	6151	6163	6164	6201	6202	6277	6278
	6319	6320	6418	6440	6441	6480	6481	6546	6557	6558	6599	6600	6695	6712	6713
	6752	6753	6823	6824	6865	6866	6954	6970	6971	7018	7019	7069	7085	7086	7132

	7133	7183	7199	7200	7247	7248	7298	7314	7315	7361	7362	7412	7428	7429	7478
	7479	7529	7545	7546	7596	7597	7646	7662	7663	7710	7711	7772	7788	7789	7836
	7837	7897	7913	7914	7961	7962	8022	8038	8039	8086	8087	8144	8160	8161	8208
	8209	8266	8282	8283	8330	8331	8388	8407	8408	8454	8455	8531	8583	8584	8630
	8631	8704	8756	8757	8804	8805	8870	8910	8911	8957	8958	9070	9122	9123	9169
	9170	9286	9338	9339	9386	9387	9478	9515	9516	9563	9564	9635	9667	9668	9715
	9716	9806	9838	9839	9840	9841	9852	9855	9859	9865	9868	9883	10345	10370	10373
	10374	10377	10404	10408	10410	10423	10452	10457	10460	10475	10504	10507	10584	10651	10730
	10787	10793	10826	10842	10863										
IFT	1335	10385	10433												
IFTF	1335	10383	10432												
IIF	4	9	14	132	231	235	1288	1294	1307	1308	1346	1347	9853	9859	9860
	9871	9883	9887	10348	10349	10350	10351	10352	10353	10357	10384	10385	10401	10404	10405
	10411	10412	10413	10414	10415	10420	10445	10452	10457	10472	10497	10727	10815	10816	10817
	10818	10819	10822												
IPP	125	1360	1400	1454	1519	1625	1716	1830	1916	2010	2107	2340	2449	2557	2664
	2740	2821	2903	3078	3251	3405	3554	3701	3849	3996	4144	4180	4264	4348	4474
	4599	4639	4713	4811	4909	5002	5095	5193	5291	5386	5478	5573	5662	5757	5861
	5997	6162	6276	6439	6556	6711	6822	6969	7084	7198	7313	7427	7544	7661	7787
	7912	8037	8159	8281	8406	8582	8755	8909	9121	9337	9514	9666	9837	10594	10634
	10735	10736	10757	10773	10774	10829	10835	10852	10853						
.LIST	1	125	132	207	209	210	211	212	213	214	215	216	217	218	219
	220	221	222	223	224	225	232	235	1219	1225	1309	1335	1360	1370	1400
	1418	1454	1462	1519	1533	1625	1634	1716	1739	1830	1853	1916	1943	2010	2032
	2107	2135	2340	2368	2449	2476	2557	2584	2664	2678	2740	2759	2821	2840	2903
	2928	3078	3103	3251	3278	3405	3428	3554	3581	3701	3728	3849	3876	3996	4023
	4144	4150	4180	4197	4264	4280	4348	4369	4474	4495	4599	4609	4639	4643	4713
	4754	4811	4852	4909	4951	5002	5044	5095	5137	5193	5235	5291	5333	5386	5424
	5478	5518	5573	5609	5662	5703	5757	5770	5861	5904	5997	6041	6162	6202	6276
	6320	6439	6481	6556	6600	6711	6753	6822	6866	6969	7019	7084	7133	7198	7248
	7313	7362	7427	7479	7544	7597	7661	7711	7787	7837	7912	7962	8037	8087	8159
	8209	8281	8331	8406	8455	8582	8631	8755	8805	8909	8958	9121	9170	9337	9387
	9514	9564	9666	9716	9837	9841	9859	9875	10352	10452	10807	10815	10816	10817	10818
	10819	10820	10822	10823	12095	12123	12130	12138	12145	12152	12160	12178	12185	12192	12199
	12206	12224	12231	12240	12247	12255	12273	12280	12288	12295	12302	12318	12325	12333	12340
	12347	12353	12360	12367	12375	12394	12401	12409	12416	12423	12430	12437	12443	12461	12468
	12476	12483	12489	12507	12514	12522	12529	12535	12552	12559	12567	12574	12580	12597	12604
	12612	12619	12625	12643	12650	12658	12665	12671	12688	12695	12703	12710	12716	12733	12741
	12749	12756	12762	12779	12786	12794	12801	12807	12824	12831	12839	12847	12853	12870	12877
	12885	12892	12898	12915	12922	12930	12937	12944	12961	12968	12976	12983	12989	13006	13013
	13021	13029	13035	13052	13059	13067	13074	13080	13095	13104	13113	13121	13129	13136	13143
	13150	13158	13166	13174	13188	13198	13207	13215	13223	13230	13237	13244	13252	13260	13268
	13282	13291	13300	13308	13316	13323	13330	13337	13345	13353	13362	13376	13385	13394	13402
	13410	13417	13424	13431	13439	13447	13455	13469	13478	13487	13495	13503	13511	13518	13525
	13533	13541	13549	13563	13572	13581	13589	13597	13604	13611	13618	13626	13634	13642	13657
	13666	13675	13683	13691	13698	13705	13712	13720	13728	13736	13750	13759	13768	13776	13785
	13792	13799	13806	13814	13822	13830	13845	13853	13861	13869	13884	13892	13901	13909	13924
	13932	13940	13948	13963	13971	13979	13987	14001	14010	14018	14026	14040	14048	14056	14064
	14078	14086	14094	14102	14118	14126	14134	14142	14157	14165	14173	14181	14196	14204	14213
	14221	14238	14245												
MACRO	170	1219	1225	1325	1359	1399	1453	1518	1624	1715	1829	1915	2009	2106	2339
	2448	2556	2663	2739	2820	2902	3076	3251	3404	3554	3701	3849	3996	4143	4180
	4264	4348	4474	4599	4638	4713	4811	4909	5002	5095	5193	5291	5386	5478	5573
	5662	5757	5861	5996	6162	6275	6435	6554	6711	6822	6969	7084	7198	7313	7427
	7544	7661	7787	7912	8037	8159	8281	8406	8582	8755	8909	9121	9337	9514	9666
	10807	10823													

MCALL	3	125	232	1309											
NLIST	1	125	132	207	209	210	211	212	213	214	215	216	217	218	219
	220	221	222	223	224	225	232	235	1219	1225	1309	1335	1360	1370	1400
	1418	1454	1462	1519	1533	1625	1634	1716	1739	1830	1853	1916	1943	2010	2032
	2107	2135	2340	2368	2449	2476	2557	2584	2664	2678	2740	2759	2821	2840	2903
	2928	3078	3103	3251	3278	3405	3428	3554	3581	3701	3728	3849	3876	3996	4023
	4144	4150	4180	4197	4264	4280	4348	4369	4474	4495	4599	4609	4639	4643	4713
	4754	4811	4852	4909	4951	5002	5044	5095	5137	5193	5235	5291	5333	5386	5424
	5478	5518	5573	5609	5662	5703	5757	5770	5861	5904	5997	6041	6162	6202	6276
	6320	6439	6481	6556	6600	6711	6753	6822	6866	6969	7019	7084	7133	7198	7248
	7313	7362	7427	7479	7544	7597	7661	7711	7787	7837	7912	7962	8037	8087	8159
	8209	8281	8331	8406	8455	8582	8631	8755	8805	8909	8958	9121	9170	9337	9387
	9514	9564	9666	9716	9837	9841	9859	9875	10352	10452	10807	10815	10816	10817	10818
	10819	10820	10822	10823	12095	12123	12130	12138	12145	12152	12160	12178	12185	12192	12199
	12206	12224	12231	12240	12247	12255	12273	12280	12288	12295	12302	12318	12325	12333	12340
	12347	12353	12360	12367	12375	12394	12401	12409	12416	12423	12430	12437	12443	12461	12468
	12476	12483	12489	12507	12514	12522	12529	12535	12552	12559	12567	12574	12580	12597	12604
	12612	12619	12625	12643	12650	12658	12665	12671	12688	12695	12703	12710	12716	12733	12741
	12749	12756	12762	12779	12786	12794	12801	12807	12824	12831	12839	12847	12853	12870	12877
	12885	12892	12898	12915	12922	12930	12937	12944	12961	12968	12976	12983	12989	13006	13013
	13021	13029	13035	13052	13059	13067	13074	13080	13095	13104	13113	13121	13129	13136	13143
	13150	13158	13166	13174	13188	13198	13207	13215	13223	13230	13237	13244	13252	13260	13268
	13282	13291	13300	13308	13316	13323	13330	13337	13345	13353	13362	13376	13385	13394	13402
	13410	13417	13424	13431	13439	13447	13455	13469	13478	13487	13495	13503	13511	13518	13525
	13533	13541	13549	13563	13572	13581	13589	13597	13604	13611	13618	13626	13634	13642	13657
	13666	13675	13683	13691	13698	13705	13712	13720	13728	13736	13750	13759	13768	13776	13785
	13792	13799	13806	13814	13822	13830	13845	13853	13861	13869	13884	13892	13901	13909	13924
	13932	13940	13948	13963	13971	13979	13987	14001	14010	14018	14026	14040	14048	14056	14064
	14078	14086	14094	14102	14118	14126	14134	14142	14157	14165	14173	14181	14196	14204	14213
	14221	14238	14245												
PAGE	170	300	1025	1286	1359	4706	5854	9849	9887	10342	10873	12094			
REPT	132	209	217												
.SBTTL	15	126	135	138	160	170	232	300	1286	1360	1400	1454	1519	1625	1716
	1830	1916	2010	2107	2340	2449	2557	2664	2740	2821	2903	3078	3251	3405	3554
	3701	3849	3996	4144	4180	4264	4348	4474	4599	4639	4706	4713	4811	4909	5002
	5095	5193	5291	5386	5478	5573	5662	5757	5854	5861	5997	6162	6276	6439	6556
	6711	6822	6969	7084	7198	7313	7427	7544	7661	7787	7912	8037	8159	8281	8406
	8582	8755	8909	9121	9337	9514	9666	9837	9849	10342	10405	10457	10504	10581	10648
	10727	10784	10807	10823	10873	10977	11910	12077	12094						
TITLE	4														
WORD	132	133	134	154	155	156	157	158	159	168	178	181	182	183	184
	187	188	189	190	191	192	193	196	197	198	207	209	210	211	212
	213	214	215	216	217	218	219	220	221	222	223	224	237	238	239
	240	241	242	243	244	248	249	250	263	267	270	273	274	275	276
	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291
	292	293	294	295	1071	1072	1073	1074	1075	1076	1077	1085	1086	1087	1088
	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1214	1215	1216	1821
	1822	1823	1825	1826	1827	1911	1912	2096	2097	2098	2099	2332	2333	4768	4866
	4965	5058	5151	5249	5347	5720	5798	6215	6331	6384	6492	6614	6668	6763	6877
	6928	7726	7736	7851	7861	7976	7986	8101	8133	8223	8255	8345	8377	8477	8534
	8535	8536	8537	8538	8539	8540	8541	8542	8543	8544	8545	8546	8547	8548	8549
	8550	8551	8552	8553	8554	8555	8556	8557	8558	8559	8560	8561	8562	8563	8564
	8565	8653	8707	8708	8709	8710	8711	8712	8713	8714	8715	8716	8717	8718	8719
	8720	8721	8722	8723	8724	8725	8726	8727	8728	8729	8730	8731	8732	8733	8734
	8735	8736	8737	8738	8831	8873	8874	8875	8876	8877	8878	8879	8880	8881	8882
	8883	8884	8885	8886	8887	8888	9006	9057	9073	9074	9075	9076	9077	9078	9079

9080	9081	9082	9083	9084	9085	9086	9087	9088	9089	9090	9091	9092	9093	9094
9095	9096	9097	9098	9099	9100	9101	9102	9103	9104	9217	9273	9289	9290	9291
9292	9293	9294	9295	9296	9297	9298	9299	9300	9301	9302	9303	9304	9305	9306
9307	9308	9309	9310	9311	9312	9313	9314	9315	9316	9317	9318	9319	9320	9430
9465	9481	9482	9483	9484	9485	9486	9487	9488	9489	9490	9491	9492	9493	9494
9495	9496	9638	9639	9640	9641	9642	9643	9644	9645	9751	9792	9809	9810	9811
9812	9813	9814	9815	9816	9864	9867	9882	10008	10039	10092	10093	10094	10095	10184
10483	10488	10580	10677	10724	10759	10814	10862	10864	12080	12082	12085	12087	12089	12090
12124	12131	12139	12146	12153	12161	12179	12186	12193	12200	12207	12225	12232	12241	12248
12256	12274	12281	12289	12296	12303	12319	12326	12334	12341	12348	12354	12361	12368	12376
12395	12402	12410	12417	12424	12431	12438	12444	12462	12469	12477	12484	12490	12508	12515
12523	12530	12536	12553	12560	12568	12575	12581	12598	12605	12613	12620	12626	12644	12651
12659	12666	12672	12689	12696	12704	12711	12717	12734	12742	12750	12757	12763	12780	12787
12795	12802	12808	12825	12832	12840	12848	12854	12871	12878	12886	12893	12899	12916	12923
12931	12938	12945	12962	12969	12977	12984	12990	13007	13014	13022	13030	13036	13053	13060
13068	13075	13081	13096	13105	13114	13122	13130	13137	13144	13151	13159	13167	13175	13189
13199	13208	13216	13224	13231	13238	13245	13253	13261	13269	13283	13292	13301	13309	13317
13324	13331	13338	13346	13354	13363	13377	13386	13395	13403	13411	13418	13425	13432	13440
13448	13456	13470	13479	13488	13496	13504	13512	13519	13526	13534	13542	13550	13564	13573
13582	13590	13598	13605	13612	13619	13627	13635	13643	13658	13667	13676	13684	13692	13699
13706	13713	13721	13729	13737	13751	13760	13769	13777	13786	13793	13800	13807	13815	13823
13831	13846	13854	13862	13870	13885	13893	13902	13910	13925	13933	13941	13949	13964	13972
13980	13988	14002	14011	14019	14027	14041	14049	14057	14065	14079	14087	14095	14103	14119
14127	14135	14143	14158	14166	14174	14182	14197	14205	14214	14222	14239	14246		

```
ABS   062350     000

ERRORS DETECTED:   0

DSKM: DQKUAA, DSKW: DQKUAA=DQKUAA. P11, DQKUAA MIC
RUN-TIME:  39 41 6 SECONDS
RUN-TIME RATIO:  307/87=3 5
CORE USED:   23K   (45 PAGES)

DOCUMENT PAGES    302
WRAP-AROUND:   0%

USER SYMBOLS    710
MACRO  NAMES    58
UNDF SYMBOLS    13
DISK BLOCKS  READ:   2214
DISK BLKS WRITTEN    1601
KILO CORE SECONDS:   2922
```