DL11-W

DL11-W/1144 MFM SLU

CZDLDD0

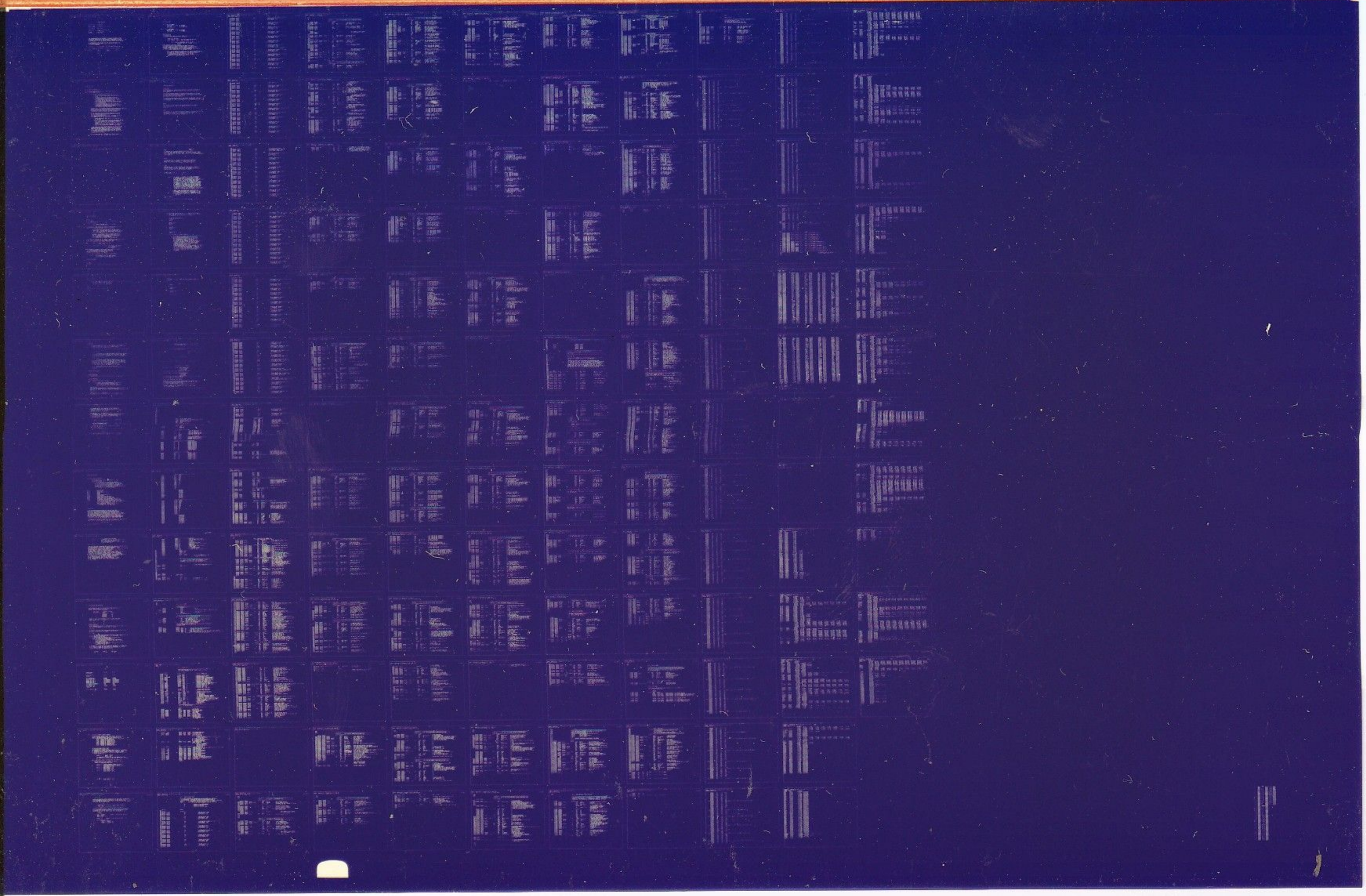
AH-8529D-MC

FICHE 1 OF 1

JAN 1980

digital

MADE IN USA



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IDENTIFICATION

PRODUCT CODE: AC-8528D-MC

PRODUCT NAME: CZDLDDO DL11-W/1144 MFM SLU

DATE CREATED: MARCH 1979

MAINTAINER: DIAGNOSTIC ENGINEERING

AUTHOR: DAN CASALETTO
REVISED BY: JOHN CIJKAJ

HISTORY SECTION

CZDLDDO WAS RELEASED OCT 79

THE FOLLOWING CHANGES WERE MADE. ALL CHANGES ARE INDICATED
BY ;** IN THE COMMENT FIELD:

1. USE THE MFPT INSTRUCTION,AND IF THE CPU IS A 11/44:

   A. DO NOT PERFORM READER ENABLE AND RECEIVER ACTIVE TESTS.
   B. IF ERROR FLAGS TESTS AND BREAK TESTS ARE ENABLED,PERFORM THESE TESTS ONLY FOR THE SLU AT 176500.PERFORM THESE TESTS FOR THE CONSOLE SLU IF BIT03 OF SWR IS ADDITIONALLY SET.
   C. WHILE IN MAINTENANCE MODE DO NOT WRITE AND READ A ^P OR AN ASCII 220. THIS WILL FORCE THE CONSOLE INTO 'CONSOLE MODE'.
   D. IN THE CLOCK REPEATABILITY TEST, ALLOW FOR A TOLERANCE OF 2 BETWEEN CLOCK COUNTS. THIS IS TO ALLOW ENOUGH TOLERANCE WHEN MOS MEMORY IS USED AND REFRESH CYCLES ARE OCCURING.

2. BECAUSE 11/44 SLU INTERRUPT REQUESTS ARE DEPENDANT ON A MFM CLOCK ENOUGH TIME MUST BE GIVEN FOR THEM TO OCCUR. THEREFORE, ALL TESTS ASSOCIATED WITH XMIT & RECEIVE INTERRUPTS SHOULD HAVE A MINIMUM OF 4 NOP'S ACTING AS WAIT FOR INTERRUPT.

3. IT WAS FOUND THAT AN ATTACHED TU58 WOULD BE ACTIVATED BY THE DIAGNOSTIC,AND,AS A RESULT,CHARACTERS WOULD BE SENT TO THE RECEIVER BUFFER.
   THIS WOULD CAUSE SOME TESTS TO FAIL. THEREFORE TO INHIBIT ANY COMMUNICATION TO THE TU58 FROM THE DIAGNOSTIC:

   A. ENABLE MAINTENANCE MODE IN ALL TESTS THAT WRITE TO THE XMITTER.
   B. IN ALL TESTS THAT WITE TO XMITTER AND BEFORE LEAVING TEST: DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS THAT MIGHT BE IN THE PROCESS OF BEING XMITTED TO FINISH.
   C. DISABLE MAINTENANCE MODE FOR PURPOSE OF ERROR PRINTING ONLY TO THE SLU WHICH THE TERMINAL IS ATTACHED.

4. IT WAS FOUND THAT UPON POWERUP AND WITH THE TU58 ATTACHED, CHARACTERS WOULD BE SENT TO THE RECEIVER FROM THE TU58. SOME RECEIVER TESTS WOULD FAIL DUE TO THIS. THEREFORE, ON ALL TESTS THAT PERFORM RECEIVER TESTS AND FOLLOWING MAINTENANCE MODE BEING ENABLED,DELAY ENOUGH TIME TO ALLOW TO ALLOW ANY CHARACTERS THAT MIGHT BE IN THE PROCESS OF BEING RECEIVED TO FINISH.

5. ADD SOFTWARE THAT WILL IMPLEMENT AUTO INITIATION OF 11/44 T/A CONSOLE TEST VIA WRAP CABLE FROM TU58 TO CONSOLE

PORTS. IT IS SELECTED BY SWR BIT02 AND IS PERFORMED
ONLY AFTER ALL SLUS ARE TESTED.

1.0 GENERAL INFORMATION

1.1 ABSTRACT

THIS DIAGNOSTIC IS A LOGIC TEST TO VERIFY THE OPERATION OF THE
THE FOLLOWING MODULES:

1. DL11-W SERIAL LINE/REAL TIME CLOCK INTERFACE
2. 11/44 MULTIFUNCTION MODULE

THE PROGRAM WILL RUN WITHOUT ANY SPECIAL TEST FIXTURES BY DEFAULT
HOWEVER, THE FOLLOWING OPTIONAL TESTING IS PROVIDED:

1. TEST TO VERIFY XMIT AND RECEIVE OF THE UARTS WITH
   A WRAP CABLE. THE UART UNDER TEST IS LOOPED BACK ON
   ITSELF. THIS IS SELECTED VIA OPERATIONAL SWITCH SETTING
   BIT 7, AND IS APPLICABLE TO THE DL11W AND 11/44 MFM.

2. AUTOMATIC INITIATION OF THE T/A CONSOLE TEST OF THE 11/44
   MFM. THF TU58 PORTS ARE LOOPED TO THE CONSOLE PORTS
   THIS IS SELECTED VIA OPERATIONAL SWITCH SETTING BIT 2
   AND IS APPLICABLE TO 11/44 MFM ONLY.
   (SEE CKKFBA0 FOR T/A CONSOLE TEST EXPLANATION)

THIS DIAGNOSTIC OPERATES ON THE CONSOLE SERIAL LINE AND CLOCK INTERFACES
AS WELL AS UP TO FIFTEEN(15) ADDITIONAL IDENTICALLY CONFIGURED
SERIAL LINE INTERFACES. THE DEFAULT ADDRESSES ARE:

A. CONSOLE - 177560 SERIAL LINE
             177546 CLOCK

B. OTHER SERIAL LINE - 776500 FIRST SERIAL LINE ADDRESS
                              OF 15 CONSECUTIVE SERIAL
                              LINE ADDRESSES

THE PROGRAM IS DESIGNED TO RUN ON ANY PDP-11 WITH 8K OF MEMORY
. IT CAN BE RUN UNDER XXDP,APT, AND ACT MONITORS,
AND ON PROCESSORS WITH NO HARDWARE SWITCH REGISTER,
SOFTWARE SWITCH REGISTER = LOCATION 176

POWER FAILURE IS SUPPORTED FOR SYSTEMS WITH CORE MEMORY.

NOTE: THIS DIAGNOSTIC WITH THE SWR - 000020
(CLOCK TESTS ONLY) SHOULD BE USED ON SWITCHLESS CPU'S
TO TEST KW-11L LINE CLOCK MODULES.

1.2 SYSTEM REQUIREMENTS

1.2.1 EQUIPMENT

STANDARD 11 FAMILY(COMPUTER WITH A CONSOLE OUTPUT DEVICE

AND 8K OF MEMORY.

OPTIONAL:
1.LOOP CABLE FOR UART LOOP BACK ON ITSELF
2.WRAP CABLE FOR 11/44 MFM T/E TESTING
(SEE DWG. #7016942 WRAP AROUND CABLE
AND SECTION 5.0 OF THIS DOCUMENT)

1.2.2 STORAGE

THE PROGRAM USES 5K WORDS OF MEMORY

1.3 ASSUMPTIONS

A. IF THE UNIT UNDER TEST (UUT) IS THE CONSOLE , THE PROGRAM WILL ASSUME THE REAL TIME CLOCK (RTC) IS ENABLED AND WILL TEST IT UNLESS THE TESTS ARE DISABLED BY BIT6 OF THE SWR.

B. IF THE UUT IS NOT THE CONSOLE, THE RTC IS NOT TESTED FOR THAT DEVICE.

C.

FOR THE DL11-W:

THE PROGRAM WILL ASSUME THE ERROR FLAG BITS AND THE BREAK FUNCTION OF THE DL11-W ARE DISABLED AND WILL NOT TEST THESE FUNCTIONS UNLESS ENABLED BY BIT10 (FOR ERROR FLAGS) AND BIT8 (FOR BREAK) OF THE SWR. THE DEFAULT CHARACTER SIZE IS 8 BITS (SEE PARA 2.3.2).

FOR THE 11/44:

THE PROGRAM ASSUMES THAT THE ERROR FLAG BITS AND THE BREAK FUNCTION ARE DISABLED, AND WILL NOT TEST THESE FUNCTIONS HOWEVER, IF BIT 10 (FOR ERROR FLAGS) AND BIT 08 (FOR BREAK) OF SWR ARE SET, THEN ERROR FLAGS AND BREAK TESTS ARE PERFORMED FOR THE TU58 SLU ONLY. IF BIT03 OF SWR IS ALSO SET THEN THESE TESTS WILL BE ENABLED FOR THE CONSOLE.

READER ENABLE AND RECEIVER ACTIVE TESTS ARE NOT PERFORMED SINCE THE 11/44 MFM DOES NOT IMPLEMENT THESE FUNCTIONS.

2.0 OPERATING INSTRUCTIONS

2.1 LOADING PROCEDURE

USE STANDARD PROCEDURE FOR PDP-11 ABSOLUTE BINARY FORMATTED TAPES.

2.2 STARTING PROCEDURE

LOAD THE SWITCH REGISTER WITH SETTING

NOTE: IF USING A CPU WITHOUT HARDWARE SWITCH REGISTER
SOFTWARE SWITCH REGISTER LOCATION = 176.
(FOR A 11/44 CPU USE MFM CONSOLE FOR DEPOSITING SWITCH REGISTER. TYPE ^P TO ENTER CONSOLE)

A. START AT 200.
AFTER CHECKING THE TRANSMITTER, THE PROGRAM WILL PRINT ITS IDENTIFICATION AND REPORT THE NUMBER OF DEVICES UNDER TEST (NUMBER IS OCTAL).
''END PASS'' IS PRINTED AFTER A FULL PASS HAS BEEN MADE ON ALL DEVICES UNDER TEST.

B. START AT 204. ****NOTE****
THE ''ECHO'' TEST WILL BE EXECUTED. AN ''*'' IS PRINTED AT THE BEGINNING OF THE TEST. THE ECHO TEST READS A CHARACTER FROM

THE TERMINAL,WRITES THAT CHARACTER TO THE TERMINAL AND
REPORTS ANY ERROR FLAGS SET IN THE RECEIVER BUFFER.
A CONTROL-C HALTS THE TEST AND PRINTS ''STOP'' AT THE TERMINAL
CONTINUING RESTARTS THE ECHO TEST.

C. START AT 210. ****NOTE****
THE TERMINAL OUTPUT TEST WILL BE EXECUTED. DEPRESSING ANY CHARACTER
AT THE TERMINAL, HALTS THE TEST. CONTINUING RESTARTS THE TEST.
THE TEST OUTPUTS 32 CHARACTERS ON A LINE AND REPEATS THE
PATTERN EVERY THREE LINES. THE PATTERN IS AS FOLLOWS
(OCTAL CODE 040 --> 377):

	(OCTAL CODE)
.''#$%&'()**,-./0123456789:;< >?	(040 --> 077)
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_	(100 --> 137)
'ABCDEFGHIJKLMNOPQRSTUVWXYZ	(140 --> 177) [LOWER CASE ALPHA]

THIS BOTTOM LINE COULD BE THE FOLLOWING IF THE TERMINAL
DOES NOT HAVE LOWER CASE:

@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\	[UPPER CASE ALPHA]

****NOTE****

IF THE TESTING ON TERMINIALS OTHER THAN THE CONSOLE IS DESIRED ;;++C
FOR TESTS B OR C,SEE SECTION 2.3.4. AND 2.3.5. OF THIS DOCUMENT. ;;++C

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2.3 OPERATING PROCEDURE

2.3.1 OPERATIONAL SWITCH SETTINGS

THE DIAGNOSTIC WILL CHECK FOR EXISTENCE OF SWITCH REGISTER AT 177570.
IF NO SWITCH REGISTER IS AVAILABLE THE PROGRAM WILL AUTOMATICALLY USE THE CONTENTS OF LOCATION 176 AS THE SOFTWARE SWITCH REGISTER. THE USER SHOULD SET THIS LOCATION BEFORE STARTING THE PROGRAM. IF A HARDWARE SWITCH IS AVAILABLE AND A SOFTWARE SWR(LOC. 176) IS DESIRED,LOAD ALL 1'S INTO LOCATION 177570.(ALL SWITCHES UP IF PHYSICAL SWITCHES ARE AVAILABLE)

BIT15 - HALT ON ERROR
BIT14 - SCOPE LOOP
BIT13 - INHIBIT ERROR TYPEOUT
BIT12 - UNUSED
BIT11 - UNUSED
BIT10 - ENABLE ERROR FLAGS TESTS
BIT09 - LOOP ON ERROR
BIT08 - ENABLE BREAK FUNCTION TESTS
BIT07 - ENABLE DATA TEST WITH WRAP CABLE
BIT06 - INHIBIT RTC TESTS (ALLOW ONLY SLU TESTS)
BIT05 - ALLOW MANUAL SETTING OF '$DEVM' (DEVICE MAP)
BIT04 - INHIBIT SLU TESTS (ALLOW ONLY LINE CLOCK TESTS)
BIT03 - FOR 11/44 MFM: ENABLE BOTH 'BREAK TESTS' AND 'ERROR FLAG TESTS' FOR THE CONSOLE SLU. (THIS BIT IS VALID ONLY IF BIT10 OR BIT08 IS SET.)
BIT02 -11/44 MFM OPTION: SELECT AUTO INITIATION OF T/A CONSOLE TEST VIA WRAP CABLE

FOR DL11-W:

IF THE SOFTWARE SWITCH REGISTER IS USED(LOC. 176) THEN
BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE
CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ^G
(CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE
THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM
CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER
APPLICABLE AREAS. BECAUSE THIS DIAGNOSTIC USES THE MAINTENANCE BIT
OF THE SERIAL LINE, THE CONTROL-G SHOULD BE ISSUED DURING PROGRAM
TYPEOUTS AT THAT TIME THE MAINTENANCE BIT IS SURE TO BE CLEAR.

IF A CONTROL-G IS DETECTED, UPON EXECUTION THE CONTENTS OF THE SWREG ARE
DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1.	<CR>	IF NO CHANGES ARE TO BE MADE
2.	6 DIGITS 0-7	TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3.	^U	TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

FOR 11/44 CPU:

SINCE THE 11/44 HAS A HARDWARE SWITCH REGISTER LOADED BY THE MFM CONSOLE
THEN THE DIAGNOSTIC SHOULD ALWAYS FIND EXISTENCE OF 177570.
WHEN OPERATING ON THE 11/44 CPU, DYNAMIC CHANGING OF SWREG(177570) DURING
PROGRAM EXECUTION CAN BE ACCOMPLISHED BY USING
TME MFM CONSOLE. TYPING ^P<CR> ON THE CONSOLE TTY WILL ENTER THE
CONSOLE. THIS IS CONSIDERED ''CONSOLE MODE''.
TO EXAMINE SWREG TYPE ' E SW<CR> ' TO THE CONSOLE PROMPT. TO LOAD THE
SWREG TYPE ' D SW DATA<CR> ' WHERE 'DATA'' IS AN OCTAL NUMBER.
IN ORDER FOR THE DIAGNOSTIC TO TYPE TO THE TTY IT IS NECESSARY
TO HAVE THE 11/44 MFM IN ''PROGRAM I/O MODE''. THIS CAN BE ACCOMPLISHED
BY TYPING ' C<CR> ' TO THE CONSOLE PROMPT. THEREFORE,WHEN CONSOLE
USE IS COMPLETED, PLACE THE MFM IN ''PROGRAM I/O MODE''.
BECAUSE THIS DIAGNOSTIC USES THE MAINTENANCE BIT, ^P WILL
NOT BE ACKNOWLEDGED DURING THESE TESTS.THEREFORE, ISSUE ^P
DURING PROGRAM TYPEOUTS. AT THIS TIME THE MAINTENANCE BIT
WILL BE CLEARED.

2.3.2 SETTING BITS PER CHARACTER

THIS PROGRAM DEFAULTS TO TESTING 8 BITS PER CHARACTER. IF THE SERIAL LINE IS SET FOR 5-->7 BITS PER CHARACTER, SET THE MEMORY LOCATION ''$USWR'' AS FOLLOWS:

CHAR. SIZE (# OF BITS)	''$USWR'' CONTENTS (BINARY)	(OCTAL)
8	100000000	400
7	010000000	200
6	001000000	100
5	000100000	40

''$USWR'' IS USED IN THE DATA PATH TESTS TO LIMIT THE BINARY COUNT TEST PATTERN TO THE NUMBER OF BITS SELECTED ON THE SERIAL LINE.

2.3.3 RUNNING UNDER APT

THE APT MAILBOX IS LOCATED AT LOCATION 500, TO ALLOW ADDITIONAL SERIAL LINE VECTOR ASSIGNMENTS TO THE 400 AREA OF MEMORY.

FOR DL11W:

THE DEFAULT EXECUTION TIMES PROVIDED($TSTM,$PASTM) ARE FOR EXECUTION WITH AN 11/34 PROCESSOR, CORE MEMORY , AND 110 BAUD.

FOR 11/44:

THE EXECUTION TIMES PROVIDED IN THE APT SCRIPT THAT FOLLOWS AND IN SECT. 2.4 ARE FOR EXECUTION WITH A 11/44 PROCESSOR, CACHE, 16K CORE MEMORY, AND 300 BAUD.

THE FOLLOWING IS A PROGRAM LOAD FILE USED BY APT:

1. E TABLE 'A' IS USED FOR APT DUMP MODE.
   A. TWO SLU'S ARE TESTED.($SWREG BIT05=1 AND $DEVM=3)
      A SLU AT 177560(DEFAULT CONSOLE SLU) AND AT 176500
      (BASE ADDRESS CODE).
   B. THE ERROR FLAG AND BREAK TESTS ARE SELECTED FOR THE SLU
      AT 176500(TU58 SLU IN MFG.)
      ($SWREG BIT 10 AND 8 =1)

2. E TABLE 'B' IS USED FOR APT QV AND RUN TIME MODES. IT ACCOMPLISHES WHAT E TABLE 'A' DOES, BUT ADDITIONALLY IT SUPPRESSES ALL TYPEOUTS TO THE TERMINAL($ENVM=240) AND SELECTS AUTO TESTING OF T/A CONSOLE TEST VIA WRAP CABLE($SWREG BIT02=1).

1ST PASS RUN TIME	LONGEST TEST TIME	ADDITIONAL RUN TIME
60	50	45

..... E TABLES .....

	A	B
E-MODE/S-MODE ($ENVM/$ENV)	200/000	240/001
SWITCH REGISTER 1 ($SWREG)	002440	002404
SWITCH REGISTER 2	000400	000400
CPU TYPE/OPTIONS	00/0000	00/0000
MEMORY MAP CODE 1	000/00000000	000/00000000
MEMORY MAP CODE 2	000/00000000	000/00000000
MEMORY MAP CODE 3	000/00000000	000/00000000
MEMORY MAP CODE 4	000/00000000	000/00000000
BUS PRIORITY/INTERRUPT 1	0000	0000
BUS PRIORITY/INTERRUPT 2	0000	0000
BUS ADDRESS CODE	176500	176500
DEVICE MAP CODE ($DEVM)	000003	000003
CTLR. SPECIFIC WORD 1	000000	000000
CTLR. SPECIFIC WORD 2	000000	000000

2.3.4 RUN WITH ALTERNATE CONSOLE ADDRESS

TO USE A CONSOLE ADDRESS OTHER THAN 177560, OR VECTOR OTHER THAN 60, THE OPERATOR MUST SUPPLY THE PROGRAM WITH THE CORRECT ADDRESSES BY INSERTING THEM AT THE TAG LABELED ''CRCSR'':

```
CRCSR:  ADDRESS OF RECEIVER RCSR
CRBUF:  ADDRESS OF RECEIVER BUFFER
CTCSR:  ADDRESS OF TRANSMITTER CSR
CTBUF:  ADDRESS OF TRANSMITTER BUFFER
CRVECT: ADDRESS OF RECEIVER VECTOR
CRPSW:  ADDRESS OF ASSOCIAED PSW
CTVECT: ADDRESS OF TRANSMITTER VECTOR
CTPSW:  ADDRESS OF ASSOCIATED PSW
```

2.3.5 TESTING ADDITIONAL SERIAL LINES

THIS PROGRAM WILL SUPPORT TESTING OF MULTIPLE SLU'S. IT REQUIRES THE ADDRESS OF THE FIRST ADDITIONAL RCSR (STORED AT ''$BASE'') AND ITS INTERRUPT VECTOR (STORED AT ''$VECT1''); AND WILL BE ABLE TO ADDRESS ANY SLU STARTING AT THE SPECIFIED BASE ADDRESS UP TO 15 CONSECUTIVE DEVICES.

```
EXAMPLE:        $BASE:  776500
                $VECT1: 300
THE PROGRAM WILL BE ABLE TO TEST THE CONSOLE PLUS ANY
ADDITIONAL DL11-W SLU'S WITHIN THE RANGE 776500 --> 776660
```

$BASE AND $VECT1 DEFAULT TO 776500 AND 300 RESPECTIVELY.

THE PROGRAM ASSOCIATES UNIT NUMBERS TO DEVICES AS FOLLOWS:
(NUMBERS IN PARENTHESIS ARE OCTAL)

```
UNIT# 0 -->  CONSOLE [ADDRESS STORED AT ''CRCSR'']
UNIT# 1 -->  BASE ADDRESS STORED AT ''$BASE''
             ASSOCIATED BASE VECTOR STORED AT''$VECT1''
UNIT# 2 -->  BASE ADDRESS + (10)
             BASE VECTOR + (10)
UNIT# 3 -->  BASE ADDRESS + (20)
             BASE VECTOR + (20)
UNIT# 4 -->  BASE ADDRESS + (30)
             BASE VECTOR + (30)
        .
        .
        .
        :
        :
        V
UNIT#15 -->  BASE ADDRESS + (160)
             BASE VECTOR + (160)
```

STARTING AT LOCATION 200 AND HAVING BIT5 OF SWR CLEAR, THE PROGRAM WILL SELF
SIZE THE NUMBER OF DEVICES (STARTING AT THE BAS ADDRESS) AND
STORE A BIT MAP AT '$DEVM' (DEVICE MAP) TO INDICATE WHICH UNIT NUMBERS
ARE PRESENT AND WILL BE TESTED:

```
-------------------------------------------------
! UNIT ! UNIT ! ..........! UNIT ! UNIT ! CONSOLE!
!  15  !  14  ! ..........!   2  .   1  !         !
-------------------------------------------------
```

A BIT MAP CAN BE ENTERED AT '$DEVM' PRIOR TO STARTING THE PROGRAM
SETTING BIT5 OF THE SWR INHIBITS THE SELF-SIZING AND DEVICE MAP
GENERATION,AND USES THE VALUE STORED BY THE OPERATOR.

EXAMPLE:

```
SWR  =  000040          [BINARY  0 000 000 000 100 000]
$BASE:  776500
$VECT1: 300

$DEVM:  13      [BINARY - 0 000 000 000 001 011]

THE PROGRAM WILL TEST -
        UNIT# 0 - CONSOLE
        UNIT# 1 = 776500 ; 300
        UNIT# 3   776520 ; 320
```

2.4 EXECUTION TIMES -

FOR DL11-W: (110 BAUD)
LONGEST SUBTEST TIME - 50 SECONDS
PASS TIME = 60 SECONDS
ADDITIONAL DEVICES = 55 SECONDS/DEVICE

FOR 11/44: (300 BAUD)
LONGEST SUBTEST TIME - 50 SECONDS
PASS TIME = 60 SECONDS
ADDITIONAL DEVICES 55 SECONDS/DEVICE

3.0 ERROR REPORTING

IF A ROUTINE FAILS AND THE INHIBIT ERROR TYPEOUT (BIT13) OF THE SWR IS NOT SET, A PRINTOUT RESULTS IN THE FORM:

```
''(SOME ASCII MESSAGE)''
TEST#   ERR PC   RCSR    [ANY APPLICABLE DAT HEADINGS]
XXXXXX  XXXXXX   XXXXXX   [ANY APPLICABLE DATA]
```

NOTE: 'RCSR'' IS DEPENDENT ON THE FAILURE & THEREFORE COULD BE TCSR,RBUF,TBUF,OR LKS

WHERE 'XXXXXX'' IS AN OCTAL NUMBER.
THIS ERROR PRINTOUT OCCURS PROVIDED THE ERROR THAT EXISTS WOULD NOT HINDER THE TYPEOUT. IN CASES WHERE IT IS NOT POSSIBLE TO PRINT AN ERROR MESSAGE (I.E. FATAL CONSOLE TRANSMITTER FAILURES), A HALT OCCURS AND THE PC CAN BE EXAMINED BY THE OPERATOR TO FIND THE ERROR INFORMATION IN THE PROGRAM LISTING.

NOTE: FOR SOFTWARE SWITCH OPERATION, THE SWITCH REGISTER CAN BE CHANGED BY TYPING A CONTROL-G AT THE CONSOLE DURING ERROR PRINTOUTS. AFTER CONTINUING FROM THE ERROR HALT THE OLD SWR CONTENTS IS DISPLAYED AND THE NEW CONTENTS CAN BE ENTERED. IF ERROR HALTS ARE DISABLED, THE CONTROL-G RESPONSE OCCURS IMMEDIATELY FOLLOWING THE TYPEOUT.

4.0 SUBROUTINE ABSTRACTS

4.1 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0 DESIGNED TO
DETECT AND ISOLATE UNEXPECTED TRAPS TO THE TRAP AND INTERRUPT VECTOR
AREA OF MEMORY.

EACH VECTOR ENTRANCE ADDRESS IS LOADED WITH THE ADDRESS OF THE NEXT
LOCATION. THE NEXT LOCATION IS LOADED WITH A BREAK POINT TRAP (000003).
THUS AN ILLEGAL TRAP OR INTERRUPT CAUSES A TRAP THROUGH THE BPT VECTOR(14)
WHICH POINTS TO THE ''CATCH'' ROUTINE.

THE ''CATCH'' ROUTINE REPORTS THE PC THAT CAUSED THE ORIGINAL TRAP AND
THE LOCATION OF THE TRAP VECTOR (IF UNDER APT, AN ERROR IS INDICATED TO APT).
AFTER REPORTING THE ERROR THE PROGRAM HALTS. THE PROGRAM MUST BE RESTARTED
AT THIS POINT.

4.2 WRPSW

THIS ROUTINE IS USED TO WRITE THE PSW BY POPPING VALUES FROM THE
STACK. THIS METHOD IS USED TO BE COMPATIBLE WITH ALL 11 FAMILY
PROCESSORS.

4.3 SCOPE

THIS ROUTINE CALL IS PLACED BETWEEN EACH SUBTEST. IT RECORDS THE STARTING
ADDRESS OF EACH SUBTEST AS IT IS BEING ENTERED AND UPDATES THE
TEST NUMBER. IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE START OF THE
SUBTEST AT WHICH THE SCOPE LOOP IS REQUESTED.

4.4 ERROR

THIS ROUTINE CALL IS PLACED WHEREEVER AN ERROR REPORT
IS DESIRED. THE LOWER BYTE OF THIS CALL IS USED AS THE ERROR NUMBER
AND AS A POINTER INTO THE ERROR TABLE . THIS ROUTINE REPORTS ERRORS
TO APT USING ''$APTYPE'' AND TYPES ERROR REPORTS TO THE CONSOLE
USING ''$ERRTYPE''.

4.5 $POWER

THIS ROUTINE SAVES ALL GENERAL REGISTERS DURING POWER-DOWN
AND RESTORES THEM AT POWER-UP. IF A POWER FAILURE OCCURS
''POWER'' IS PRINTED AT THE CONSOLE AFTER POWER IS RESTORED.

4.6 CKSWR

THIS ROUTINE CALL IS USED TO DETECT THE RECEPTION OF A CONTROL-G
FROM THE CONSOLE. THE CALL USES ''$READ'' TO PERFORM THE CONTROL-G
SEQUENCE OF DISPLAYING THE CONTENTS OF THE SOFTWARE SWITCH REGISTER
AND THE ENTERING THE NEW CONTENTS FROM THE TERMINAL.

5.0 AUTOMATIC INITIATION OF 11/44 T/A CONSOLE TEST
VIA WRAP CABLE

PURPOSE: THE T/E(OR T/A) CONSOLE TEST CAN BE IMPLEMENTED
BY MANUALLY TYPING T/E(OR T/A) ON THE KEYBOARD
OF THE TERMINAL WHEN IN CONSOLE MODE. IN ORDER TO
IMPLEMENT THIS TEST IN AN AUTOMATIC WAY IN MANUFACTURING
WHILE UNDER APT, THE USE OF A WRAP CABLE FROM
THE TU58 TO THE CONSOLE CAN BE USED ALLOWING THIS
DIAGNOSTIC TO ISSUE THE 'T/A' COMMAND TO THE CONSOLE.
THE DIAGNOSTIC WILL ISSUE THE APPROPRIATE SEQUENCE
OF COMMANDS TO THE CONSOLE VIA THE WRAP CABLE WHEN
BIT02 OF SWR =1. THE DIAGNOSTIC WILL THEN MONITOR
THE EXPECTED RESPONSE FROM THE CONSOLE VIA THE WRAP
CABLE AND HALT IF THERE IS AN ERROR. THE T/A TEST
IS DONE ONLY AFTER ALL SLUS ARE TESTED. IF T/A IS SUCCESSFUL
'END PASS' IS PRINTED AND THE DIAGNOSTIC STARTS AGAIN.

FIGURE 1 SHOWS THE PROPER WRAP CABLE SETUP AND
REQUIREMENTS FOR AUTOMATICALLY INITIATING T/A FROM THE
THE DIAGNOSTIC.NOTICE THAT THIS ARRANGEMENT ALLOWS
FOR THE TERMINAL TO MONITOR ALL COMMUNICATION FROM
THE CONSOLE OUTPUT DURING EXECUTION OF THE DIAGNOSTIC
IN ''WRAP MODE''.

TYPEOUT EXAMPLES

'. WITH THE CONFIGURATION OF FIGURE 1 AND ''WRAP MODE'' SELECTED

THE PROGRAM MAY BE LOADED BY APT. IF 'E TABLE B' OF SECTION
2.3.3 WERE USED WITH THE EXCEPTION OF ALLOWING TYPEOUTS($ENVM=200)
THE FOLLOWING WOULD BE SEEN ON THE LOCAL TERMINAL:

```
CZDLDDO DL11-W/1144 MFM SLU
02 DEVICES UNDER TEST  ^P
CONSOLE
>>>T/A

CONSOLE-TESTB
END PASS ^P
CONSOLE
>>>T/A

CONSOLE-TESTB
END PASS ^P
CONSOLE
>>>T/A

CONSOLE-TESTB
END PASS ^P   .....ETC.
```

DESCRIPTION: REFERING TO THE ABOVE PRINTOUTS:

A. THE DIAGNOSTIC IS LOADED WITH THE TITLE BEING PRINTED.
B. TWO SLU DEVICES(CONSOLE,TU58) ARE SPECIFIED
C. BOTH SLUS ARE TESTED COMPLETELY. AT THIS POINT
   THE THE DIAGNOSTIC ISSUES ^P TO THE WRAP CABLE.
   THE CONSOLE ENTERS CONSOLE MODE AND
   THE ^P TYPED ON THE TERMINAL IS THE MFM CONSOLE ECHO.
D. THE CONSOLE PERFORMS ITS OWN SELF TEST BY TYPING
   'CONSOLE' FOLLOWED BY >>>, THE CONSOLE PROMPT.
E. THE DIAGNOSTIC THEN ISSUES T/A AND THE TERMINAL
   SHOWS THE CONSOLE ECHO OF THIS.
F. THE MFM THEN PERFORMS THE T/A TEST SHOWN BY THE TERMINAL
   TYPING 'CONSOLE-TESTB'.THE DIAGNOSTIC LOOKS FOR THE
   'B' IN THIS TYPEOUT,AND WHEN FOUND , CONSIDERS
   THE TEST A SUCCESS. THE DIAGNOSTIC WILL TYPE END PASS
   INDICATING A SUCCESSFUL PASS OF THE DIAGNOSTIC.
G. THE DIAGNOSTIC CONTINUES WITH FURTHER PASSES OF THE
   DIAGNOSTIC.

2. IF 'E TABLE B' OF 2.3.3 WERE USED WITH TYPEOUTS SUPPRESSED ($ENVM=240) AS STATED, THEN THE FOLLOWING TYPEOUTS WOULD BE NOTICED:

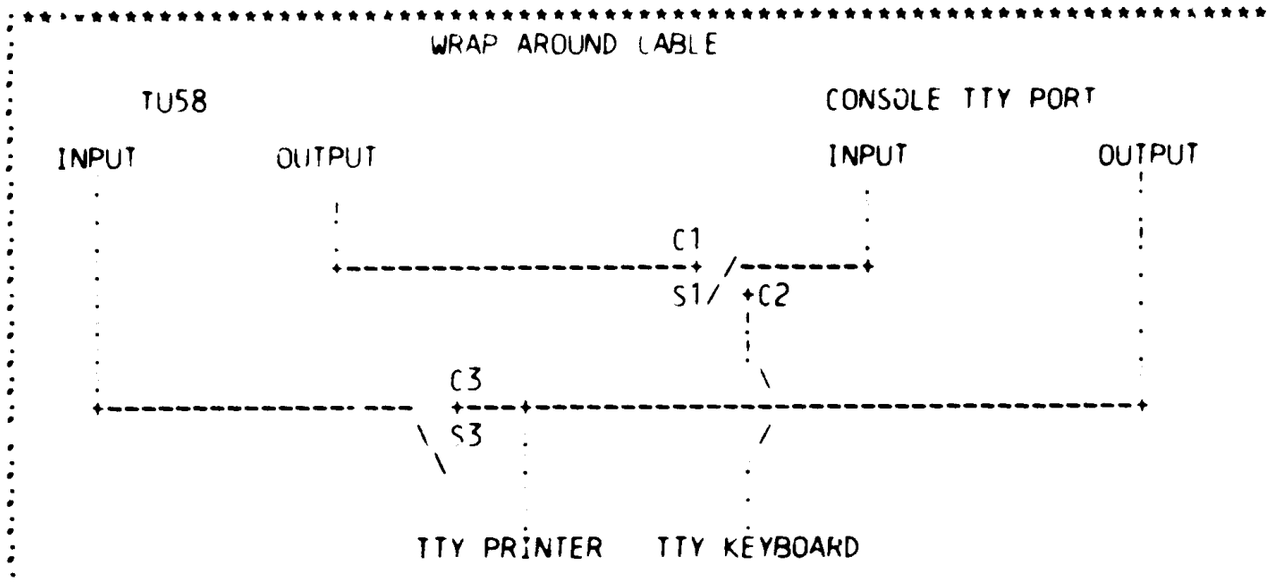
```
^P
CONSOLE
>>>T/A

CONSOLE-TESTB^P
CONSOLE
>>>T/A

CONSOLE-TESTB^P
CONSOLE
>>>T/A

CONSOLE-TESTB^P .....ETC.
```

FIG. 1- WRAPAROUND CONFIGURATION - AUTO INITIATION OF
11/44 T/A CONSOLE TEST

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; WHEN THE SWITCH IS IN 'NORMAL'' MODE CONTACTS ARE:
;                                   S1-C2 IS CLOSED
;                                   S1-C1 IS OPEN
;                                   S3-C3 IS OPEN
; THIS ALLOWS THE USE OF THE TERMINAL WITH THE CONSOLE
;
; WHEN THE SWTICH IS IN 'WRAP'' MODE CONTACTS ARE
;                                   S1-C1 CLOSED
;                                   S1-C2 OPEN
;                                   S2-C3 CLOSED
; THIS ALLOWS THE TU58 PORT TO COMMUNICATE WITH THE CONSOLE PORT AND FOR
; THE TTY TO MONITOR THE CONSOLE OUTPUT
;
; THIS IS ALL DONE WITH A DPDT SWITCH
;
; BEFORE THIS TEST CAN BE RUN THE CONSOLE UART,TTY,TU58 MUST BE AT
; THE SAME BAUD RATE. THE CONSOLE AND TU58 JART,AND THE TTY SHOULD BE
;SET UP WITH THE SAMF STOP BIT SETTING,
; WITH PARITY INHIBITED AND WITH A WORD LENGTH OF 7 OR 8 BITS
;
; FOR MORE INFORMATION SEE THE MFM PRINTS AND THE WRAP AROUND
; CABLE DRAWING NUMBER: 7016942
;
;*******************************************************************************
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%

```
784
791
795
799
803
804
811
812
818
828
843
844
845                             .MCALL  .$TYPE,.$TYPOC,.$TRAP
846                             .MCALL  .SETUP,STARS,PUSH,POP,SETUP,.EQUIV,.$ERRTYP
847                             .MCALL  .$APTHDR,.$APTBLS,.$ACT11,.$SCOPE
848                             .MCALL  .$CMTAG,.$EOP,.$READ
849                             .MCALL  .EQUAT
850                             .SBTTL  BASIC DEFINITIONS

                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                          STACK=  1100
104000                                  ERROR-EMT
000004                                  SCOPE=IOT

                                ;*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
177776                                  PSW=PS
177774                          STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                          PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                          DSWR-   177570          ;;HARDWARE SWITCH REGISTER
177570                          DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                                ;*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
001000                          SW9=SW09
000400                          SW8=SW08
000200                          SW7=SW07
000100                          SW6=SW06
000040                          SW5=SW05
000020                          SW4=SW04
000010                          SW3=SW03
000004                          SW2=SW02
000002                          SW1=SW01
000001                          SW0=SW00

                        ;*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
001000                          BIT9=BIT09
000400                          BIT8=BIT08
000200                          BIT7=BIT07
000100                          BIT6=BIT06
000040                          BIT5=BIT05
000020                          BIT4=BIT04
000010                          BIT3=BIT03
000004                          BIT2=BIT02
000002                          BIT1=BIT01
000001                          BIT0=BIT00
```

```
                                ;*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
851     000007                          MTPT=7
852     176500                          ABASE=  176500
853     000300                          AVECT1= 300
854     000400                          AUSWR=  400
855     000001                          $TN=    1
856     161000                          $SWR=   161000
857     000003                          BPT=    000003          ;THIS IS THE COMMAND FOR A TRAP
858                                                             ;   THROUGH 14 (BPT TRAP)
859
860     000000                          .-0
861                             ;;**********************************************************************
862                                     ;*ALL UNUSED LOCATIONS FROM 4-776 CONTAIN A ''.+2,BPT''
863                                     ;*SEQUENCE TO CATCH ILLEGAL TRAPS & INTERRUPPTS
864                                     ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
865
873
874             000014                  .  14                   ;THE BPT TRAP VECTOR POINTS TO THE
875 000014  014552                      .WORD   CATCH           ;   ILLEGAL TRAP HANDLER ''CATCH''
876 000016  000340                      .WORD   340
877
878             000042                  .       42
879 000042  000000                      .WORD   0
880
881
883
884
885             000174                  .=      174
886 000174  000000              DISPREG:.WORD   0
887 000176  000000              SWREG:  .WORD   0
888
889             000200                  .=200
890 000200  000167  002642              JMP     START           ;DO INTERFACE TEST
891 000204  000167  017114              JMP     ECHO            ;DO ECHO TEST
892 000210  000167  017330              JMP     OUTTST          ;DO OUTPUT TEST TO TERMINAL
```

```
894
895          000500                          .=      500
896                                  .SBTTL  ACT11 HOOKS

                                     ;;*****************************************************************
                                     ;HOOKS REQUIRED BY ACT11
             000500                          $SVPC=.                 ;SAVE PC
             000046                          .=46
     000046  014450                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
             000052                          .=52
     000052  000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
             000500                          .=$SVPC                 ;; RESTORE PC
897                                  .SBTTL  APT PARAMETER BLOCK

                                     ;;*****************************************************************
                                     ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                     ;;*****************************************************************
             000500                          .$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  000500                          $APTHDR ;;POINT TO APT HEADER BLOCK
             000500                          .=.$X   ;;RESET LOCATION COUNTER
                                     ;;*****************************************************************
                                     ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                     ;INTERFACE SPEC.

     000500                          $APTHD:
     000500  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
     000502  001066                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
     000504  000050                  $TSTM:  .WORD   50      ;;RUN TIM OF LONGEST TEST
     000506  000060                  $PASTM: .WORD   60      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
     000510  000055                  $UNITM: .WORD   55      ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
     000512  000030                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
898
```

```
    900                             .SBTTL  COMMON TAGS

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

            001000                          .=1000
    001000                          $CMTAG:                         ;;START OF COMMON TAGS
    001000  000000                          .WORD   0
    001002     000                  $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
    001003     000                  $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
    001004  000000                  $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
    001006  000000                  $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
    001010  000000                  $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
    001012  000000                  $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
    001014     000                  $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
    001015     001                  $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
    001016  000000                  $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
    001020  000000                  $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
    001022  000000                  $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
    001024  000000                  $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
    001026  000000                  $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
    001030  000000                          .WORD   0               ;;RESERVED--NOT TO BE USED
    001032  000000                          .WORD   0
    001034     000                  $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
    001035     000                  $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
    001036  000000                          .WORD   0
    001040  177570                  SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
    001042  177570                  DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
    001044  177560                  $TKS:   177560                  ;;TTY KBD STATUS
    001046  177562                  $TKB:   177562                  ;;TTY KBD BUFFER
    001050  177564                  $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
    001052  177566                  $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
    001054     000                  $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
    001055     002                  $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
    001056     012                  $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A 'LINE FEED''
    001057     000                  $TPFLG: .BYTE   0               ;;'TERMINAL AVAILABLE'' FLAG (BIT<07>=0=YES)
    001060  000000                  $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
    001062     077                  $QUES:  .ASCII  /?/             ;;QUESTION MARK
    001063     015                  $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
    001064     012     000          $LF:    .ASCIZ  <12>            ;;LINE FEED
                                    ;;**********************************************************************
                                    .SBTTL  APT MAILBOX-ETABLE

                                    ;;**********************************************************************
                                    .EVEN
    001066                          $MAIL:                          ;;APT MAILBOX
    001066  000000                  $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
    001070  000000                  $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
    001072  000000                  $TESTN: .WORD   ATESTN          ;;TEST NUMBER
    001074  000000                  $PASS:  .WORD   APASS           ;;PASS COUNT
    001076  000000                  $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
    001100  000000                  $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
    001102  000000                  $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
    001104  000000                  $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
    001106                          $ETABLE:                        ;;APT ENVIRONMENT TABLE
    001106     000                  $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
```

```
001107  000                 $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
001110  000000              $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
001112  000400              $USWR:  .WORD   AUSWR   ;;USER SWITCHES
001114  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
001116  000                 $MAMS1: .BYTE   AMAMS1  .;HIGH ADDRESS,M.S. BYTE
001117  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
001120  000000              $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
                            ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF 'TYPE'' ABOVE
001122  000                 $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
001123  000                 $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
001124  000000              $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
001126  000                 $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
001127  000                 $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
001130  000000              $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
001132  000                 $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
001133  000                 $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
001134  000000              $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
001136  000300              $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001140  000000              $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001142  176500              $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001144  000000              $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
001146                      $ETEND:
                            .MEXIT
```

```
                                .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


    001146                      $ERRTB:
  901
  902 001146                    .$ERRTB:
  903 001146  017630                    EM1                     ;''CAN NOT ACCESS TCSR''
  904 001150  024012                    DH1                     ;''TEST# ERR PC  TCSR''
  905 001152  024572                    DT1                     ;$TESTN,$ERRPC,TCSR
  906 001154  000000                    0
  907
  908 001156  017654                    EM2                     ;''CAN NOT ACCESS TBUF''
  909 001160  024037                    DH2                     ;''TEST# ERR PC  TBUF''
  910 001162  024602                    DT2                     ;$TESTN,$ERRPC,TBUF
  911 001164  000000                    0
  912
  913 001166  017700                    EM3                     ;''TCSR DONE NOT CLEARED WITH TBUF FULL''
  914 001170  024012                    DH1                     ;''TEST# ERR PC  TCSR''
  915 001172  024572                    DT1                     ;$TESTN,$ERRPC,TCSR
  916 001174  000000                    0
  917
  918 001176  017745                    EM4                     ;''TCSR DONE NOT SET''
  919 001200  024012                    DH1                     ;''TEST# ERR PC  TCSR''
  920 001202  024572                    DT1                     ;$TESTN,$ERRPC,TCSR
  921 001204  000000                    0
  922
  923 001206  017767                    EM5                     ;TCSR DONE NOT SET WITH RESET
  924 001210  024012                    DH1                     ;''TEST# ERR PC  TCSR''
  925 001212  024572                    DT1                     ;$TESTN,$ERRPC,TCSR
  926 001214  000000                    0
  927
  928 001216  020024                    EM6                     ;''CAN NOT ACCESS RCSR''
  929 001220  024064                    DH6                     ;''TEST# ERR PC  RCSR''
  930 001222  024612                    DT6                     ;$TESTN,$ERRPC,RCSR
  931 001224  000000                    0
  932
  933 001226  020050                    EM7                     ;''CAN NOT ACCESS RBUF''
  934 001230  024111                    DH7                     ;''TEST# ERR PC  RBUF''
  935 001232  024622                    DT7                     ;$TESTN,$ERRPC,RBUF
  936 001234  000000                    0
  937
  938 001236  020074                    EM10                    ;''CAN NOT ACCESS LKS''
  939 001240  024136                    DH10                    ;''TEST# ERR PC  LKS''
  940 001242  024632                    DT10                    ;$TESTN,$ERRPC,LKS
  941 001244  000000                    0
  942
```

```
943 001246  020117                 EM11        ;'BIT0 OF TCSR NOT CLEAR AFTER RESET''
944 001250  024012                 DH1         ;'TEST# ERR PC  TCSR
945 001252  024572                 DT1         ;$TESTN,$ERRPC,TCSR
946 001254  000000                 0
947
948 001256  020162                 EM12        ;'CAN NOT SET BIT0 OF TCSR''
949 001260  024012                 DH1         ;'TEST# ERR PC  TCSR''
950 001262  024572                 DT1         ;$TESTN,$ERRPC,TCSR
951 001264  000000                 0
952
953 001266  020213                 EM13        ;'CAN NOT CLEAR BIT0 OF TCSR''
954 001270  024012                 DH1         ;'TEST# ERR PC  TCSR''
955 001272  024572                 DT1         ;$TESTN,$ERRPC,TCSR
956 001274  000000                 0
957
958 001276  020246                 EM14        ;'RESET DID NOT CLEAR BIT0 OF TCSR''
959 001300  024012                 DH1         ;'TEST# ERR PC  TCSR''
960 001302  024572                 DT1         ;$TESTN,$ERRPC,TCSR
961 001304  000000                 0
962
963 001306  020307                 EM15        ;'BIT2 OF TCSR NOT CLEAR AFTER RESET''
964 001310  024012                 DH1         ;'TEST# ERR PC  TCSR''
965 001312  024572                 DT1         ;$TESTN,$ERRPC,TCSR
966 001314  000000                 0
967
968 001316  020352                 EM16        ;'CAN NOT SET BIT2 OF TCSR''
969 001320  024012                 DH1         ;'TEST# ERR PC  TCSR''
970 001322  024572                 DT1         ;$TESTN,$ERRPC,TCSR
971 001324  000000                 0
972
973 001326  020403                 EM17        ;'CAN NOT CLEAR BIT2 OF TCSR''
974 001330  024012                 DH1         ;'TEST# ERR PC  TCSR''
975 001332  024572                 DT1         ;$TESTN,$ERRPC,TCSR
976 001334  000000                 0
977
978 001336  020436                 EM20        ;'RESET DID NOT CLEAR BIT2 OF TCSR''
979 001340  024012                 DH1         ;'TEST# ERR PC  TCSR''
980 001342  024572                 DT1         ;$TESTN,$ERRPC,TCSR
981 001344  000000                 0
982
983 001346  020477                 EM21        ;'BIT6 OF TCSR NOT CLEAR AFTER RESET2
984 001350  024012                 DH1         ;'TEST# ERR PC  TCSR''
985 001352  024572                 DT1         ;$TESTN,$ERRPC,TCSR
986 001354  000000                 0
987
988 001356  020542                 EM22        ;'XMIT INTERRUPT WITH PRIORITY 7''
989 001360  024012                 DH1         ;'TEST# ERR PC  TCSR''
990 001362  024572                 DT1         ;$TESTN,$ERRPC,TCSR
991 001364  000000                 0
992
993 001366  020577                 EM23        ;'CAN NOT SET BIT6 OF TCSR''
994 001370  024012                 DH1         ;'TEST# ERR PC  TCSR''
995 001372  024572                 DT1         ;$TESTN,$ERRPC,TCSR
996 001374  000000                 0
997
998 001376  020630                 EM24        ;'CAN NOT CLEAR BIT6 OF TCSR''
999 001400  024012                 DH1         ;'TEST# ERR PC  TCSR''
```

```
1000 001402  024572                  DT1                ;$TESTN,$ERRPC,TCSR
1001 001404  000000                  0
1002
1003 001406  020663                  EM25               ;'RESET DID NOT CLEAR BIT6 OF TCSR''
1004 001410  024012                  DH1                ;'TEST# ERR PC  TCSR''
1005 001412  024572                  DT1                ;$TESTN,$ERRPC,TCSR
1006 001414  000000                  0
1007
1008 001416  020724                  EM26               ;'BIT6 OF RCSR NOT CLEAR AFTER RESET''
1009 001420  024064                  DH6                ;'TEST# ERR PC  RCSR''
1010 001422  024612                  DT6                ;$TESTN,$ERRPC,RCSR
1011 001424  000000                  0
1012
1013 001426  020767                  EM27               ;'RCVR INTERRUPT WITH PRIORITY 7''
1014 001430  024064                  DH6                ;'TEST# ERR PC  RCSR''
1015 001432  024612                  DT6                ;$TESTN,$ERRPC,RCSR
1016 001434  000000                  0
1017
1018 001436  021026                  EM30               ;'CAN NOT SET BIT6 OF RCSR''
1019 001440  024064                  DH6                ;'TEST# ERR PC  RCSR''
1020 001442  024612                  DT6                ;$TESTN,$ERRPC,RCSR
1021 001444  000000                  0
1022
1023 001446  021057                  EM31               ;'CAN NOT CLEAR BIT6 OF RCSR''
1024 001450  024064                  DH6                ;'TEST# ERR PC  RCSR''
1025 001452  024612                  DT6                ;$TESTN,$ERRPC,RCSR
1026 001454  000000                  0
1027
1028 001456  021112                  EM32               ;'CAN NOT CLEAR BIT6 OF RCSR WITH RESET2
1029 001460  024064                  DH6                ;'TEST# ERR PC  RCSR''
1030 001462  024612                  DT6                ;$TESTN,$ERRPC,RCSR
1031 001464  000000                  0
1032
1033 001466  021160                  EM33               ;'BIT6 OF LKS NOT CLEAR AFTER RESET''
1034 001470  024136                  DH10               ;'TEST# ERR PC  LKS''
1035 001472  024632                  DT10               ;$TESTN,$ERRPC,LKS
1036 001474  000000                  0
1037
1038 001476  021222                  EM34               ;'LKS INTERRUPT WITH PRIORITY 7''
1039 001500  024136                  DH10               ;'TEST# ERR PC  LKS''
1040 001502  024632                  DT10               ;$TESTN,$ERRPC,LKS
1041 001504  000000                  0
1042
1043 001506  021260                  EM35               ;'CAN NOT SET BIT6 OF LKS''
1044 001510  024136                  DH10               ;'TEST# ERR PC  LKS''
1045 001512  024632                  DT10               ;$TESTN,$ERRPC,LKS
1046 001514  000000                  0
1047
1048 001516  021310                  EM36               ;'CAN NOT CLEAR BIT6 OF LKS''
1049 001520  024136                  DH10               ;'TEST# ERR PC  LKS''
1050 001522  024632                  DT10               ;$TESTN,$ERRPC,LKS
1051 001524  000000                  0
1052
1053 001526  021342                  EM37               ;'RESET DID NOT CLEAR BIT6 OF LKS''
1054 001530  024136                  DH10               ;'TEST# ERR PC  LKS''
1055 001532  024632                  DT10               ;$TESTN,$ERRPC,LKS
1056 001534  000000                  0
```

```
1057
1058 001536  021402                    EM40    ;'DUAL ADDRESSING ERROR''
1059 001540  024162                    DH40    ;'TEST# ERR PC  GOOD    BAD''
1060 001542  024642                    DT40    ;$TESTN,$ERRPC,$GDADR,$BDCSR
1061 001544  000000                    0
1062
1063 001546  021430                    EM41    ;'BIT7 OF LKS NOT SET AFTER RESET2
1064 001550  024136                    DH10    ;'TEST# ERR PC  LKS''
1065 001552  024632                    DT10    ;$TESTN,$ERRPC,LKS
1066 001554  000000                    0
1067
1068 001556  021470                    EM42    ;'CAN NOT CLEAR BIT7 OF LKS''
1069 001560  024136                    DH10    ;'TEST# ERR PC  LKS''
1070 001562  024632                    DT10    ;$TESTN,$ERRPC,LKS
1071 001564  000000                    0
1072
1073 001566  021522                    EM43    ;'BIT7 OF LKS DOES NOT SET''
1074 001570  024136                    DH10    ;'TEST# ERR PC  LKS''
1075 001572  024632                    DT10    ;$TESTN,$ERRPC,LKS
1076 001574  000000                    0
1077
1078 001576  021553                    EM44    ;'RTC INTERRUPT AT PRIORITY 7''
1079 001600  024136                    DH10    ;'TEST# ERR PC  LKS''
1080 001602  024632                    DT10    ;$TESTN,$ERRPC,LKS
1081 001604  000000                    0
1082
1083 001606  021607                    EM45    ;'RTC INTERRUPTS WHEN DISABLED''
1084 001610  024136                    DH10    ;'TEST# ERR PC  LKS''
1085 001612  024632                    DT10    ;$TESTN,$ERRPC,LKS
1086 001614  000000                    0
1087
1088 001616  021644                    EM46    ;'RTC INTERRUPT DID NOT OCCUR''
1089 001620  024136                    DH10    ;'TEST# ERR PC  LKS''
1090 001622  024632                    DT10    ;$TESTN,$ERRPC,LKS
1091 001624  000000                    0
1092
1093 001626  021644                    EM47    ;'RTC INTERRUPT DID NOT OCCUR''
1094 001630  024136                    DH10    ;'TEST# ERR PC  LKS'
1095 001632  024632                    DT10    ;$TESTN,$ERRPC,LKS
1096 001634  000000                    0
1097
1098 001636  021700                    EM50    ;'RTC DOUBLE INTERRUPT '
1099 001640  024136                    DH10    ;'TEST# ERR PC  LKS''
1100 001642  024632                    DT10    ;$TESTN,$ERRPC,LKS
1101 001644  000000                    0
1102
1103 001646  021725                    EM51    ;'RESET DID NOT CLEAR RTC INTERRUPT''
1104 001650  024136                    DH10    ;'TEST# ERR PC  LKS''
1105 001652  024632                    DT10    ;$TESTN,$ERRPC,LKS
1106 001654  000000                    0
1107
1108 001656  021755                    EM52    ;'RTC INTERRUPT DID NOT CLEAR WITH BIT7 OF LKS''
1109 001660  024136                    DH10    ;'TEST# ERR PC  LKS''
1110 001662  024632                    DT10    ;$TESTN,$ERRPC,LKS
1111 001664  000000                    0
1112
1113 001666  022032                    EM53
```

```
1114 001670  024216                    DH53            ;'TEST# ERR PC  LKS   CNT1   CNT2''
1115 001672  024654                    DT53            ;$TESTN,$ERRPC,LKS,FIRST,SECND
1116 001674  000000                    0
1117
1118 001676  022056                    EM54            ;'XMIT INTERRUPTS WHEN DISABLED''
1119 001700  024012                    DH1             ;'TEST# ERR PC  TCSR''
1120 001702  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1121 001704  000000                    0
1122
1123 001706  022214                    EM55            ;'XMIT DID NOT INTERRUPT''
1124 001710  024012                    DH1             ;'TEST# ERR PC  TCSR''
1125 001712  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1126 001714  000000                    0
1127
1128 001716  022114                    EM56            ;'XMIT INTERRUPT AT PRIORITY 7''
1129 001720  024012                    DH1             ;'TEST# ERR PC  TCSR''
1130 001722  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1131 001724  000000                    0
1132
1133 001726  022152                    EM57            ;'XMIT INTERRUPTS WITH ENABLE CLEAR''
1134 001730  024012                    DH1             ;'TEST# ERR PC  TCSR''
1135 001732  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1136 001734  000000                    0
1137
1138 001736  022214                    EM60            ;'XMIT DID NOT INTERRUPT''
1139 001740  024012                    DH1             ;'TEST# ERR PC  TCSR''
1140 001742  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1141 001744  000000                    0
1142
1143 001746  022243                    EM61            ;'XMIT RE-INTERRUPTED''
1144 001750  024012                    DH1             ;'TEST# ERR PC  TCSR''
1145 001752  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1146 001754  000000                    0
1147
1148 001756  022267                    EM62            ;'LOADING TBUF DID NOT CLEAR INTERRUPT''
1149 001760  024012                    DH1             ;'TEST# ERR PC  TCSR''
1150 001762  024572                    DT1             ;$TESTN,$ERRPC,TCSR
1151 001764  000000                    0
1152
1153 001766  022334                    EM63            ;'RCVR ACTIVE NOT SET''
1154 001770  024064                    DH6             ;'TEST# ERR PC  RCSR''
1155 001772  024612                    DT6             ;$TESTN,$ERRPC,RCSR
1156 001774  000000                    0
1157
1158 001776  022360                    EM64            ;'RECEIVER DONE NEVER SET''
1159 002000  024064                    DH6             ;'TEST# ERR PC  RCSR''
1160 002002  024612                    DT6             ;$TESTN,$ERRPC,RCSR
1161 002004  000000                    0
1162
1163 002006  022404                    EM65            ;'RCVR ACTIVE NOT CLEARED WITH DONE SET2
1164 002010  024064                    DH6             ;'TEST# ERR PC  RCSR''
1165 002012  024612                    DT6             ;$TESTN,$ERRPC,RCSR
1166 002014  000000                    0
1167
1168 002016  022452                    EM66            ;'RESET DID NOT CLEAR RCVR DONE''
1169 002020  024064                    DH6             ;'TEST# ERR PC  RCSR''
1170 002022  024612                    DT6             ;$TESTN,$ERRPC,RCSR
```

```
1171 002024  000000                    0
1172
1173 002026  022510                    EM67    ;'RDR ENABLE SET DID NOT CLEAR RCVR DONE''
1174 002030  024064                    DH6     ;'TEST# ERR PC  RCSR''
1175 002032  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1176 002034  000000                    0
1177
1178 002036  022553                    EM70    ;'READING RBUF DID NOT CLEAR RCVR DONE''
1179 002040  024064                    DH6     ;'TEST# ERR PC  RCSR''
1180 002042  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1181 002044  000000                    0
1182
1183 002046  022620                    EM71    ;'RCVR INTERRUPTS WITH ENABLE CLEAR''
1184 002050  024064                    DH6     ;'TEST# ERR PC  RCSR''
1185 002052  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1186 002054  000000                    0
1187
1188 002056  022767                    EM72    ;'RCVR DID NOT INTERRUPT''
1189 002060  024064                    DH6     ;'TEST# ERR PC  RCSR''
1190 002062  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1191 002064  000000                    0
1192
1193 002066  022662                    EM73    ;'RCVR INTERRUPTS AT PRIORITY 7''
1194 002070  024064                    DH6     ;'TEST# ERR PC  RCSR''
1195 002072  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1196 002074  000000                    0
1197
1198 002076  022720                    EM74    ;'RCVR INTERRUPT REQUEST PASSED WITH ENABLE CLEAR''
1199 002100  024064                    DH6     ;'TEST# ERR PC  RCSR''
1200 002102  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1201 002104  000000                    0
1202
1203 002106  022767                    EM75    ;'RCVR DID NOT INTERRUPT''
1204 002110  024064                    DH6     ;'TEST# ERR PC  RCSR''
1205 002112  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1206 002114  000000                    0
1207 002116  023016                    EM76    ;'RECEIVER RE-INTERRUPTED''
1208 002120  024064                    DH6     ;'TEST# ERR PC  RCSR''
1209 002122  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1210 002124  000000                    0
1211
1212 002126  023042                    EM77    ;'READING RBUF DID NOT CLEAR INTERRUPT''
1213 002130  024064                    DH6     ;'TEST# ERR PC  RCSR''
1214 002132  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1215 002134  000000                    0
1216
1217 002136  023107                    EM100   ;'RESET DID NOT CLEAR RCVR INTERRUPT''
1218 002140  024064                    DH6     ;'TEST# ERR PC  RCSR''
1219 002142  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1220 002144  000000                    0
1221
1222
1223 002146  023152                    EM101   ;'"OR" FLAG DID NOT SET''
1224 002150  024064                    DH6
1225 002152  024612                    DT6     ;$TESTN,$ERRPC,RCSR
1226 002154  000000                    0
1227
```

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1228 002156  023200                EM102           ;''ERROR' NOT SET WITH 'OR' FLAG''
1229 002160  024064                DH6             ;'TEST# ERR PC  RCSR''
1230 002162  024612                DT6             ;$TESTN,$ERRPC,RCSR
1231 002164  000000                0
1232 002166  023237                EM103           ;'BREAK DID NOT TRANSMIT ALL ZEROES''
1233 002170  024263                DH103           ;'TEST# ERR PC  RCSR  DATA''
1234 002172  024670                DT103           ;$TESTN,$ERRPC,RCSR,$BDDAT
1235 002174  000000                0
1236
1237 002176  023275                EM104           ;'BREAK DID NOT SET FRAMING ERROR''
1238 002200  024064                DH6             ;'TEST# ERR PC  RCSR''
1239 002202  024612                DT6             ;$TESTN,$ERRPC,RCSR
1240 002204  000000                0
1241
1242 002206  023332                EM105           ;'DATA COMPARE ERROR''
1243 002210  024320                DH105           ;''EST# ERR PC  RCSR  GOOD  BAD''
1244 002212  024702                DT105           ;$TFSTN,$ERRPC,RCSR,GD,BD
1245 002214  000000                0
1246
1247 002216  023355                EM106           ;'DATA COMPARE ERROR WITH CABLE''
1248 002220  024320                DH105           ;'TEST# ERR PC  RCSR    GOOD    BAD''
1249 002222  024702                DT105           ;$TESTN,$ERRPC,RCSR,GD,BD
1250 002224  000000                0
1251
1252 002226  023413                EM107           ;'TIMEOUT IN EXERCISER TEST''
1253 002230  024064                DH6             ;'TEST# ERR PC  RCSR''
1254 002232  024612                DT6             ;$TESTN,$ERRPC,RCSR
1255 002234  000000                0
1256
1257 002236  023445                EM110           ;''INCORRECT RECEIVE COUNT
1258 002240  024364                DH110           ;''TEST# ERR PC  RCSR    TRANS   RCV''
1259 002242  024716                DT110           ;$TESTN,$ERRPC,RCSR,XMTCNT,RCVCNT
1260 002244  000000                0
1261
1262 002246  023475                EM111           ;'DATA COMPARE ERROR IN EXERCISER''
1263 002250  024320                DH105           ;''TEST# ERR PC  RCSR    GOOD    BAD''
1264 002252  024702                DT105           ;$TESTN,$ERRPC,RCSR,GD,BD
1265 002254  000000                0
1266
1267 002256  023535                EM112           ;''TRAP CATCHER''
1268 002260  024430                DH112           ;''TEST#   ERR PC  RCSR   OLDPC  TRAP ADR''
1269 002262  024732                DT112           ;$TESTN,$ERRPC,RCSR,OLDPC,BDVECT
1270 002264  000000                0
1271
1272 002266  023552                EM113           ;'NO CLK INTERRUPT IN EXERCISER''
1273 002270  024136                DH10            ;''TEST#  ERR PC  LKS''
1274 002272  024632                DT10            ;$TESTN,$ERRPC,LKS
1275 002274  000000                0
1276
1277 002276  023610                EM114           ;''ERROR' NOT SET WITH 'FR' FLAG''
1278 002300  024064                DH6             ;''TEST# ERR PC  RCSR''
1279 002302  024612                DT6             ;$TESTN,$ERRPC,RCSR
1280 002304  000000                0
1281
1282 002306  023647                EM115           ;RCV ACTVIE NOT CLEAR WITH INIT
1283 002310  024064                DH6             ;''TEST# ERR PC  RCSR''
1284 002312  024612                DT6             ;$TESTN,$ERRPC,RCSR
```

```
1285 002314  000000                          0
1286
1287 002316  023706                          EM116                  ;RCV ACTIVE WITHOUT ''START'' BIT
1288 002320  024064                          DH6                    ;''TEST# ERR PC  RCSR''
1289 002322  024612                          DT6                    ;$TESTN,$ERRPC,RCSR
1290 002324  000000                          0
1291
1292 002326  023745                          EM117                  ;RDR ENABLE NOT CLEAR WITH RCV ACTIVE
1293 002330  024064                          DH6                    ;''TEST# ERR PC  RCSR''
1294 002332  024612                          DT6                    ;$TESTN,$ERRPC,RCSR
1295 002334  000000                          0
1296
1297                                 ;STORAGE LOCATIONS
1298 002336  000000                 FIRST:   .WORD   0
1299 002340  000000                 LOC1:    .WORD   0              ;TIMER LOOP COUNTER
1300 002342  000000                 LOC2:    .WORD   0              ;TIMER LOOP COUNTER
1301 002344  000000                 SAVE0:   .WORD   0              ;STORAGE FOR LOCATIONS
1302 002346                          SAVLOC:  .BLKW   22             ;THAT T/E USES
1303 002412                          ENDSTK:  .BLKW   10             ;JIMS SPECIAL STACK (WRAP AROUND)
1304 002432  000000                 JIMSTK:  .WORD   0
1305 002434  000000                 SAVEPS:  .WORD   0              ;SAVE PSW AREA
1306 002436  000000                 OLDSUM:  .WORD   0              ;CHECKSUM STORAGE
1307 002440  000000                 RCVCNT:  .WORD   0
1308 002442  000000                 XMTCNT:  .WORD   0
1309 002444  000000                 CLKCNT:  .WORD   0
1310 002446  000000                 STPSW:   .WORD   0
1311 002450  000000                 SRPSW:   .WORD   0
1312 002452  000000                 SCPSW:   .WORD   0
1313 002454                          BUF:     .BLKW   44
1314 002564      020     000         CNTLP:   .ASCIZ  <20>
1315 002566      136     120     000 PROMPT:  .ASCII  /^P/<0><CR><LF>/CONSOLE/<CR><LF>/>>>/<377>
     002571      015     012     103
     002574      117     116     123
     002577      117     114     105
     002602      015     012     076
     002605      076     076     377
1316 002610      124     057     101 TA:      .ASCIZ  $T/A$<CR><LF>
     002613      015     012     000
1317
1318                                 .EVEN
1319 002616  000000                 SECND:   .WORD   0
1320 002620  000000                 OLDPC:   .WORD   0
1321 002622  000000                 BDVECT:  .WORD   0
1322
1323
1324
1325
1326
1327 002624  000000                 CTSTFL:  .WORD   0              ;CONSLE UNDER TEST FLAG
1328 002626  000000                 TMP1:    .WORD   0              ;TEMP LOCATION FOR TABLE OFFSETS
1329 002630  000000                 TMP2:    .WORD   0              ;TEMP LOCATION FOR DEVICE COUNT
1330 002632  000000                 TMP3:    .WORD   0              ;LOCATION FOR DEVICE MAP BIT TEST MASK
1331                                 ;REGISTER AND VECTOR ADDRESSES FOR THE DL-11W UNDER TEST
1332
1333 002634  000000                 RCSR:    .WORD   0
1334 002636  000000                 RBUF:    .WORD   0
1335 002640  000000                 TCSR:    .WORD   0
```

```
1336 002642  000000                TBUF:   .WORD   0
1337 002644  000000                RVECT:  .WORD   0
1338 002646  000000                RPSW.   .WORD   0
1339 002650  000000                TVECT:  .WORD   0
1340 002652  000000                TPSW:   .WORD   0
1341
1342                               ;CONSOLE REGISTER AND VECTOR ADDRESSES FOR THE DL-11W
1343
1344 002654  177560                CRCSR:  177560                  ;ADDRESS OF RECEIVER COMMAND/STATUS REGISTER
1345 002656  177562                CRBUF:  177562                  ;ADDRESS OF RECEIVER BUFFER
1346 002660  177564                CTCSR:  177564                  ;ADDRESS OF TRANSMITTER COMMAND/STATUS REGISTER
1347 002662  177566                CTBUF:  177566                  ;ADDRESS OF TRANSMITTER BUFFER
1348 002664  000060                CRVECT: 60                      ;RECEIVER INTERRUPT VECTOR
1349 002666  000062                CRPSW:  62
1350 002670  000064                CTVECT: 64                      ;TRANSMITTER INTERRUPT VECTOR
1351 002672  000066                CTPSW:  66
1352
1353                               ;REAL TIME CLOCK REGISTER AND VECTOR ADDRESSES
1354 002674  177546                LKS:    .WORD   177546
1355 002676  000100                RTCVT:  .WORD   100
1356 002700  000102                RTCPSW: .WORD   102
1357
1358 002702                        ADRTBL: .BLKW   20
1359 002742                        VCTTBL: .BLKW   20
1360 003002  000000                FLAG44: .WORD   0
1361 003004  176500                TURCSR: .WORD   176500
1362 003006  176502                TURBUF: .WORD   176502
1363 003010  176504                TUTCSR: .WORD   176504
1364 003012  176506                TUTBUF: .WORD   176506
1365
1366
1367                               ;SUBROUTINE TO GENERATE DEVICE ADDRESS TABLE
1368
1369 003014  012702  002702        DEVADR: MOV     #ADRTBL,R2      ;POINT R2 TO THE DEVICE ADDRESS TABLE
1370 003020  016700  176116                MOV     $BASE,R0        ;LOAD BASE DEVICE ADDRESS IN R0
1371 003024  010001                        MOV     R0,R1           ;
1372 003026  062701  000170                ADD     #170,R1         ;POINT R1 TO LAST DEVICE ADDRESS
1373 003032  010022                1$:     MOV     R0,(R2)+        ;MOVE DEVICE ADDRESS TO TABLE
1374 003034  062700  000010                ADD     #10,R0          ;POINT R0 TO NEXT DEVICE ADDRESS
1375 003040  020001                        CMP     R0,R1           ;FINISHED GENERATING TABLE?
1376 003042  003773                        BLE     1$              ;BR, IF LAST DEVICE ADDRESS NOT LOADED
1377 003044  000207                        RTS     PC
1378
1379
1380
1381 003046  005067  176016        START:  CLR     $FATAL          ;CLEAR ERROR NO.
1382 003052  005067  176010                CLR     $MSGTYP         ;CLEAR MESSAGE TYPE
1383 003056  005067  176010                CLR     $TESTN          ;CLEAR TEST NO.
1384 003062  005067  177536                CLR     CTSTFL          ;CLEAR CONSOLE UNDER TEST FLAG
1385 003066  005067  176004                CLR     $DEVCT          ;CLEAR DEVICE COUNT
1386 003072  005067  176002                CLR     $UNIT           ;CLEAR UNIT NUMBER
1387 003076  005067  177700                CLR     FLAG44          ;** CLEAR 11/44 CPU FLAG
1388 003102  005767  176004                TST     $USWR           ;IS $USWR LOADED?
1389 003106  001003                        BNE     1$              ;BR IF YES
1390 003110  012767  000400  175774        MOV     #400,$USWR      ;ELSE, DEFAULT TO $USWR=400
1391 003116  012737  000006  000004  1$:   MOV     #6,@#4          ;INITIALIZE TIMEOUT VECTORS TO TRAP
1392 003124  012737  000003  000006        MOV     #3,@#6          ;  CATCHER ROUTINE
```

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1393
1394                                    .SBTTL  INITIALIZE THE COMMON TAGS
                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
003132  012706  001000                          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
003136  005026                                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
003140  022706  001040                          CMP     #SWR,R6 ;;DONE?
003144  001374                                  BNE     .-6             ;;LOOP BACK IF NO
003146  012706  001000                          MOV     #1000,SP                ;;SETUP THE STACK POINTER
                                        ;;INITIALIZE A FEW VECTORS
003152  012737  015272  000020                  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
003160  012737  000340  000022                  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
003166  012737  014576  000030                  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
003174  012737  000340  000032                  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
003202  012737  017246  000034                  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
003210  012737  000340  000036                  MOV     #340,@#TRAPVEC+2;LEVEL 7
003216  012737  015114  000024                  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
003224  012737  000340  000026                  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
003232  016767  011172  011162                  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
003240  005067  175614                          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
003244  112767  000001  175543                  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
003252  012767  003252  175526                  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
003260  012767  003260  175522                  MOV     #.,$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.
003266  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
003272  012737  003326  000004                  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
003300  012767  177570  175532                  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
003306  012767  177570  175526                  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
003314  022777  177777  175516                  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
003322  001012                                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT   -1
003324  000403                                  BR      65$             ;;BRANCH IF NO TIMEOUT
003326  012716  003334          64$:            MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
003332  000002                                  RTI
003334  012767  000176  175476  65$:            MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
003342  012767  000174  175472                  MOV     #DISPREG,DISPLAY
003350  012637  000004          66$:            MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

003354  005067  175514                          CLR     $PASS           ;;CLEAR PASS COUNT
003360  132767  000200  175521                  BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
003366  001403                                  BEQ     67$             ;;YES,USE NON-APT SWITCH
003370  012767  001110  175442                  MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
003376                          67$:
1395
1396                                    ;SIZE FOR 11/44 CPU
1397
1398 003376  013746  000010                    MOV     @#10,-(SP)      ;** SAVE VECTOR
1399 003402  012737  003430  000010            MOV     #10$,@#10       ;** SET UP FOR TRAP
1400 003410  000007                            MFPT                    ;** WHAT CPU??
1401 003412  122700  000001                    CMPB    #1,R0           ;** ARE WE A 11/44
1402 003416  001007                            BNE     11$             ;** NO GO RESET VECTOR
1403 003420  052737  000001  003002            BIS     #1,@#FLAG44     ;** YES SET FLAG
1404 003426  000403                            BR      11$             ;** SKIP RTI
1405 003430  012716  003436          10$:      MOV     #11$,(SP)       ;** SET STACK RETURN
1406 003434  000002                            RTI                     ;** RETURN
1407 003436  012637  000010          11$:      MOV     (SP)+,@#10      ;** RESTORE VECTOR
1408 003442  032777  000020  175370            BIT     #BIT4,@SWR      ;TEST CLOCK ONLY?
```

```
1409 003450  001404                          BEQ     INIT            ;BR IF NOT
1410 003452  005267  177146                  INC     CTSTFL          ;ELSE, SET CONSOLE TEST FLAG TO ENABLE CLOCK TESTS
1411 003456  000167  001136                  JMP     ID              ;  AND JUMP TO TYPE PROGRAM ID
1412 003462  132767  000001  175416  INIT:   BITB    #BIT0,$ENV      ;CHECK IF ON APT
1413 003470  001404                          BEQ     MANL            ;BR IF NOT APT
1414 003472  132767  000200  175407          BITB    #BIT7,$ENVM     ;DID APT SIZE
1415 003500  001056                          BNE     APTSZD          ;BR, IF APT SIZED
1416 003502  032777  000040  175330  MANL:   BIT     #BIT5,@SWR      ;WAS '$DEVM' MANUALLY SET?
1417 003510  001052                          BNE     APTSZD          ;IF YES, SKIP SELF-SIZING
1418
1419 003512  004767  177276          SIZE:   JSR     PC,DEVADR       ;GENERATE DEVICE ADDRESS TABLE
1420 003516  005067  177106                  CLR     TMP2            ;CLR TEMP LOCATION TO KEEP DEVICE COUNT
1421 003522  005067  175416                  CLR     $DEVM           ;CLEAR DEVICE MAP
1422 003526  013703  000004                  MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
1423 003532  012737  003562  000004          MOV     #4$,@#4         ;SET TIMEOUT POINTER
1424 003540  016700  175376                  MOV     $BASE,R0        ;LOAD BASE ADDRESS
1425 003544  062700  000160                  ADD     #160,R0         ;POINT R0 TO UNIT #15 (UNIT#0-CONSOLE)
1426 003550  005710                  3$:     TST     (R0)            ;CHECK FOR DEVICE EXISTANCE
1427 003552  005267  175366                  INC     $DEVM           ;INDICATE DEVICE EXISTANCE IN DEVICE MAP
1428 003556  005267  177046                  INC     TMP2            ;INCREMENT DEVICE COUNT
1429 003562  012706  001000          4$:     MOV     #1000,SP        ;RESET STACK POINTER
1430 003566  006367  175352                  ASL     $DEVM           ;ADJUST DEVICE MAP FOR NEXT UNIT CHECK
1431 003572  162700  000010                  SUB     #10,R0          ;POINT R0 TO NEXT DEVICE NUMBER
1432 003576  026700  175340                  CMP     $BASE,R0        ;FINISHED SIZING?
1433 003602  003762                          BLE     3$              ;BR, IF BASE ADDRESS HAS NOT BEEN CHECKED
1434 003604  016700  177044                  MOV     CRCSR,R0        ;LOAD CONSOLE DEVICE ADDRESS
1435 003610  012737  003630  000004          MOV     #5$,@#4         ;SET UP TIMEOUT POINTER
1436 003616  005710                          TST     (R0)            ;TEST FOR CONSOLE EXISTANCE
1437 003620  005267  175320                  INC     $DEVM           ;INDICATE CONSOLE EXISTANCE IN DEVICE MAP
1438 003624  005267  177000                  INC     TMP2            ;INCREMENT DEVICE COUNT
1439 003630  010337  000004          5$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
1440
1441 003634  000415                          BR      VCTADR          ;BR TO GENERATE VECTOR ADDRESS TABLE
1442
1443 003636  005067  176766          APTSZD: CLR     TMP2            ;CLEAR TEMP LOCATION TO KEEP DEVICE CNT
1444 003642  016702  175276                  MOV     $DEVM,R2        ;MOVE DEVICE MAP TO R2
1445 003646  005702                  TSTDVM: TST     R2              ;TEST MSB OF DEVICE MAP
1446 003650  100002                          BPL     1$              ;BR, IF MSB IS ZERO
1447 003652  005267  176752                  INC     TMP2            ;INCREMENT DEVICE COUNT, IF MSB=1
1448 003656  006302                  1$:     ASL     R2              ;SHIFT NEXT BIT INTO MSB POSITION
1449 003660  001401                          BEQ     DVADT           ;BR, IF NO OTHER BITS ARE SET IN $DEVM
1450 003662  000771                          BR      TSTDVM          ;CONTINUE CHECKING $DEVM, IF MORE BITS SET
1451 003664  004767  177124          DVADT:  JSR     PC,DEVADR       ;GENERATE DEVICE ADDRESS TABLE
1452
1453                                 ;GENERATE VECTOR ADDRESS TABLE
1454
1455 003670  012702  002742          VCTADR: MOV     #VCTTBL,R2      ;GET LOCATION OF VECTOR TABLE
1456 003674  113700  001136                  MOVB    @#$VECT1,R0     ;COPY BASE VECTOR
1457 003700  042700  177400                  BIC     #177400,R0      ;CLEAR BYTE SIGN EXTENSION
1458 003704  010001                          MOV     R0,R1           ;
1459 003706  062701  000170                  ADD     #170,R1         ;POINT R1 TO LAST DEVICE VECTOR
1460 003712  010022                  1$:     MOV     R0,(R2)+        ;PUT VECTOR ADDRESS IN TABLE
1461 003714  062700  000010                  ADD     #10,R0          ;POINT R0 TO NEXT VECTOR ADDRESS
1462 003720  020001                          CMP     R0,R1           ;FINISHED GENERATING VECTOR TABLE?
1463 003722  003773                          BLE     1$              ;BR, IF LAST VECTOR IS NOT LOADED
1464
1465                                 ;MOVE DEVICE COUNT INTO DEVICE COUNT MESSAGE
```

```
1466
1467 003724  016700  176700                MOV     TMP2,R0         ;COPY DEVICE COUNT INTO R0
1468 003730  005001                        CLR     R1              ;CLEAR AUXILARY REGISTER
1469 003732  000300                        SWAB    R0              ;PUT DEVICE COUNT IN UPPER BYTE OF R0
1470 003734  006300                        ASL     R0              ;MOVE MSB OF COUNT INTO
1471 003736  006300                        ASL     R0              ;MSB OF R0
1472 003740  006300              SHIFT:    ASL     R0              ;PUT MSB OF COUNT INTO CARRY
1473 003742  106101                        ROLB    R1              ;MOVE MSB OF COUNT INTO R1
1474 003744  006300                        ASL     R0              ;MOVE NEXT BIT TO CARRY
1475 003746  106101                        ROLB    R1              ;MOVE INTO R1
1476 003750  006300                        ASL     R0              ;MOVE LAST BIT OF DIGIT
1477 003752  106101                        ROLB    R1              ;INTO R1
1478 003754  062701  000060                ADD     #60,R1          ;CONVERT DIGIT TO ASCII
1479 003760  000301                        SWAB    R1              ;MOVE DIGIT TO UPPER BYTE
1480 003762  032701  000020                BIT     #BIT4,R1        ;HAVE BOTH DIGITS BEEN MOVED TO R1?
1481 003766  001764                        BEQ     SHIFT           ;BR, IF NOT
1482 003770  010167  020546                MOV     R1,M2A          ;MOVE DEVICE COUNT TO OUTPUT MESSAGE
1483
1484
1485 003774  052767  000002  176630  BEGIN:  BIS     #BIT1,TMP3      ;SET UP BIT MASK TO TEST $DEVM FOR DEVICES EXCEPT CONSOLE
1486 004002  005067  176620                CLR     TMP1            ;CLEAR LOCATION TO STORE TABLE OFFSETS
1487 004006  032767  000001  175130        BIT     #BIT0,$DEVM     ;IS CONSOLE TO BE TESTED?
1488 004014  001001                        BNE     TCONS           ;BR, IF CONSOLE IS TO BE TESTED
1489 004016  000414                        BR      TSTDEV          ;BR, TO TEST OTHER DEVICES
1490 004020  005267  176600          TCONS:  INC     CTSTFL          ;INDICATE CONSOLE UNDER TEST
1491 004024  012700  002654                MOV     #CRCSR,R0       ;SET UP CONSOLE DEVICE ADDRESSES
1492 004030  012701  002634                MOV     #RCSR,R1        ;POINT R1 TO UUT ADDRESS TABLE
1493 004034  012021                1$:     MOV     (R0)+,(R1)+     ;TRANSFER CONSOLE ADDRESSES
1494 004036  022701  002652                CMP     #TPSW,R1        ;FINISHED TRANSFER?
1495 004042  002374                        BGE     1$              ;BR, IF NOT
1496 004044  000167  000122                JMP     TST1            ;GO TEST CONSOLE INTERFACE
1497
1498                                  ;PREPARE ADDRESSES AND VECTORS FOR UUT
1499 004050  036767  176556  175066  TSTDEV: BIT     TMP3,$DEVM      ;CHECK TO SEE IF DEVICE IS TO BE TESTED
1500 004056  001010                        BNE     SETADR          ;BR, IF YES
1501 004060  006367  176546                ASL     TMP3            ;SHIFT MASK TO CHECK NEXT $DEVM BIT
1502 004064  062767  000002  176534        ADD     #2,TMP1         ;INCREMENT TABLE INDEX
1503 004072  005267  175002                INC     $UNIT           ;INCREMENT UNIT NUMBER
1504 004076  000764                        BR      TSTDEV          ;GO TEST NEXT BIT OF DEVICE MAP
1505
1506 004100  005267  174774          SETADR: INC     $UNIT           ;UPDATE UNIT NUMBER
1507 004104  006367  176522                ASL     TMP3            ;UPDATE DEVICE MAP TEST MASK
1508 004110  016702  176512                MOV     TMP1,R2         ;MOVE TABLE OFFSET TO R2
1509 004114  062767  000002  176504        ADD     #2,TMP1         ;UPDATE TABLE OFFSET FOR NEXT DEVICE
1510 004122  016200  002702                MOV     ADRTBL(R2),R0   ;PUT UUT ADDRESS INTO R0
1511 004126  012701  002634                MOV     #RCSR,R1        ;POINT R1 TO STORAGE AREA FOR UUT ADDRESSES
1512 004132  010021                ADR:    MOV     R0,(R1)+        ;TRANSFER UUT ADDRESS
1513 004134  062700  000002                ADD     #2,R0           ;POINT TO NEXT UUT REGISTER
1514 004140  030027  000006                BIT     R0,#6           ;FINISHED TRANSFER?
1515 004144  001372                        BNE     ADR             ;BR, IF NOT
1516
1517 004146  016200  002742                MOV     VCTTBL(R2),R0   ;PUT UUT VECTOR INTO R0
1518 004152  010021                VECT:   MOV     R0,(R1)+        ;TRANSFER UUT VECTORS TO ACTIVE TABLE AREA
1519 004154  062700  000002                ADD     #2,R0           ;POINT TO NEXT VECTOR
1520 004160  030027  000006                BIT     R0,#6           ;FINISHED TRANSFER?
1521 004164  001372                        BNE     VECT            ;BR, IF NOT
1522 004166  000167  000000                JMP     TST1            ;GO TEST DEVICE
```

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   1523
   1524
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1526
1527
1528                                    ;;*****************************************************************
                                        ;*TEST 1         TEST ABILITY TO REFERENCE TCSR
                                        ;;*****************************************************************
     004172  000004                     TST1:   SCOPE
1529 004174  013703  000004                     MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
1530 004200  012737  004214  000004            MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
1531 004206  005777  176426                     TST     @TCSR           ;REFERENCE THE XMIT COMMAND/STATUS REG.
1532 004212  000412                     BR      4$              ; GO TO END OF TEST
1533
1534 004214  022626                     1$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER TIMEOUT
1535 004216  005767  176402                     TST     CTSTFL          ;CHECK IF DEVICE IS CONSOLE
1536 004222  001002                     BNE     2$              ;IF YES, SKIP ERROR TYPEOUT
1537 004224  104001                     ERROR+1         ;REPORT ERROR TO APT & TTY
1538 004226  000404                     BR      4$              ;BR TO END OF TEST
1539 004230                             2$:
     004230  004767  011226                     JSR     PC,$ATY4                ;;ONLY REPORT A FATAL ERROR
     004234  000001                     1                               ;;THE ERROR NUMBER (FROM APT LIST)
1540 004236  000000                     3$:     HALT
1541 004240  010337  000004             4$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
1542
1543
1544
1545                                    ;;*****************************************************************
                                        ;*TEST 2         TEST ABILITY TO REFERENCE TBUF
                                        ;;*****************************************************************
     004244  000004                     TST2:   SCOPE
1546 004246  013703  000004                     MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
1547 004252  012737  004266  000004            MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
1548 004260  005777  176356                     TST     @TBUF           ;REFERENCE THE XMIT BUFFER
1549 004264  000412                     BR      4$              ;GO TO END OF  TEST
1550
1551 004266  022626                     1$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER TIMEOUT
1552 004270  005767  176330                     TST     CTSTFL          ;CHECK IF DEVICE IS CONSOLE
1553 004274  001002                     BNE     2$              ;IF YES, SKIP ERROR TYPEOUT
1554 004276  104002                     ERROR+2         ;REPORT ERROR TO APT & TTY
1555 004300  000404                     BR      4$              ;BR TO END OF TEST
1556 004302                             2$:
     004302  004767  011154                     JSR     PC,$ATY4                ;;ONLY REPORT A FATAL ERROR
     004306  000002                     2                               ;;THE ERROR NUMBER (FROM APT LIST)
1557 004310  000000                     3$:     HALT
1558 004312  010337  000004             4$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
```

```
                                ;;*****************************************************************
                                ;*TEST 3         TEST THAT BIT2(MAINT. BIT) CAN BE SET & RESET
                                ;;*****************************************************************
     004316  000004             TST3:   SCOPE
1563 004320  000005                     RESET                   ;CLEAR EVERYTHING
1564 004322  032777  000004  176310      BIT     #BIT2,@TCSR     ;TEST FOR BIT2 OF TCSR CLEAR
1565 004330  001411                      BEQ     3$              ;BR IF CLEAR
1566
1567 004332  005767  176266              TST     CTSTFL          ;CHECK IF DEVICE IS CONSOLE
1568 004336  001002                      BNE     1$              ;IF YES, SKIP ERROR TYPEOUT
1569 004340  104015                      ERROR+15                ;BIT2 OF TCSR NOT CLEAR AFTER RESET
1570 004342  000404                      BR      3$
1571
1572 004344                         1$:
     004344  004767  011112              JSR     PC,$ATY4                ;;ONLY REPORT A FATAL ERROR
     004350  000015                      15                      ;;THE ERROR NUMBER (FROM APT LIST)
1573 004352  000000                 2$:  HALT
1574
1575 004354  052777  000004  176256  3$: BIS     #BIT2,@TCSR     ;SET BIT2 OF TCSR
1576 004362  032777  000004  176250      BIT     #BIT2,@TCSR     ;TEST FOR BIT2 SET
1577 004370  001001                      BNE     4$              ;BR IF SET
1578
1579 004372  104016                      ERROR+16                ;BIT2 OF TCSR WILL NOT SET
1580
1581 004374  042777  000004  176236  4$: BIC     #BIT2,@TCSR     ;CLEAR BIT2 OF TCSR
1582 004402  032777  000004  176230      BIT     #BIT2,@TCSR     ;TEST BIT2 CLEAR
1583 004410  001411                      BEQ     7$              ;BR IF CLEAR
1584
1585 004412  005767  176206              TST     CTSTFL          ;CHECK IF DEVICE IS CONSOLE
1586 004416  001002                      BNE     5$              ;IF YES, SKIP ERROR TYPEOUT
1587 004420  104017                      ERROR+17
1588 004422  000404                      BR      7$
1589 004424                         5$:
     004424  004767  011032              JSR     PC,$ATY4                ;;ONLY REPORT A FATAL ERROR
     004430  000017                      17                      ;;THE ERROR NUMBER (FROM APT LIST)
1590 004432  000000                 6$:  HALT                    ;BIT0 OF TCSR WILL NOT CLEAR
1591
1592 004434  052777  000004  176176  7$: BIS     #BIT2,@TCSR     ;SET BIT2 OF TCSR
1593 004442  000005                      RESET                   ;CLEAR BIT2 WITH RESET
1594 004444  032777  000004  176166      BIT     #BIT2,@TCSR     ;TEST FOR BIT2 CLEAR
1595 004452  001404                      BEQ     10$             ;** IF CLEAR, GO TO NEXT TEST
1596
1597 004454  042777  000004  176156      BIC     #BIT2,@TCSR     ;CLEAR BIT2. TO PRINT ERROR
1598 004462  104020                      ERROR+20
1599                                                             ;RESET DID NOT CLEAR BIT2 OF TCSR
1600
1601 004464  000240                 10$: NOP                     ;**
1602                                ;;*****************************************************************
                                ;*TEST 4         TEST THAT TCSR BIT7(DONE) CLEARS WHEN XBUF IS LOADED
                                ;;*****************************************************************
     004466  000004             TST4:   SCOPE
1603 004470  052777  000004  176142      BIS     #BIT2,@TCSR     ;** ENABLE MAINT. WRAP
1604 004476  005077  176140              CLR     @TBUF           ;LOAD XBUF
1605 004502  105777  176132              TSTB    @TCSR           ;CHECK DONE
1606 004506  100021                      BPL     3$              ;BR IF CLEAR
```

```
1607                                                    ;FILL SECOND BUFFER, BECAUSE REFRESH COULD CAUSE
1608                                                    ;   FIRST TEST TO FAIL
1609 004510  005077  176126            CLR     @TBUF   ;FILL DOUBLE BUFFER
1610 004514  105777  176120            TSTB    @TCSR   ;CHECK DONE
1611 004520  100014                    BPL     3$      ;BR IF CLEAR
1612
1613 004522  005767  176076            TST     CTSTFL  ;CHECK IF DEVICE IS CONSOLE
1614 004526  001005                    BNE     1$      ;IF YES, SKIP ERROR TYPEOUT
1615 004530  042777  000004  176122    BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                        ;** WITH TERMINAL.
1616 004536  104003                    ERROR+3         ;DONE NOT CLEARED WITH TBUF FULL
1617 004540  000404                    BR      3$      ;BR TO END OF TEST
1618 004542                    1$:
     004542  004767  010714            JSR     PC,$ATY4        ;;ONLY REPORT A FATAL ERROR
     004546  000003                    3                       ;;THE ERROR NUMBER (FROM APT LIST)
1619 004550  000000            2$:     HALT                    ;TCSR 'DONE'' NOT CLEARED WITH TBUF FULL
1620 004552  005000            3$:     CLR     R0              ;CLEAR TIMER
1621 004554  105777  176060    4$:     TSTB    @TCSR           ;CHECK FOR XMIT DONE
1622 004560  100417                    BMI     ID              ;IF DONE SETS, BR TO END OF TEST
1623 004562  005200                    INC     R0              ;INCREMENT TIMER
1624 004564  001373                    BNE     4$              ;BR IF TIMER NOT DONE
1625
1626 004566  005767  176032            TST     CTSTFL          ;CHECK IF DEVICE IS CONSOLE
1627 004572  001005                    BNE     5$
1628 004574  042777  000004  176056    BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                        ;** WITH TERMINAL.
1629 004602  104004                    ERROR+4         ;TCSR 'DONE'' DOES NOT SET
1630 004604  000405                    BR      ID      ;BR TO END OF TEST
1631 004606                    5$:
     004606  004767  010650            JSR     PC,$ATY4        ;;ONLY REPORT A FATAL ERROR
     004612  000004                    4                       ;;THE ERROR NUMBER (FROM APT LIST)
1632 004614  000000                    HALT
1633 004616  000427                    BR      ENDB7   ;** BR TO NEXT TEST,
                                                        ;** AND SKIP THE TYPEOUT THAT FOLLOWS
                                                        ;**   BECAUSE OF THIS FAILURE
1634
1635
1636
1637 004620                    ID:
1638 004620  042777  000004  176032    BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                        ;** WITH TERMINAL.
1639 004626  023737  000042  000046    CMP     @#42,@#46       ;UNDER ACT11?
1640 004634  001412                    BEQ     6$              ;IF YES, SKIP IDENT. TYPEOUT
1641 004636  005767  174232            TST     $PASS           ;IS THIS THE FIRST PASS?
1642 004642  001007                    BNE     6$              ;IF NOT BR TO NEXT TEST & SKIP THE IDENTIFICATION TYPEOUTS
1643 004644  005767  174226            TST     $DEVCT          ;IS THIS THE FIRST SUBPASS?
1644 004650  001004                    BNE     6$              ;IF NOT, BRTO NEXT TEST
1645 004652  104401                    TYPE                    ;TYPE PROGRAM INDENTIFICATION
1646 004654  024502                    M1
1647 004656  104401                    TYPE                    ;TYPE NUMBER OF DEVICES UNDER TEST
1648 004660  024540                    M2
1649 004662  032777  000020  174150    6$:     BIT     #BIT4,@SWR      ;CLOCK TEST ONLY?
1650 004670  001402                    BEQ     ENDB7           ;** BR IF NOT
1651 004672  000167  000640            JMP     TCLOCK          ;ELSE, JUMP TO TEST CLOCK
1652 004676                    ENDB7:
1653 004676  005000                    CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
```

```
004700  012701  000002                MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
004704  005300            40$:        DEC     R0              ;** TRANSMITTED TO FINISH BEFORE MAINTENANCE
004706  001376                        BNE     40$             ;** WRAP FOR THE UART UNDER TEST IS DISABLED.
004710  005301                        DEC     R1              ;** THIS WILL INHIBIT ANY COMMUNICATION
004712  001374                        BNE     40$             ;** TO HARDWARE MEDIA SUCH AS TU58 THAT MIGHT
                                                              ;** BE ATTACHED TO UART UNDER TEST.
```

```
                                        ;;*******************************************************************
                                        ;*TEST 5        TEST THAT TCSR 'DONE'' SETS WITH RESET
                                        ;;*******************************************************************
004714  000004                  TST5:   SCOPE
1658 004716  052777  000004  175714    BIS     #BIT2,@TCSR     ;** ENABLE MAINT. WRAP
1659 004724  005077  175712            CLR     @TBUF           ;LOAD TRANSMIT BUFFER
1660 004730  105777  175704    1$:     TSTB    @TCSR           ;WAIT FOR DONE
1661 004734  100375                    BPL     1$
1662 004736  005077  175700            CLR     @TBUF           ;LOAD SECOND BUFFER
1663 004742  000240                    NOP
1664 004744  000005                    RESET                   ;CLEAR DONE WITH RESET
1665 004746  105777  175666            TSTB    @TCSR           ;CHECK FOR DONE SET
1666 004752  100401                    BMI     10$             ;** BR TO NEXT TEST IF DONE SET
1667
1668 004754  104005                    ERROR+5         ;TCSR 'DONE ' DOES NOT SET WITH RESET
1669
1670 004756  000240            10$:    NOP                     ;**
1671
1672
1673                                     ;;*******************************************************************
                                        ;*TEST 6        TEST ABILITY TO ACCESS RCSR
                                        ;;*******************************************************************
004760  000004                  TST6:   SCOPE
1674 004762  013703  000004            MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
1675 004766  012737  005002  000004    MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
1676 004774  005777  175634            TST     @RCSR           ;ACCESS RCSR
1677 005000  000402                    BR      2$              ;BR TO END OF TEST
1678
1679 005002  022626            1$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER TIMEOUT
1680 005004  104006                    ERROR+6                 ;CAN NOT ACCESS RCSR
1681 005006  010337  000004    2$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
```

```
                                        ;;*****************************************************************
                                        ;*TEST 7         TEST ABILITY TO ACCESS RBUF
                                        ;;*****************************************************************
                                        ;
     005012  000004                     TST7:   SCOPE
1686 005014  013703  000004                     MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
1687 005020  012737  005034  000004            MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
1688 005026  005777  175604                     TST     @RBUF           ;ACCESS RBUF
1689 005032  000402                             BR      2$              ;BR TO END OF TEST
1690
1691 005034  022626                     1$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER TIMEOUT
1692 005036  104007                             ERROR+7                 ;CAN NOT ACCESS RBUF
1693 005040  010337  000004             2$:     MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
1694
1695
1696
1697
```

```
1699
1700
1701                                    ;;*****************************************************************
                                        ;*TEST 10       TEST THAT BIT0(BREAK BIT) CAN BE SET & CLEARED & RESET
                                        ;;*****************************************************************
     005044  000004                     TST10:  SCOPE
1702 005046  032777  000400  173764             BIT     #BIT8,@SWR      ;IS BREAK FUNCTION ENABLED?
1703 005054  001475                             BEQ     10$             ;** BR TO NEXT TEST, IF NOT
1704 005056  032767  000001  175716             BIT     #BIT0,FLAG44    ;** IS THIS A 11/44
1705 005064  001407                             BEQ     9$              ;** NO
1706 005066  005767  175532                     TST     CTSTFL          ;** YES THIS IS 11/44. IS THIS THE CONSOLE
1707                                                                     ;** SLU
1708 005072  001404                             BEQ     9$              ;** NO
1709 005074  032777  000010  173736             BIT     #BIT03,@SWR     ;** THIS IS THE CONSOLE SLU.SHOULD THE BREAK
1710                                                                     ;** TEST BE PERFORMED
1711 005102  001462                             BEQ     10$             ;** NO
1712
1713 005104  000005                     9$:     RESET                   ;CLEAR EVERYTHING
1714 005106  032777  000001  175524             BIT     #BIT0,@TCSR     ;CHECK BIT0 OF TCSR CLEAR
1715 005114  001411                             BEQ     3$              ;BR IF CLEAR
1716 005116  005767  175502                     TST     CTSTFL
1717 005122  001002                             BNE     1$
1718 005124  104011                             ERROR+11                ;BIT0 WAS NOT CLEAR AFTER RESET
1719 005126  000404                             BR      3$
1720 005130                             1$:
     005130  004767  010326                     JSR     PC,$ATY4                ;;ONLY REPORT A FATAL ERROR
     005134  000011                             11                      ;;THE ERROR NUMBER (FROM APT LIST)
1721 005136  000000                     2$:     HALT
1722
1723 005140  052777  000001  175472     3$:     BIS     #BIT0,@TCSR     ;SET BIT0 IN TCSR
1724 005146  032777  000001  175464             BIT     #BIT0,@TCSR     ;TEST BIT0 OF TCSR
1725 005154  001001                             BNE     4$              ;BR IF SET
1726
1727 005156  104012                             ERROR+12                ;BIT0 OF TCSR WILL NOT SET
1728
1729 005160  042777  000001  175452     4$:     BIC     #BIT0,@TCSR     ;CLEAR BIT0 OF TCSR
1730 005166  032777  000001  175444             BIT     #BIT0,@TCSR     ;TEST BIT0 OF TCSR
1731 005174  001411                             BEQ     7$
1732 005176  005767  175422                     TST     CTSTFL
1733 005202  001002                             BNE     5$
1734 005204  104013                             ERROR+13                ;BIT0 OF TCSR WILL NOT CLEAR
1735 005206  000404                             BR      7$
1736 005210                             5$:
     005210  004767  010246                     JSR     PC,$ATY4                ;;ONLY REPORT A FATAL ERROR
     005214  000013                             13                      ;;THE ERROR NUMBER (FROM APT LIST)
1737 005216  000000                     6$:     HALT
1738
1739 005220  052777  000001  175412     7$:     BIS     #BIT0,@TCSR     ;SET BIT0 IN TCSR
1740 005226  000005                             RESET                   ;CLEAR BIT0 WITH RESET
1741 005230  032777  000001  175402             BIT     #BIT0,@TCSR     ;TEST BIT0 CLEAR
1742 005236  001404                             BEQ     10$             ;** BR IF CLEAR
1743 005240  042777  000001  175372             BIC     #BIT0,@TCSR     ;CLEAR BIT0, TO PRINT ERROR
1744 005246  104014                             ERROR+14                ;RESET DID NOT CLEAR BIT0 OF TCSR
1745 005250  000240                     10$:    NOP                     ;**
```

1747

```
                                ;;*****************************************************************
                                ;*TEST 11       TEST THAT BIT6(XMIT INT EN) CAN BE SET & RESET
                                ;;*****************************************************************
     005252  000004             TST11:  SCOPE
1752 005254  000005                     RESET                   ;CLEAR EVERYTHING
1753 005256  017703  175366             MOV     @TVECT,R3       ;SAVE XMIT VECTOR
1754 005262  012777  005312  175360     MOV     #1$,@TVECT      ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
1755 005270  004767  007244             JSR     PC,WRPSW                ;SET PSW TO PRIORITY-7
1756 005274  000340                     .WORD   340
1757 005276  032777  000100  175334     BIT     #BIT6,@TCSR     ;TEST BIT6 OF TCSR
1758 005304  001404                     BEQ     2$              ;BR IF ZERO
1759 005306  104021                     ERROR+21
1760                                                            ;BIT6 IN TCSR NOT CLEAR AFTER RESET
1761 005310  000402                     BR      2$
1762
1763 005312  022626             1$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
1764 005314  104022                     ERROR+22
1765                                                            ;XMIT INTERRUPT OCCURRED  PRIO-7
1766
1767 005316  052777  000100  175314  2$:     BIS     #BIT6,@TCSR     ;SET BIT6 OF TCSR
1768 005324  032777  000100  175306         BIT     #BIT6,@TCSR     ;TEST BIT6 OF TCSR
1769 005332  001001                     BNE     3$              ;BR, IF SET
1770
1771 005334  104023                     ERROR+23
1772                                                            ;CANNOT SET BIT6 OF TCSR
1773
1774 005336  042777  000100  175274  3$:     BIC     #BIT6,@TCSR     ;CLEAR BIT6 OF TCSR
1775 005344  032777  000100  175266         BIT     #BIT6,@TCSR     ;TEST BIT6 OF TCSR
1776 005352  001401                     BEQ     4$              ;BR IF CLEAR
1777 005354  104024                     ERROR+24
1778                                                            ;CANNOT CLEAR BIT6 OF TCSR
1779
1780 005356  052777  000100  175254  4$:     BIS     #BIT6,@TCSR     ;SET BIT6 OF TCSR
1781 005364  000005                     RESET                   ;CLEAR BIT6 WITH RESET
1782 005366  032777  000100  175244         BIT     #BIT6,@TCSR     ;TEST BIT6 OF TCSR
1783 005374  001401                     BEQ     5$              ;BR IF CLEAR
1784
1785 005376  104025                     ERROR+25
1786                                                            ;CANNOT CLEAR BIT6 OF TCSR WITH RESET
1787 005400  010377  175244         5$·     MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
```

```
                                ;;*****************************************************************
                                ;*TEST 12       TEST THAT BIT6 OF RCSR CAN BE SET & RESET
                                ;;*****************************************************************
     005404  000004             TST12:  SCOPE
1792 005406  000005                     RESET                   ;CLEAR EVERYTHING
1793 005410  017703  175230             MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
1794 005414  012777  005444  175222     MOV     #1$,@RVECT      ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
1795 005422  004767  007112             JSR     PC,WRPSW        ;SET PSW TO PRIORITY=7
1796 005426  000340                             .WORD   340
1797 005430  032777  000100  175176     BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
1798 005436  001404                     BEQ     2$
1799 005440  104026                     ERROR+26
1800                                                            ;BIT6 OF RCSR NOT CLEAR AFTER RESET
1801 005442  000402                     BR      2$
1802
1803 005444  022626             1$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
1804 005446  104027                     ERROR+27
1805                                                            ;RCVR INTERRUPT WITH PRIORITY-7
1806
1807 005450  052777  000100  175156  2$:     BIS     #BIT6,@RCSR     ;SET BIT6 OF RCSR
1808 005456  032777  000100  175150         BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
1809 005464  001001                     BNE     3$              ;BR, IF SET
1810
1811 005466  104030                     ERROR+30
1812                                                            ;CANNOT SET BIT6 OF RCSR
1813
1814 005470  042777  000100  175136  3$:     BIC     #BIT6,@RCSR     ;CLEAR BIT6 OF RCSR
1815 005476  032777  000100  175130         BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
1816 005504  001401                     BEQ     4$              ;BR, IF CLEAR
1817
1818 005506  104031                     ERROR+31
1819                                                            ;CANNOT CLEAR BIT6 OF RCSR
1820
1821 005510  052777  000100  175116  4$:     BIS     #BIT6,@RCSR     ;SET BIT6 OF RCSR
1822 005516  000005                     RESET                   ;CLEAR BIT6OF RCSR WITH RESET
1823 005520  032777  000100  175106         BIT     #BIT6,@RCSR     ;TEST BIT6 OF RCSR
1824 005526  001401                     BEQ     5$              ;BR, IF CLEAR
1825
1826 005530  104032                     ERROR+32
1827                                                            ;CANNOT CLEAR BIT6 OF RCSR WITH RESET
1828 005532  010377  175106         5$:     MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
1829
```

```
                                ;TCLOCK: MOV     #12,$TSTNM      ;ADJUST TEST NUMBER TO (NEXT TEST - 1)
                                ;;*****************************************************************
                                ;*TEST 13        TEST ABILITY TO ACCESS LKS
                                ;;*****************************************************************
                                ;TST13:  SCOPE
005544  000004                  ;
005546  005767  175052          ;       TST     CTSTFL          ;IS CONSOLE UNDER TEST?
005552  001420                  ;       BEQ     TST14           ;IF NOT, SKIP THIS TEST
005554  032777  000100  173256  ;       BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
005562  001014                  ;       BNE     TST14           ;IF YES, SKIP THIS TEST
005564  013703  000004          ;       MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
005570  012737  005604  000004  ;       MOV     #1$,@#4         ;SET UP TIMEOUT VECTOR
005576  005777  175072          ;       TST     @LKS            ;ACCESS LKS
005602  000402                  ;       BR      2$              ;NO TIMEOUT -  BR TO END OF TEST
                                ;
005604  022626                  ;1$:    CMP     (SP)+,(SP)+     ;RESTORE SP AFTER TIMEOUT
005606  104010                  ;       ERROR+10                ;CAN NOT ACCESS LKS
                                ;
005610  010337  000004          ;2$:    MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
                                ;
                                ;;*****************************************************************
                                ;*TEST 14        TEST THAT BIT6 OF LKS CAN BE SET & RESET
                                ;;*****************************************************************
                                ;TST14:  SCOPE
005614  000004                  ;
005616  005767  175002          ;       TST     CTSTFL          ;IS CONSOLE UNDER TEST?
005622  001460                  ;       BEQ     TST15           ;IF NOT, SKIP THIS TEST
005624  032777  000100  173206  ;       BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
005632  001054                  ;       BNE     TST15           ;IF YES, SKIP THIS TEST
005634  000005                  ;       RESET
005636  017703  175034          ;       MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
005642  012777  005672  175026  ;       MOV     #1$,@RTCVT      ;SET UP INTERRUPT VECTOR FOR ERROR REPORT
005650  004767  006664          ;       JSR     PC,WRPSW        ;SET PSW TO PRIORITY 7
005654  000340                  ;               .WORD   340
005656  032777  000100  175010  ;       BIT     #BIT6,@LKS      ;TEST BIT6 OF LKS
005664  001404                  ;       BEQ     2$
005666  104033                  ;       ERROR+33
                                ;                               ;BIT6 OF LKS NOT CLEAR AFTER RESET
005670  000402                  ;       BR      2$
                                ;
005672  022626                  ;1$:    CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
005674  104034                  ;       ERROR+34
                                ;                               ;LKS INTERRUPT WITH PRIORITY 7
                                ;
005676  052777  000100  174770  ;2$:    BIS     #BIT6,@LKS      ;SET BIT6 OF LKS
005704  032777  000100  174762  ;       BIT     #BIT6,@LKS      ;TEST BIT6 OF LKS
005712  001001                  ;       BNE     3$              ;BR IF SET
                                ;
005714  104035                  ;       ERROR+35
                                ;                               ;CANNOT SET BIT6 OF LKS
                                ;
005716  042777  000100  174750  ;3$:    BIC     #BIT6,@LKS      ;CLEAR BIT6 OF LKS
005724  032777  000100  174742  ;       BIT     #BIT6,@LKS      ;TEST BIT6 OF LK
005732  001401                  ;       BEQ     4$
005734  104036                  ;       ERROR+36
                                ;                               ;CANNOT CLEAR BIT6 OF LKS
005736  052777  000100  174730  ;4$:    BIS     #BIT6,@LKS      ;SET BIT6 OF LKS
005744  000005                  ;       RESET                   ;CLEAR BIT6 OF LKS WITH RESET
```

```
 1876 005746  032777  000100  174720          BIT     #BIT6,@LKS      ;TEST BIT6 OF LKS
 1877 005754  001401                          BEQ     5$              ;BR IF CLEAR
 1878
 1879 005756  104037                          ERROR+37
 1880                                                                 ;CANNOT CLEAR BIT6 OF LKS WITH RESET
 1881 005760  010377  174712          5$:     MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
```

```
                                        ;;*****************************************************************
                                        ;*TEST 15       TEST FOR DUAL ADDRESSING OF REGISTERS
                                        ;;*****************************************************************
 005764  000004                 TST15:  SCOPE
1886 005766  013703  000004             MOV     @#4,R3          ;SAVE TIMEOUT VECTOR
1887 005772  013704  000006             MOV     @#6,R4          ;SAVE TIMEOUT PSW
1888 005776  012737  006130  000004     MOV     #4$,@#4         ;SET UP TIMEOUT VECTOR
1889 006004  012737  000340  000006     MOV     #340,@#6        ;KEEP PRIO=7
1890 006012  000005                     RESET                   ;CLEAR EVERYTHING
1891 006014  012700  000002             MOV     #BIT1,R0        ;SET UP BIT MASK
1892 006020  032777  000020  173012     BIT     #BIT4,@SWR      ;CLOCK TEST ONLY?
1893 006026  001404                     BEQ     1$              ;BR IF NOT
1894 006030  016767  174640  172762     MOV     LKS,$GDADR      ;ELSE, MOVE GOOD LKS ADDRESS INTO $GDADR
1895 006036  000403                     BR      2$
1896 006040  016767  174570  172752 1$: MOV     RCSR,$GDADR     ;MOVE GOOD RCSR ADDRESS INTO $GDADR
1897 006046  016767  172746  172746 2$: MOV     $GDADR,$BDADR   ;MOVE GOOD ADDRESS INTO TEST ADDRESS LOCATION
1898 006054  040067  172742             BIC     R0,$BDADR       ;CREATE BAD ADDRESS BY COMPLEMENTING ONE BIT
1899 006060  026767  172734  172734     CMP     $GDADR,$BDADR   ;ARE ADDRESSES IDENTICAL?
1900 006066  001002                     BNE     3$              ;IF NOT, TEST THIS ADDRESS
1901 006070  050067  172726             BIS     R0,$BDADR       ;ELSE, BIT SET THIS BIT POSITION TO GENERATE BAD ADDRESS
1902 006074  017767  172722  172722 3$: MOV     @$BDADR,$GDDAT  ;SAVE CONTENTS OF BAD ADDRESS IF IT EXISTS
1903 006102  052777  000100  172712     BIS     #BIT6,@$BDADR   ;SET BIT6 USING BAD ADDRESS
1904 006110  032777  000100  172702     BIT     #BIT6,@$GDADR   ;CHECK TO SEE IF GOOD ADDRESS CONTAINS BIT6
1905 006116  001011                     BNE     6$              ;BR IF SET ---> ERROR
1906 006120  016777  172700  172674     MOV     $GDDAT,@$BDADR  ;RESTORE ANY MEMORY LOCATION THAT WAS ALTERED
1907 006126  000401                     BR      5$              ;BR TO CONTINUE TEST
1908 006130  022626                 4$: CMP     (SP)+,(SP)+     ;RESTORE SP AFTER TIMEOUT
1909 006132  006300                 5$: ASL     R0              ;SHIFT BIT MASK TO NEXT POSITION
1910 006134  105700                     TSTB    R0              ;COMPLEMENTED ALL BITS FROM 1 - 7?                ;;++
1911 006136  100343                     BPL     2$              ;BR, IF NOT.                                      ;;++
1912 006140  000401                     BR      7$              ;BR TO NEXT TEST
1913
1914 006142  104040                 6$: ERROR+40                ;DUAL ADDRESSING ERROR
1915                                                             ;$BDADR = DUAL ADDRESS
1916                                                             ;$GDADR = GOOD ADDRESS
1917
1918 006144  010337  000004         7$: MOV     R3,@#4          ;RESTORE TIMEOUT VECTOR
1919 006150  010437  000006             MOV     R4,@#6          ;RESTORE TIMEOUT PSW
```

```
                                ;;*****************************************************************
                                ;*TEST 16       TEST THAT BIT7 OF LKS SETS & CAN BE CLEARED
                                ;;*****************************************************************
006154  000004                  TST16:  SCOPE
1924 006156  005767  174442            TST     CTSTFL          ;IS CONSOLE UNDER TEST?
     006162  001437                    BEQ     TST17           ;IF NOT, SKIP THIS TEST
     006164  032777  000100  172646    BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
     006172  001033                    BNE     TST17           ;IF YES, SKIP THIS TEST
1925 006174  000005                    RESET                   ;CLEAR EVERYTHING & SET BIT7 OF LKS
1926 006176  105777  174472    1$:     TSTB    @LKS            ;TEST FOR BIT7 OF LKS
1927 006202  100401                    BMI     2$              ;BR IF SET
1928
1929 006204  104041                    ERROR+41                ;BIT7 OF LKS DID NOT SET WITH RESET
1930
1931 006206  042777  000200  174460  2$:     BIC     #BIT7,@LKS      ;CLEAR BIT7 OF LKS
1932 006214  032777  000200  174452          BIT     #BIT7,@LKS      ;TEST BIT7 OF LKS
1933 006222  001410                    BEQ     3$
1934 006224  042777  000200  174442          BIC     #BIT7,@LKS      ;TRY ONE MORE TIME BECAUSE THE CLOCK
1935 006232  032777  000200  174434          BIT     #BIT7,@LKS      ;  MAY HAVE SET IMMEDIATELY AFTER THE FIRST CLEAR
1936 006240  001401                    BEQ     3$
1937
1938 006242  104042                    ERROR+42                ;CAN NOT CLEAR BIT7 OF LKS
1939
1940 006244  005000            3$:     CLR     R0              ;CLEAR TIMER
1941 006246  105777  174422    CONT:   TSTB    @LKS            ;TEST FOR BIT7 OF LKS
1942 006252  100403                    BMI     TST17           ;BR, IF SET
1943 006254  005200                    INC     R0              ;INCREMENT TIMER
1944 006256  001373                    BNE     CONT            ;CONTINUE UNTIL TIME EXPIRES
1945
1946 006260  104043                    ERROR+43                ;BIT7 OF LKS DOES NOT SET
1947
```

```
                                ;;*****************************************************************
                                ;*TEST 17       TEST THAT THE REAL TIME CLOCK INTERRUPTS PROPERLY
                                ;;*****************************************************************
006262  000004                  TST17:  SCOPE
1951 006264  005767  174334            TST     CTSTFL          ;IS CONSOLE UNDER TEST?
     006270  001505                    BEQ     TST20           ;IF NOT, SKIP THIS TEST
     006272  032777  000100  172540    BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
     006300  001101                    BNE     TST20           ;IF YES, SKIP THIS TEST
1952 006302  004767  006232            JSR     PC,WRPSW        ;SET PSW TO PRIORITY 7
1953 006306  000340                    .WORD   340
1954 006310  017703  174362            MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
1955 006314  0177C   174360            MOV     @RTCPSW,R4      ;SAVE LINE CLOCK PSW VECTOR
1956 006320  012777  006364  174350    MOV     #2$,@RTCVT      ;SET RTC INTERRUPT VECTOR TO ERROR REPORT
1957 006326  012777  000340  174344    MOV     #340,@RTCPSW    ;KEEP PRIORITY AT 7
1958 006334  042777  000200  174332    BIC     #BIT7,@LKS      ;CLEAR CLOCK DONE FLAG
1959 006342  052777  000100  174324    BIS     #BIT6,@LKS      ;SET INTERRUPT ENABLE
1960 006350  105777  174320    1$:     TSTB    @LKS            ;WAIT FOR RTC DONE(INTERRUPT REQUEST)
1961 006354  100375                    BPL     1$
1962 006356  000240                    NOP                     ;GIVE TIME FOR ANY INTERRUPTS
1963 006360  000240                    NOP                     ;GIVE TIME FOR ANY INTERRUPTS
1964 006362  000402                    BR      3$              ;BR, IF NO INTERRUPT OCCURS
1965                                                                    .
1966 006364  022626            2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
1967 006366  104044                    ERROR+44                ;RTC INTERRUPTS AT PRIORITY 7
1968
1969 006370  005077  174300    3$:     CLR     @LKS    ;DISABLE RTC INTERRUPTS & CLEAR DONE
1970 006374  012777  006424  174274    MOV     #4$,@RTCVT      ;SET RTC INTERRUPT VECTOR FOR ERROR
1971 006402  004767  006132            JSR     PC,WRPSW        ;CHANGE PSW TO PRIORITY 5
1972 006406  000240                    .WORD   240
1973 006410  105777  174260    20$:    TSTB    @LKS            ;WAIT FOR DONE (INTERRUPT REQUES )
1974 006414  100375                    BPL     20$
1975 006416  000240                    NOP                     ;GIVE TIME FOR ANY INTERRUPT
1976 006420  000240                    NOP                     ;GIVE TIME FOR ANY INTERRUPT
1977 006422  000402                    BR      5$              ;IF NO INTERRUPT - BR TO CONTINUE TEST
1978
1979 006424  022626            4$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
1980 006426  104045                    ERROR+45                ;RTC INTERRUPTS WITH INTERRUPTS DISABLED
1981
1982 006430  012777  006464  174240    5$:     MOV     #7$,@RTCVT      ;POINT RTC VECTOR TO END OF TEST
1983 006436  042777  000200  174230            BIC     #BIT7,@LKS      ;CLEAR CLOCK DONE FLAG
1984 006444  052777  000100  174222            BIS     #BIT6,@LKS      ;ALLOW INTERRUPTS
1985 006452  105777  174216            6$:     TSTB    @LKS            ;WAIT FOR RTC DONE
1986 006456  100375                    BPL     6$
1987 006460  000240                    NOP                     ;GIVE TIME FOR INTERRUPT
1988
1989 006462  104046                    ERROR+46                ;RTC INTERRUPT DID NOT OCCUR
1990
1991 006464  022626            7$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
1992 006466  042777  000100  174200    BIC     #BIT6,@LKS      ;DISABLE INTERRUPTS
1993 006474  010377  174176            MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
1994 006500  010477  174174            MOV     R4,@RTCPSW      ;RESTORE LINE CLOCK PSW VECTOR
1995
1996
```

```
                        ;;*****************************************************************
                        ;*TEST 20        TEST RTC FOR DOUBLE INTERRUPTS
                        ;;*****************************************************************
006504 000004           TST20:  SCOPE
2002 006506 005767 174112       TST     CTSTFL          ;IS CONSOLE UNDER TEST?
     006512 001462              BEQ     TST21           ;IF NOT, SKIP THIS TEST
     006514 032777 000100 172316        BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
     006522 001056              BNE     TST21           ;IF YES, SKIP THIS TEST
2003 006524 000005              RESET                   ;CLEAR EVERYTHING
2004 006526 017703 174144       MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
2005 006532 017704 174142       MOV     @RTCPSW,R4      ;SAVE LINE CLOCK PSW VECTOR
2006 006536 012777 006606 174132        MOV     #2$,@RTCVT      ;SET UP RTC INTERRUPT VECTOR
2007 006544 012777 000340 174126        MOV     #340,@RTCPSW    ;DISALLOW INTERRUPTS AFTER THE INTERRUPT
2008 006552 004767 005762       JSR     PC,WRPSW        ;SET PRIORITY TO 5
2009 006556 000240                      .WORD   240
2010 006560 042777 000200 174106        BIC     #BIT7,@LKS      ;CLEAR CLOCK DONE FLAG
2011 006566 052777 000100 174100        BIS     #BIT6,@LKS      ;ENABLE CLOCK INTERRUPTS
2012 006574 105777 174074       1$:     TSTB    @LKS            ;WAIT FOR DONE
2013 006600 100375              BPL     1$
2014 006602 000240              NOP                     ;GIVE TIME FOR ANY INTERRUPT
2015
2016 006604 104047              ERROR+47                ;RTC INTERRUPT DID NOT OCCUR
2017
2018 006606 022626              2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2019 006610 012777 006636 174060        MOV     #3$,@RTCVT      ;POINT RTC VECTOR TO ERROR REPORT
2020 006616 004767 005716       JSR     PC,WRPSW        ;SET PSW TO PRIORITY 5
2021 006622 000240                      .WORD   240
2022 006624 000240              NOP                     ;GIVE SOME TIME FOR AN INTERRUPT
2023 006626 000240              NOP                     ;GIVE SOME TIME FOR AN INTERRUPT
2024 006630 000240              NOP                     ;GIVE SOME TIME FOR AN INTERRUPT
2025 006632 000240              NOP                     ;GIVE SOME TIME FOR AN INTERRUPT
2026 006634 000402              BR      4$              ;NO INTERRUPT - BR TO END OF TEST
2027
2028 006636 022626              3$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2029 006640 104050              ERROR+50                ;INTERRUPT SEQUENCE DID NOT CLEAR
2030                                                    ;INTERRUPT REQUEST
2031
2032 006642 042777 000100 174024 4$:    BIC     #BIT6,@LKS      ;DISABLE CLOCK INTERRUPTS
2033 006650 010377 174022       MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
2034 006654 010477 174020       MOV     R4,@RTCPSW      ;RESTORE LINE CLOCK PSW VECTOR
```

```
                                ;;*****************************************************************
                                ;*TEST 21        TEST THAT RTC INTERRUPT CLEARS WITH RESET
                                ;;*****************************************************************
006660  000004                  TST21:  SCOPE
2039 006662  005767  173736              TST     CTSTFL          ;IS CONSOLE UNDER TEST?
     006666  001445              BEQ     TST22           ;IF NOT, SKIP THIS TEST
     006670  032777  000100  172142      BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
     006676  001041              BNE     TST22           ;IF YES, SKIP THIS TEST
2040 006700  004767  005634              JSR     PC,WRPSW        ;SET PRIORITY TO 7
2041 006704  000340                      .WORD   340
2042 006706  017703  173764              MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
2043 006712  012777  006772  173756      MOV     #2$,@RTCVT      ;POINT RTC VECTOR TO ERROR REPORT
2044 006720  042777  000200  173746      BIC     #BIT7,@LKS      ;CLEAR CLOCK DONE FLAG
2045 006726  052777  000100  173740      BIS     #BIT6,@LKS      ;ENABLE CLOCK INTERRUPTS
2046 006734  105777  173734      1$:     TSTB    @LKS            ;WAIT FOR DONE (INTERRUPT REQUEST)
2047 006740  100375              BPL     1$
2048 006742  000005              RESET                   ;CLEAR PENDING INTERRUPT WITH RESET
2049 006744  004767  005570              JSR     PC,WRPSW        ;SET PRIORITY TO 5
2050 006750  000240                      .WORD   240
2051 006752  000240              NOP                     ;GIVE TIME FOR ANY INTERRUPT
2052 006754  000240              NOP                     ;GIVE TIME FOR ANY INTERRUPT
2053 006756  000240              NOP                     ;GIVE TIME FOR ANY INTERRUPT
2054 006760  000240              NOP                     ;GIVE TIME FOR ANY INTERRUPT
2055 006762  042777  000100  173704      BIC     #BIT6,@LKS      ;DISALLOW INTERRUPTS
2056 006770  000402              BR      3$              ;BR TO END OF TEST
2057
2058 006772  022626              2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2059 006774  104051              ERROR+51                ;RESET DID NOT CLEAR INTERRUPT
2060
2061 006776  010377  173674      3$:     MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
```

```
2063
2064
2065                                    ;;*****************************************************************
                                        ;*TEST 22       TEST THAT RTC INTERRUPT CLEARS BY CLEARING BIT7 OF *
                                        ;;*****************************************************************
                                        TST22:  SCOPE
2066 007002  000004                     
     007004  005767  173614             TST     CTSTFL          ;IS CONSOLE UNDER TEST?
     007010  001452                     BEQ     TST23           ;IF NOT, SKIP THIS TEST
     007012  032777  000100  172020     BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
     007020  001046                     BNE     TST23           ;IF YES, SKIP THIS TEST
2067 007022  004767  005512             JSR     PC,WRPSW        ;SET PRIORITY TO 7
2068 007026  000340                     .WORD   340
2069 007030  017703  173642             MOV     @RTCVT,R3       ;SAVE LINE CLOCK VECTOR
2070 007034  012777  007120  173634     MOV     #2$,@RTCVT      ;POINT RTC VECTOR TO ERROR REPORT
2071 007042  042777  000200  173624     BIC     #BIT7,@LKS      ;CLEAR CLOCK DONE FLAG
2072 007050  052777  000100  173616     BIS     #BIT6,@LKS      ;ENABLE CLOCK INTERRUPTS
2073 007056  105777  173612     1$:     TSTB    @LKS            ;WAIT FOR DONE (INTERRUPT REQUEST)
2074 007062  100375                     BPL     1$
2075 007064  042777  000200  173602     BIC     #BIT7,@LKS      ;CLEAR DONE & INTERRUPT
2076 007072  004767  005442             JSR     PC,WRPSW        ;ALLOW INTERRUPTS
2077 007076  000240                     .WORD   240
2078 007100  000240                     NOP                     ;GIVE TIME FOR ANY INTERRUPT
2079 007102  000240                     NOP                     ;GIVE TIME FOR ANY INTERRUPT
2080 007104  000240                     NOP                     ;GIVE TIME FOR ANY INTERRUPT
2081 007106  000240                     NOP                     ;GIVE TIME FOR ANY INTERRUPT
2082 007110  042777  000100  173556     BIC     #BIT6,@LKS      ;DISALLOW INTERRUPTS
2083 007116  000402                     BR      3$              ;BR TO END OF TEST
2084
2085
2086 007120  022626             2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2087 007122  104052                     ERROR+52                ;CLEARING BIT7 OF LKS DID NOT CLEAR INTERRUPT
2088
2089 007124  010377  173546     3$:     MOV     R3,@RTCVT       ;RESTORE LINE CLOCK VECTOR
2090 007130  004767  005404             JSR     PC,WRPSW        ;RESTORE PRIORITY TO 7
2091 007134  000340                     .WORD   340
```

```
2093
2094
2095                                    ;;*********************************************************************
                                        ;*TEST 23        TEST CLOCK REPEATABILITY
                                        ;;*********************************************************************
        007136  000004                  TST23:  SCOPE
2096    007140  005767  173460                    TST     CTSTFL          ;IS CONSOLE UNDER TEST?
        007144  001467                          BEQ     TST24           ;IF NOT, SKIP THIS TEST
        007146  032777  000100  171664          BIT     #BIT6,@SWR      ;ARE LINE CLOCK TESTS INHIBITED?
        007154  001063                          BNE     TST24           ;IF YES, SKIP THIS TEST
2097    007156  042777  000100  173510          BIC     #BIT6,@LKS      ;DISALLOW INTERRUPTS
2098
2099    007164  005000                          CLR     R0              ;CLEAR A TIMER
2100    007166  012701  177777                  MOV     #-1,R1          ;SET A FLAG INDICATING FIRST PASS THRU THIS LOOP
2101    007172  005002                  1$:     CLR     R2              ;CLEAR CLOCK COUNTER
2102    007174  005077  173474                  CLR     @LKS            ;CLEAR DONE
2103    007200  105777  173470          2$:     TSTB    @LKS            ;SYNC ON DONE
2104    007204  100375                          BPL     2$
2105    007206  005077  173462                  CLR     @LKS            ;CLEAR DONE
2106    007212  105777  173456          3$:     TSTB    @LKS            ;IS CLOCK DONE?
2107    007216  100003                          BPL     4$              ;BR IF NOT , TO INCREMENT TIMER
2108    007220  005202                          INC     R2              ;IF DONE, INCREMENT CLOCK COUNT
2109    007222  005077  173446                  CLR     @LKS            ;CLEAR DONE
2110    007226  005200                  4$:     INC     R0              ;INCREMENT TIMER
2111    007230  001370                          BNE     3$              ;BR IF TIME REMAINS
2112    007232  005201                          INC     R1              ;INCREMENT LOOP PASS FLAG
2113    007234  001003                          BNE     CMPARE          ;BR IF TWO PASSES HAVE BEEN MADE
2114    007236  010267  173074                  MOV     R2,FIRST        ;IF NOT, STORE FIRST CLOCK COUNT
2115    007242  000753                          BR      1$              ;DO LOOP AGAIN
2116    007244  016701  173066          CMPARE: MOV     FIRST,R1        ;RECALL FIRST CLOCK COUNT
2117    007250  160201                          SUB     R2,R1           ;CALCULATE DIFFERENCE OF TWO COUNTS
2118    007252  100001                          BPL     TOLER           ;IF POSITIVE,SKIP NEGATION OF DIFFERENCE
2119    007254  005401                          NEG     R1              ;MAKE DIFFERENCE A POSITIVE NUMBER
2120    007256  032767  000001  173516  TOLER:  BIT #BIT0,FLAG44        ;** IS THIS A 11/44
2121    007264  001403                          BEQ 6$                  ;** NO
2122    007266  020127  000002                  CMP R1,#2               ;** YES; COMPARE DIFFERENCE WITH DESIRED
2123                                            ;** TOLERANCE OF 2
2124    007272  000402                          BR 7$                   ;**
2125    007274  020127  000001          6$:     CMP     R1,#1           ;COMPARE DIFFERENCE WITH DESIRED TOLERANCE
2126    007300  003403                  7$:     BLE     5$              ;BR, IF LOWER/EQUAL TO TOLERANCE
2127
2128    007302  010267  173310                  MOV     R2,SECND        ;STORE SECOND COUNT
2129    007306  104053                          ERROR+53                ;CLOCK REPEATABILITY ERROR
2130
2131    007310  032777  000020  171522  5$:     BIT     #BIT4,@SWR      ;CLOCK TESTS ONLY?
2132    007316  001402                          BEQ     TST24           ;BR IF NOT
2133    007320  000167  005054                  JMP     $EOP            ;ELSE, JUMP TO END OF PASS ROUTINE
2134
```

```
                                ;;*****************************************************************
                                ;*TEST 24       TEST THAT XMIT INTERRUPTS ONLY WHEN ENABLED
                                ;;*****************************************************************
007324  000004                TST24:  SCOPE
2139 007326  042777  000100  173304        BIC     #BIT6,@TCSR     ;CLEAR TRANSMIT INTERRUPT ENABLE
2140 007334  017703  173310                MOV     @TVECT,R3       ;SAVE XMIT VECTOR
2141 007340  012777  007364  173302        MOV     #2$,@TVECT      ;POINT XMIT VECTOR TO ERROR REPORT
2142 007346  105777  173266        1$:     TSTB    @TCSR           ;WAIT FOR DONE
2143 007352  100375                BPL     1$
2144 007354  004767  005160                JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2145 007360  000140                        .WORD   140
2146 007362  000402                BR      3$
2147
2148 007364  022626        2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2149 007366  104054                ERROR+54
2150                                                        ;XMIT INTERRUPTS WITH INTERRUPT ENABLE CLEAR
2151 007370  012777  007416  173252  3$:     MOV     #4$,@TVECT      ;SET XMIT VECTOR TO END OF TEST
2152 007376  052777  000100  173234        BIS     #BIT6,@TCSR     ;ENABLE INTERRUPTS
2153 007404  000240                NOP                             ;**
2154 007406  000240                NOP                             ;**
2155 007410  000240                NOP                             ;**
2156 007412  000240                NOP                             ;**
2157
2158 007414  104055                ERROR+55                        ;XMIT DID NOT INTERRUPT
2159
2160 007416  042777  000100  173214  4$:     BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
2161 007424  022626                CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2162 007426  010377  173216                MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
2163
```

```
                                ;;*****************************************************************
                                ;*TEST 25        TEST THAT XMIT INTERRUPTS DO NOT OCCUR WHEN DISABLED
                                ;;*****************************************************************
007432  000004                  TST25:  SCOPE
2167 007434  042777  000100  173176        BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
2168 007442  004767  005072                JSR     PC,WRPSW        ;SET PSW TO PRIORITY 7
2169 007446  000340                        .WORD   340
2170 007450  017703  173174                MOV     @TVECT,R3       ;SAVE XMIT VECTOR
2171 007454  012777  007510  173166        MOV     #2$,@TVECT      ;POINT XMIT VECTOR TO ERROR REPORT
2172 007462  105777  173152        1$:     TSTB    @TCSR           ;WAIT FOR DONE
2173 007466  100375                        BPL     1$
2174 007470  052777  000100  173142        BIS     #BIT6,@TCSR     ;ENABLE INTERRUPT
2175 007476  000240                        NOP                     ;**
2176 007500  000240                        NOP                     ;**
2177 007502  000240                        NOP                     ;**
2178 007504  000240                        NOP                     ;**
2179 007506  000402                        BR      3$              ;CONTINUE TEST
2180
2181 007510  022626                2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2182 007512  104056                        ERROR+56
2183                                                                ;XMIT INTERRUPTS AT PRIORITY=7
2184 007514  042777  000100  173116  3$:     BIC     #BIT6,@TCSR     ;CLEAR INTERRUPT ENABLE
2185 007522  012777  007550  173120        MOV     #4$,@TVECT      ;POINT XMIT VECTOR TO ERROR REPORT
2186 007530  004767  005004                JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2187 007534  000140                        .WORD   140
2188 007536  000240                        NOP                     ;**
2189 007540  000240                        NOP                     ;**
2190 007542  000240                        NOP                     ;**
2191 007544  000240                        NOP                     ;**
2192 007546  000402                        BR      5$              ;BR TO END OF TEST-NO INTERRUPT
2193
2194 007550  022626                4$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2195 007552  104057                        ERROR+57
2196                                                                ;XMIT INTERRUPT OCCURES WITH BIT6 CLEAR
2197 007554  010377  173070        5$:     MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
```

```
                                ;;*****************************************************************
                                ;*TEST 26       TEST TRANSMITTER FOR DOUBLE INTERRUPTS
                                ;;*****************************************************************
 007560  000004                 TST26:  SCOPE
2202 007562  042777  000100  173050        BIC     #BIT6,@TCSR     ;CLEAR INTERRUPT ENABLE
2203 007570  017703  173054                MOV     @TVECT,R3       ;SAVE XMIT VECTOR
2204 007574  017704  173052                MOV     @TPSW,R4        ;SAVE XMIT PSW VECTOR
2205 007600  012777  007650  173042        MOV     #2$,@TVECT      ;SET UP XMIT VECTOR
2206 007606  012777  000340  173036        MOV     #340,@TPSW      ;SET PIO 7 AFTER INTERRUPT
2207 007614  004767  004720                JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2208 007620  000140                        .WORD   140
2209 007622  105777  173012        1$:     TSTB    @TCSR           ;WAIT FOR DONE
2210 007626  100375                BPL     1$
2211 007630  052777  000100  173002        BIS     #BIT6,@TCSR     ;ENABLE INTERRUPTS
2212 007636  000240                NOP                             ;**
2213 007640  000240                NOP                             ;**
2214 007642  000240                NOP                             ;**
2215 007644  000240                NOP                             ;**
2216
2217 007646  104060                ERROR+60
2218                                                            ;XMIT INTERRUPT DID NOT OCCUR
2219 007650  022626        2$:     CMP     (SP)+,(SP)+             ;RESTORE SP AFTER INTERRUPT
2220 007652  012777  007706  172770        MOV     #4$,@TVECT      ;POINT XMIT VECTOR TO ERROR
2221 007660  004767  004654                JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2222 007664  000140                        .WORD   140
2223 007666  000240                NOP                             ;GIVE TIME FOR ANY INTERRUPTS
2224 007670  000240                NOP                             ;GIVE TIME FOR ANY INTERRUPTS
2225 007672  000240                NOP                             ;GIVE TIME FOR ANY INTERRUPTS
2226 007674  000240                NOP                             ;GIVE TIME FOR ANY INTERRUPTS
2227 007676  042777  000100  172734        BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
2228 007704  000402                BR      5$                      ;BR TO END OF TEST
2229
2230 007706  022626        4$:     CMP     (SP)+,(SP)+             ;RESTORE SP AFTER INTERRUPT
2231 007710  104061                ERROR+61
2232                                                            ;XMIT RE-INTERRUPTED
2233 007712  010377  172732        5$:     MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
2234 007716  010477  172730                MOV     R4,@TPSW        ;RESTORE XMIT PSW VECTOR
2235
2236                                ;;*****************************************************************
                                ;*TEST 27       TEST THAT XMIT INTERRUPT CLEARS WITH LOADING TBUF
                                ;;*****************************************************************
 007722  000004                 TST27:  SCOPE
2237 007724  042777  000100  172706        BIC     #BIT6,@TCSR     ;DISABLE INTERRUPTS
2238 007732  004767  004602                JSR     PC,WRPSW        ;SET PSW TO PRIORITY 7
2239 007736  000340                        .WORD   340
2240 007740  017703  172704                MOV     @TVECT,R3       ;SAVE XMIT VECTOR
2241 007744  012777  010032  172676        MOV     #2$,@TVECT      ;POINT XMIT VECTOR TO ERROR
2242 007752  052777  000004  172660        BIS     #BIT2,@TCSR     ;** ENABLE MAINT. WRAP
2243 007760  052777  000100  172652        BIS     #BIT6,@TCSR     ;ENABLE INTERRUPTS
2244 007766  005077  172650                CLR     @TBUF           ;LOAD TBUF
2245 007772  105777  172642        1$:     TSTB    @TCSR           ;WAIT FOR DONE (INTERRUPT)
2246 007776  100375                BPL     1$
2247 010000  005077  172636                CLR     @TBUF           ;FILL SECOND BUFFER TO RESET INT.
2248 010004  004767  004530                JSR     PC,WRPSW        ;ALLOW INTERRUPTS
2249 010010  000140                        .WORD   140
```

```
2250 010012  000240                        NOP                 ;GIVE TIME FOR ANY INTERRUPTS
2251 010014  000240                        NOP                 ;GIVE TIME FOR ANY INTERRUPTS
2252 010016  000240                        NOP                 ;GIVE TIME FOR ANY INTERRUPTS
2253 010020  000240                        NOP                 ;GIVE TIME FOR ANY INTERRUPTS
2254 010022  042777  000100  172610        BIC     #BIT6,@TCSR ;DISABLE INTERRUPTS
2255 010030  000405                        BR      3$          ;BR TO END OF TEST
2256
2257 010032  022626                2$:     CMP     (SP)+,(SP)+ ;RESTORE SP AFTER INTERRUPT
2258 010034  042777  000004  172616        BIC     #BIT2,@CTCSR;** DISABLE MAINTENANCE MODE FOR
                                                               ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                               ;** WITH TERMINAL.
2259 010042  104062                        ERROR+62
2260                                                           ;LOADING TBUF DID NOT CLEAR INTERRUPT.
2261 010044  010377  172600          3$:    MOV     R3,@TVECT   ;RESTORE XMIT VECTOR
2262
2263 010050  005000                        CLR     R0          ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     010052  012701  000002                MOV     #2,R1       ;** THAT MIGHT BE IN THE PROCESS OF BEING
     010056  005300                40$:    DEC     R0          ;** TRANSMITTED TO FINISH BEFORE MAINTENANCE
     010060  001376                        BNE     40$         ;** WRAP FOR THE UART UNDER TEST IS DISABLED.
     010062  005301                        DEC     R1          ;** THIS WILL INHIBIT ANY COMMUNICATION
     010064  001374                        BNE     40$         ;** TO HARDWARE MEDIA SUCH AS TU58 THAT MIGHT
                                                               ;** BE ATTACHED TO UART UNDER TEST.
```

```
2265
2266                                    ;;*********************************************************************
                                        ;*TEST 30        TEST THAT RCVR ACTIVE & DONE SET & CLEAR
                                        ;;*********************************************************************
     010066  000004                     TST30:  SCOPE
2267 010070  032767  000001  172704             BIT     #BIT0,FLAG44    ;**
2268 010076  001073                             BNE     RCVDON          ;**
2269 010100  000005                             RESET                   ;CLEAR EVERYTHING
2270 010102  052777  000004  172530             BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2271 010110  005000                             CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     010112  012701  000002                     MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                         ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                         ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
     010116  105777  172512             42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
     010122  100405                             BMI     43$             ;**
     010124  005300                             DEC     R0              ;**
     010126  001373                             BNE     42$             ;**
     010130  005301                             DEC     R1              ;**
     010132  001371                             BNE     42$             ;**
     010134  000402                             BR      .+6             ;**
     010136  005777  172474             43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2272 010142  005000                             CLR     R0              ;CLEAR A TIMER
2273 010144  005077  1724                       CLR     @TBUF           ;LOAD TRANSMIT BUFFER
2274 010150  032777  00400   172456     WACTV:  BIT     #BIT11,@RCSR    ;TEST RCVR ACTIVE BIT
2275 010156  001006                             BNE     2$              ;BR IF SET
2276 010160  005200                             INC     R0              ;INCREMENT TIMER IF NOT SET
2277 010162  001372                             BNE     WACTV           ;CONTINUE WAIT IF TIME REMAINS
2278 010164  042777  000004  172466             BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                         ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                         ;** WITH TERMINAL.
2279
2280 010172  104063                             ERROR+63                ;RCVR ACTIVE DID NOT SET WHILE RECEIVING
2281
2282 010174                             2$:
     010174  005000                             CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     010176  012701  000002                     MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
     010202  005300                     40$:    DEC     R0              ;** TRANSMITTED TO FINISH BEFORE MAINTENANCE
     010204  001376                             BNE     40$             ;** WRAP FOR THE UART UNDER TEST IS DISABLED.
     010206  005301                             DEC     R1              ;** THIS WILL INHIBIT ANY COMMUNICATION
     010210  001374                             BNE     40$             ;** TO HARDWARE MEDIA SUCH AS TU58 THAT MIGHT
                                                                         ;** BE ATTACHED TO UART UNDER TEST.
2283 010212  000005                             RESET
2284 010214  032777  004000  172412             BIT     #BIT11,@RCSR    ;VERIFY "INIT" CLEARS RCV ACTIVE
2285 010222  001401                             BEQ     3$
2286
2287 010224  104115                             ERROR+115               ;INIT DID NOT CLEAR RCV ACTIVE
2288
2289 010226  005000                     3$:     CLR     R0              ;CLEAR A TIMER
2290 010230  052777  000004  172402             BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2291 010236  062700  000000             WT:     ADD     #0,R0           ;WAIT AT LEAST ONE BIT TIME
2292 010242  005200                             INC     R0
2293 010244  001374                             BNE     WT
2294 010246  036777  173526  172360             BIT     BIT11,@RCSR     ;VERIFY RCV ACTIVE STILL CLEAR
2295 010254  001404                             BEQ     RCVDON          ;BR IF CLEAR
2296
2297 010256  042777  000004  172374             BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                         ;** CONSOLE TO ALLOW FOR COMMUNICATION
```

```
                                                                        ;** WITH TERMINAL.
2298 010264  104116                          ERROR+116                  ;RCV ACTIVE WITHOUT ''START'' BIT
2299
2300 010266  052777  000004  172344  RCVDON: BIS     #BIT2,@TCSR        ;SET MAINTENCE WRAP
2301 010274  005000                          CLR     R0                 ;CLEAR TIMER
2302 010276  005077  172340                  CLR     @TBUF              ;LOAD TRANSMIT BUFFER
2303 010302  105777  172326          WDONE:  TSTB    @RCSR              ;CHECK FOR RECEIVER DONE
2304 010306  100406                          BMI     5$                 ;BR, IF DONE
2305 010310  005200                          INC     R0                 ;INCREMENT TIMER, IF NOT DONE
2306 010312  001373                          BNE     WDONE              ;CONTINUE WAIT IF TIME REMAINS
2307 010314  042777  000004  172336          BIC     #BIT2,@CTCSR       ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2308 010322  104064                          ERROR+64
2309                                                                    ;RECEIVER DONE NEVER SET
2310
2311 010324  032767  000001  172450  5$:     BIT     #BIT0,FLAG44       ;** 11/44??
2312 010332  001010                          BNE     6$                 ;** DO NOT EXECUTE THIS SECTION
2313 010334  032777  004000  172272          BIT     #BIT11,@RCSR       ;CHECK FOR RCVR ACTIVE CLEAR
2314 010342  001404                          BEQ     6$                 ;BR, IF CLEAR
2315 010344  042777  000004  172306          BIC     #BIT2,@CTCSR       ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2316 010352  104065                          ERROR+65
2317                                                                    ;RCVR ACTIVE DID NOT CLEAR WITH RCVR DONE
2318
2319 010354  000005                  6$:     RESET                      ;CLEAR DONE WITH RESET
2320 010356  105777  172252                  TSTB    @RCSR              ;CHECK FOR DONE CLEAR
2321 010362  001404                          BEQ     7$
2322
2323 010364  042777  000004  172266          BIC     #BIT2,@CTCSR       ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2324 010372  104066                          ERROR+66
2325                                                                    ;RESET DID NOT CLEAR RCVR DONE
2326
2327 010374                          7$:
2328 010374  042777  000004  172256          BIC     #BIT2,@CTCSR       ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
```

```
                                ;;*****************************************************************
                                ;*TEST 31        TEST THAT READING RBUF CLEARS RECEIVER DONE
                                ;;*****************************************************************
     010402  000004             TST31:  SCOPE
2332 010404  000005                     RESET                   ;CLEAR EVERYTHING
2333 010406  052777  000004  172224      BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2334 010414  005000                     CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     010416  012701  000002             MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                 ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                 ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
     010422  105777  172206     42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
     010426  100405                     BMI     43$             ;**
     010430  005300                     DEC     R0              ;**
     010432  001373                     BNE     42$             ;**
     010434  005301                     DEC     R1              ;**
     010436  001371                     BNE     42$             ;**
     010440  000402                     BR      .+6             ;**
     010442  005777  172170     43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2335 010446  005077  172170             CLR     @TBUF           ;LOAD TRANSMITTER
2336 010452  105777  172156     1$:     TSTB    @RCSR           ;WAIT FOR RECEIVER DONE
2337 010456  100375                     BPL     1$
2338 010460  017700  172152             MOV     @RBUF,R0        ;READ RECEIVE BUFFER
2339 010464  042777  000004  172166      BIC     #BIT2,@TCSR     ;** DISABLE MAINTENANCE MODE FOR
                                                                 ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                 ;** WITH TERMINAL.
2340 010472  105777  172136             TSTB    @RCSR           ;CHECK FOR RECEIVE DONE CLEAR
2341 010476  001401                     BEQ     10$             ;** BR, IF CLEAR TO NEXT TEST
2342 010500  104070                     ERROR+70
2343                                                             ;READING RBUF DID NOT CLEAR RCVR DONE
2344 010502  000240             10$:    NOP
2345
2346                            ;;*****************************************************************
                                ;*TEST 32        TEST THAT RDR ENABLE CLEARS RECEIVER DONE FLAG
                                ;;*****************************************************************
     010504  000004             TST32:  SCOPE
2347 010506  032767  000001  172266      BIT     #BIT0,FLAG44    ;** 11/44 ??
2348 010514  001050                     BNE     10$             ;** YES DO NOT EXECUTE THIS TEST
2349 010516  000005                     RESET                   ;CLEAR EVERYTHING
2350 010520  052777  000001  172106      BIS     #BIT0,@RCSR     ;SET RDR ENABLE
2351 010526  052777  000004  172104      BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2352 010534  005000                     CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     010536  012701  000002             MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                 ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                 ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
     010542  105777  172066     42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
     010546  100405                     BMI     43$             ;**
     010550  005300                     DEC     R0              ;**
     010552  001373                     BNE     42$             ;**
     010554  005301                     DEC     R1              ;**
     010556  001371                     BNE     42$             ;**
     010560  000402                     BR      .+6             ;**
     010562  005777  172050     43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2353 010566  005077  172050             CLR     @TBUF           ;LOAD TRANSMITTER
2354 010572  105777  172036     1$:     TSTB    @RCSR           ;WAIT FOR RECEIVER DONE
2355 010576  100375                     BPL     1$
2356 010600  032777  000001  172026      BIT     #BIT0,@RCSR     ;VERIFY RCV ACTIVE CLEARED RDR ENABLE
```

```
2357 010606  001401                          BEQ     2$              ;BR IF CLEAR
2358
2359 010610  104117                          ERROR+117               ;RDR ENABLE NOT CLEARED WITH RCV ACTIVF
2360
2361 010612  052777  000001  172014  2$:     BIS     #BIT0,@RCSR     ;CLEAR DONE BY SETTING RDR ENABLE
2362 010620  105777  172010                  TSTB    @RCSR           ;CHECK FOR DONE CLEAR
2363 010624  001404                          BEQ     10$             ;** BR, IF CLEAR TO NEXT TEST
2364 010626  042777  000004  172024          BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                     ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                     ;** WITH TERMINAL.
2365 010634  104067                          ERROR+67
2366                                                                 ;SETTING RDR ENABLE DID NOT CLEAR RCVR DONE
2367 010636  000240                  10$:     NOP                     ;**
2368
2369
```

```
                                        ;;*****************************************************************
                                        ;*TEST 33       TEST THAT RCVR INTERRUPTS ONLY WHEN ENABLED
                                        ;;*****************************************************************
      010640  000004                    TST33:  SCOPE
2374  010642  042777  000100  171770            BIC     #BIT6,@TCSR     ;DISABLE TRANSMIT INTERRUPTS
2375  010650  042777  000100  171756            BIC     #BIT6,@RCSR     ;DISABLE RECEIVER INTERRUPTS
2376  010656  052777  000004  171754            BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2377  010664  005000                            CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
      010666  012701  000002                    MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                        ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                        ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
      010672  105777  171736            42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
      010676  100405                            BMI     43$             ;**
      010700  005300                            DEC     R0              ;**
      010702  001373                            BNE     42$             ;**
      010704  005301                            DEC     R1              ;**
      010706  001371                            BNE     42$             ;**
      010710  000402                            BR      .+6             ;**
      010712  005777  171720            43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2378  010716  017703  171722                    MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
2379  010722  012777  010760  171714            MOV     #2$,@RVECT      ;POINT RCV VECTOR TO ERROR REPORT
2380  010730  004767  003604                    JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2381  010734  000140                                    .WORD   140
2382  010736  005077  171700                    CLR     @TBUF           ;SEND A CHARACTER
2383  010742  105777  171666            1$:     TSTB    @RCSR           ;WAIT FOR RECEIVER DONE
2384  010746  100375                            BPL     1$
2385  010750  042777  000004  171702            BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2386  010756  000405                            BR      3$              ;CONTINUE TEST
2387
2388  010760                            2$:
2389  010760  042777  000004  171672            BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2390  010766  022626                            CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2391  010770  104071                            ERROR+71
2392                                                                    ;RECEIVER INTERRPUTS WITH INT. ENABLE CLEAR
2393
2394  010772  012777  011026  171644    3$:     MOV     #4$,@RVECT      ;POINT RCV VECTOR TO END OF TEST
2395  011000  052777  000100  171626            BIS     #BIT6,@RCSR     ;ENABLE RCV INTERRUPTS
2396  011006  000240                            NOP                     ;** GIVE ANY INTERRUPTS TIME
2397  011010  000240                            NOP                     ;** GIVE ANY INTERRUPTS TIME
2398  011012  000240                            NOP                     ;** GIVE ANY INTERRUPTS TIME
2399  011014  000240                            NOP                     ;** GIVE ANY INTERRUPTS TIME
2400  011016  042777  000004  171634            BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2401  011024  104072                            ERROR+72
2402                                                                    ;RCVR DID NOT INTERRUPT
2403
2404  011026  042777  000100  171600    4$:     BIC     #BIT6,@RCSR     ;DISABLE INTERRUPTS
2405  011034  042777  000004  171616            BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
```

```
2406 011042  022626                    CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2407 011044  010377  171574            MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
```

```
                                ;;*****************************************************************
                                ;*TEST 34       TEST THAT RCVR INTERRUPTS DO NOT OCCUR WHEN DISABLED
                                ;;*****************************************************************
011050  000004                  TST34:  SCOPE
2412 011052  000005                     RESET                   ;CLEAR EVERYTHING
2413 011054  004767  003460             JSR     PC,@#PSW        ;SET PSW TO PRIORITY 7
2414 011060  000340                     .WORD   340
2415 011062  017703  171556             MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
2416 011066  012777  011174  171550     MOV     #2$,@RVECT      ;POINT RCVR VECTOR TO ERROR REPORT
2417 011074  052777  000004  171536     BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2418 011102  005000                     CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
011104  012701  000002                  MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
011110  105777  171520          42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
011114  100405                          BMI     43$             ;**
011116  005300                          DEC     R0              ;**
011120  001373                          BNE     42$             ;**
011122  005301                          DEC     R1              ;**
011124  001371                          BNE     42$             ;**
011126  000402                          BR      .+6             ;**
011130  005777  171502          43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2419 011134  105777  167710          6$:     TSTB    @$TPS           ;TEST FOR XMIT READY
2420 011140  100375                      BPL     6$              ;LOOP IF NOT
2421 011142  005077  171474              CLR     @TBUF           ;SEND A CHARACTER
2422 011146  105777  171462          1$:     TSTB    @RCSR           ;WAIT FOR RECEIVER DONE
2423 011152  100375                      BPL     1$
2424 011154  052777  000100  171452      BIS     #BIT6,@RCSR     ;ENABLE INTERRUPTS
2425 011162  000240                      NOP                     ;** GIVE TIME FOR INTERRUPT
2426 011164  000240                      NOP                     ;** GIVE TIME FOR INTERRUPT
2427 011166  000240                      NOP                     ;** GIVE TIME FOR INTERRUPT
2428 011170  000240                      NOP                     ;** GIVE TIME FOR INTERRUPT
2429 011172  000405                      BR      3$              ;CONTINUE TEST
2430 011174                      2$:
2431 011174  042777  000004  171456      BIC     #BIT2,@TCSR     ;** DISABLE MAINTENANCE MODE FOR
                                                                ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                ;** WITH TERMINAL.
2432 011202  022626                      CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2433 011204  104073                  ERROR+73
2434                                                            ;RCVR INTERRUPTS AT PRIORITY 7
2435
2436 011206  042777  000100  171420  3$:     BIC     #BIT6,@RCSR     ;CLEAR INTERRUPT ENABLE
2437 011214  012777  011244  171422          MOV     #4$,@RVECT      ;POINT RCVR VECTOR TO ERROR REPORT
2438 011222  004767  003312              JSR     PC,@#PSW        ;SET PSW TO PRIORITY 3
2439 011226  000140                      .WORD   140
2440 011230  000240                      NOP                     ;GIVE TIME FOR ANY INTERRUPT
2441 011232  000240                      NOP                     ;GIVE TIME FOR ANY INTERRUPT
2442 011234  042777  000004  171416      BIC     #BIT2,@TCSR     ;** DISABLE MAINTENANCE MODE FOR
                                                                ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                ;** WITH TERMINAL.
2443 011242  000405                      BR      5$              ;BR TO END OF TEST, IF NO INTERRUPT
2444
2445 011244                      4$:
2446 011244  042777  000004  171406      BIC     #BIT2,@TCSR     ;** DISABLE MAINTENANCE MODE FOR
                                                                ;** CONSOLE TO ALLOW FOR COMMUNICATION
```

```
                                                        ;** WITH TERMINAL.
2447 011252  022626                    CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2448 011254  104074                    ERROR+74
2449                                                    ;RCVR INTERRUPT REQUEST PASSED WITH BIT6 CLEAR
2450 011256  010377  171362    5$:     MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
```

```
2452
2453
2454                                    ;;*****************************************************************
                                        ;*TEST 35        TEST RECEIVER FOR DOUBLE INTERRUPTS
                                        ;;*****************************************************************
     011262  0000C4                     TST35:  SCOPE
2455 011264  000005                             RESET                   ;CLEAR EVERYTHING
2456 011266  017703  171352                     MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
2457 011272  017704  171350                     MOV     @RPSW,R4        ;SAVE RECEIVE PSW VECTOR
2458 011276  012777  011420  171340             MOV     #2$,@RVECT      ;POINT RCV VECTOR TO CONTINUE TEST
2459 011304  012777  000340  171334             MOV     #340,@RPSW      ;SET PRIORITY TO 7 AFTER INTERRUPT
2460 011312  004767  003222                     JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2461 011316  000140                             .WORD   140
2462 011320  052777  000004  171312             BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2463 011326  005000                             CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     011330  012701  000002                     MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                         ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                         ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
     011334  105777  171274             42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
     011340  100405                             BMI     43$             ;**
     011342  005300                             DEC     R0              ;**
     011344  001373                             BNE     42$             ;**
     011346  005301                             DEC     R1              ;**
     011350  001371                             BNE     42$             ;**
     011352  000402                             BR      .+6             ;**
     011354  005777  171256             43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2464 011360  005077  171256                     CLR     @TBUF           ;SEND A CHARACTER
2465 011364  105777  171244             1$:     TSTB    @RCSR           ;WAIT FOR RCVR DONE
2466 011370  100375                             BPL     1$
2467 011372  042777  000004  171260             BIC     #BIT2,@TCSR     ;** DISABLE MAINTENANCE MODE FOR
                                                                         ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                         ;** WITH TERMINAL.
2468 011400  052777  000100  171226             BIS     #BIT6,@RCSR     ;ENABLE RCV INTERRUPTS
2469 011406  000240                             NOP                     ;** GIVE SOME TIME
2470 011410  000240                             NOP                     ;** GIVE SOME TIME
2471 011412  000240                             NOP                     ;** GIVE SOME TIME
2472 011414  000240                             NOP                     ;** GIVE SOME TIME
2473
2474 011416  104075                             ERROR+75
2475                                                                     ;RCVR INTERRUPT DID NOT OCCUR
2476
2477 011420  022626                     2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2478 011422  012777  011466  171214             MOV     #3$,@RVECT      ;POINT RCV VECTOR TO ERROR REPORT
2479 011430  004767  003104                     JSR     PC,WRPSW        ;RESET PSW TO PRIORITY 3
2480 011434  000140                             .WORD   140
2481 011436  000240                             NOP                     ;** GIVE SOME TIME
2482 011440  000240                             NOP                     ;** GIVE SOME TIME
2483 011442  000240                             NOP                     ;** GIVE SOME TIME
2484 011444  000240                             NOP                     ;** GIVE SOME TIME
2485 011446  042777  000100  171160             BIC     #BIT6,@RCSR     ;CLEAR INTERRUPT ENABLE
2486 011454  010377  171164                     MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
2487 011460  010477  171162                     MOV     R4,@RPSW        ;RESTORE RECEIVE PSW VECTOR
2488 011464  000402                             BR      4$              ;BR TO END OF TEST
2489
2490 011466  022626                     3$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2491 011470  104076                             ERROR+76
2492                                                                     ;RECEIVER RE-INTERRUPTED
```

```
2493 011472  010377  171146          4$:     MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
```

```
2495
2496
2497                                    ;;*****************************************************************
                                        ;*TEST 36       TEST THAT RCVR INTERRUPT CLEARS BY READING RBUF
                                        ;;*****************************************************************
                                        ;
011476  000004                          TST36:  SCOPE
2498 011500  000005                             RESET                   ;CLEAR EVERYTHING
2499 011502  004767  003032                     JSR     PC,WRPSW        ;SET PSW PRIORITY TO 7
2500 011506  000340                             .WORD   340
2501 011510  017703  171130                     MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
2502 011514  012777  011642  171122             MOV     #2$,@RVECT      ;POINT RCV VECTOR TO ERROR REPORT
2503 011522  052777  000100  171104             BIS     #BIT6,@RCSR     ;SET RCVR INTERRUPT ENABLE
2504 011530  052777  000004  171102             BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2505 011536  005000                             CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
011540  012701  000002                          MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                        ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                        ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
011544  105777  171064          42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
011550  100405                          BMI     43$             ;**
011552  005300                          DEC     R0              ;**
011554  001373                          BNE     42$             ;**
011556  005301                          DEC     R1              ;**
011560  001371                          BNE     42$             ;**
011562  000402                          BR      .+6             ;**
011564  005777  171046          43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2506 011570  005077  171046             CLR     @TBUF           ;SEND A CHARACTER
2507 011574  105777  171034          1$:     TSTB    @RCSR           ;WAIT FOR DONE (INTERRUPT)
2508 011600  100375                          BPL     1$
2509 011602  042777  000004  171050          BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                        ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                        ;** WITH TERMINAL.
2510 011610  005077  171022                  CLR     @RBUF           ;READ RBUF TO CLEAR PENDING INTERRPUT
2511 011614  004767  002720                  JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2512 011620  000140                          .WORD   140
2513 011622  000240                          NOP                     ;** ALLOW TIME FOR ANY ERRONEOUS INTERRUPT
2514 011624  000240                          NOP                     ;** ALLOW TIME FOR ANY ERRONEOUS INTERRUPT
2515 011626  000240                          NOP                     ;** ALLOW TIME FOR ANY ERRONEOUS INTERRUPT
2516 011630  000240                          NOP                     ;** ALLOW TIME FOR ANY ERRONEOUS INTERRUPT
2517 011632  042777  000100  170774          BIC     #BIT6,@RCSR     ;NO INTERRUPT-CLEAR INT. ENABLE
2518 011640  000402                          BR      3$
2519
2520 011642  022626                  2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2521 011644  104077                          ERROR+77                ;READING RBUF DID NOT CLEAR INTERRUPT
2522
2523 011646  010377  170772          3$:     MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
2524
```

```
                                ;;*****************************************************************
                                ;*TEST 37       TEST THAT RESET CLEARS RECEIVE INTERRUPT
                                ;;*****************************************************************
011652  000004                  TST37:  SCOPE
2529 011654  000005                     RESET                   ;CLEAR EVERYTHING
2530 011656  004767  002656              JSR     PC,WRPSW        ;SET PSW TO PRIORITY 7
2531 011662  000340                      .WORD   340
2532 011664  017703  170754              MOV     @RVECT,R3       ;SAVE RECEIVE VECTOR
2533 011670  012777  012010  170746      MOV     #2$,@RVECT      ;POINT RCV VECTOR TO ERROR REPORT
2534 011676  052777  000100  170730      BIS     #BIT6,@RCSR     ;SET RCV INTERRUPT ENABLE
2535 011704  052777  000004  170726      BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2536 011712  005000                      CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
011714  012701  000002                   MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                 ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                 ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
011720  105777  170710          42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
011724  100405                          BMI     43$             ;**
011726  005300                          DEC     R0              ;**
011730  001373                          BNE     42$             ;**
011732  005301                          DEC     R1              ;**
011734  001371                          BNE     42$             ;**
011736  000402                          BR      .+6             ;**
011740  005777  170672          43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2537 011744  012777  000377  170670      MOV     #377,@TBUF      ;SEND AN ALL 1'S CHARACTER
2538 011752  105777  170656          1$:     TSTB    @RCSR           ;WAIT FOR RCV DONE
2539 011756  100375                          BPL     1$
2540 011760  000005                      RESET                   ;CLEAR RCV INTERRUPT & RBUF
2541 011762  004767  002552              JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2542 011766  000140                      .WORD   140
2543 011770  000240                      NOP                     ;** ALLOW TIME FOR AN ERRONEOUS INTERRUPT
2544 011772  000240                      NOP                     ;** ALLOW TIME FOR AN ERRONEOUS INTERRUPT
2545 011774  000240                      NOP                     ;** ALLOW TIME FOR AN ERRONEOUS INTERRUPT
2546 011776  000240                      NOP                     ;** ALLOW TIME FOR AN ERRONEOUS INTERRUPT
2547 012000  042777  000100  170626      BIC     #BIT6,@RCSR     ;NO INTERRUPT-CLEAR INT. ENABLE
2548 012006  000402                      BR      3$              ;CONTINUE TEST
2549
2550
2551 012010  022626                  2$:     CMP     (SP)+,(SP)+     ;RESTORE SP AFTER INTERRUPT
2552 012012  104100                      ERROR+100               ;RESET DID NOT CLEAR RCVR INTERRUPT
2553
2554 012014  010377  170624          3$:     MOV     R3,@RVECT       ;RESTORE RECEIVE VECTOR
```

```
                                        ;;*****************************************************************
                                        ;*TEST 40       TEST THAT THE 'OR' ERROR & 'ERROR' CAN BE SET
                                        ;;*****************************************************************
012020  000004                  TST40:  SCOPE
2559 012022  032777  002000  167010        BIT     #BIT10,@SWR     ;IS THIS TEST ENABLED
2560 012030  001471                        BEQ     TST41           ;IF NOT ENABLED, BR TO NEXT TEST
2561 012032  032767  000001  170742        BIT     #BIT0,FLAG44    ;** IS THIS A 11/44
2562 012040  001407                        BEQ     9$              ;** NO
2563 012042  005767  170556                TST     CTSTFL          ;** YES THIS IS 11/44. IS THIS THE CONSOLE
2564                                                                ;** SLU
2565 012046  001404                        BEQ     9$              ;** NO
2566 012050  032777  000010  166762        BIT     #BIT03,@SWR     ;** THIS IS THE CONSOLE SLU.SHOULD THE OVERRUN
2567                                                                ;** ERROR TEST BE PERFORMED
2568 012056  001456                        BEQ     TST41           ;** NO
2569 012060  000005                9$:     RESET                   ;CLEAR EVERYTHING
2570 012062  052777  000004  170550        BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2571 012070  005000                        CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
012072  012701  000002                    MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
012076  105777  170532            42$:  TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
012102  100405                        BMI     43$             ;**
012104  005300                        DEC     R0              ;**
012106  001373                        BNE     42$             ;**
012110  005301                        DEC     R1              ;**
012112  001371                        BNE     42$             ;**
012114  000402                        BR      .+6             ;**
012116  005777  170514            43$:  TST     @RBUF           ;** READ TO CLEAR DONE
2572 012122  012700  000003                MOV     #3,R0           ;SET CHARACTER COUNT TO SEND 3 CHAR.
2573 012126  005077  170510            1$:   CLR     @TBUF           ;LOAD TRANSMIT BUFFER
2574 012132  105777  170502            2$:   TSTB    @TCSR           ;WAIT FOR TRANSMIT DONE
2575 012136  100375                        BPL     2$
2576 012140  005300                        DEC     R0              ;DECREMENT CHARACTER COUNT
2577 012142  001371                        BNE     1$              ;BR IF ALL CHARACTERS NOT TRANSMITTED
2578 012144  042777  000004  170506        BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                ;** WITH TERMINAL.
2579 012152  032777  040000  170456        BIT     #BIT14,@RBUF    ;TEST FOR 'OR' ERROR FLAG
2580 012160  001001                        BNE     3$              ;BR, IF SET
2581 012162  104101                        ERROR+101
2582                                                                ;'OR' ERROR FLAG DID NOT SET
2583
2584 012164  032777  100000  170444  3$:   BIT     #BIT15,@RBUF    ;TEST 'ERROR' FLAG
2585 012172  001001                        BNE     4$              ;BR, IF SET
2586 012174  104102                        ERROR+102
2587                                                                ;'ERROR' FLAG DID NOT SET WITH 'OR' FLAG
2588 012176                        4$:
2589 012176  005000                        CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
012200  012701  000002                    MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
012204  005300                    40$:  DEC     R0              ;** TRANSMITTED TO FINISH BEFORE MAINTENANCE
012206  001376                        BNE     40$             ;** WRAP FOR THE UART UNDER TEST IS DISABLED.
012210  005301                        DEC     R1              ;** THIS WILL INHIBIT ANY COMMUNICATION
012212  001374                        BNE     40$             ;** TO HARDWARE MEDIA SUCH AS TU58 THAT MIGHT
                                                                ;** BE ATTACHED TO UART UNDER TEST.
```

```
2591
2592
2593                                    ;;*****************************************************************
                                        ;*TEST 41        TEST THAT BREAK TRANSMITS ALL ZEROES
                                        ;;*****************************************************************
     012214  000004                     TST41:  SCOPE
2594 012216  032777  000400  166614             BIT     #BIT8,@SWR      ;IS BREAK FUNCTION TEST ENABLED?
2595 012224  001505                             BEQ     TST42           ;BR TO NEXT TEST, IF NOT ENABLED
2596 012226  032767  000001  170546             BIT     #BIT0,FLAG44    ;** IS THIS A 11/44
2597 012234  001407                             BEQ     9$              ;** NO
2598 012236  005767  170362                     TST     CTSTFL          ;** YES THIS IS 11/44. IS THIS THE CONSOLE
2599                                                                     ;** SLU
2600 012242  001404                             BEQ     9$              ;** NO
2601 012244  032777  000010  166566             BIT     #BIT03,@SWR     ;** THIS IS THE CONSOLE SLU.SHOULD THE BREAK
2602                                                                     ;** TEST BE PERFORMED
2603 012252  001472                             BEQ     TST42           ;** NO
2604 012254  000005                     9$:     RESET                   ;CLEAR EVERYTHING
2605 012256  052777  000004  170354             BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2606 012264  005000                             CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     012266  012701  000002                     MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                         ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                         ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
     012272  105777  170336             42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
     012276  100405                             BMI     43$             ;**
     012300  005300                             DEC     R0              ;**
     012302  001373                             BNE     42$             ;**
     012304  005301                             DEC     R1              ;**
     012306  001371                             BNE     42$             ;**
     012310  000402                             BR      .+6             ;**
     012312  005777  170320             43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2607 012316  012777  177777  170316             MOV     #-1,@TBUF       ;TRANSMIT ALL ONES TO RCVR
2608 012324  105777  170304             1$:     TSTB    @RCSR           ;WAIT FOR RCVR DONE
2609 012330  100375                             BPL     1$
2610 012332  005077  170300                     CLR     @RBUF           ;CLEAR DONE (LEAVING ALL ONES IN RBUF)
2611 012336  052777  000001  170274             BIS     #BIT0,@TCSR     ;TRANSMIT BREAK
2612 012344  005000                             CLR     R0              ;CLEAR A TIMER
2613 012346  117767  170262  166452  2$:       MOVB    @RCSR,$BDDAT    ;WAIT FOR RCVR DONE
2614 012354  100411                             BMI     CONT41          ;BR IF DONE
2615 012356  005200                             INC     R0              ;IF NOT, INCREMENT TIMER
2616 012360  001372                             BNE     2$              ;BR IF TIME REMAINS
2617
2618 012362  042777  000001  170250             BIC     #BIT0,@TCSR       ;CLEAR BREAK  BIT
2619 012370  042777  000004  170262             BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                         ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                         ;** WITH TERMINAL.
2620 012376  104103                             ERROR+103               ;BREAK DID NOT TRANSMIT ANYTHING
2621
2622 012400  105777  170232             CONT41: TSTB    @RBUF           ;CHECK RECEIVE BUFFER FOR ZERO
2623 012404  001407                             BEQ     3$              ;BR, IF ZERO
2624 012406  042777  000001  170224             BIC     #BIT0,@TCSR       ;CLEAR  BREAK BIT
2625 012414  042777  000004  170236             BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                         ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                         ;** WITH TERMINAL.
2626
2627 012422  104103                             ERROR+103               ;BREAK DID NOT TRANSMIT ALL ZEROES
2628
2629 012424  042777  000001  170206  3$:       BIC     #BIT0,@TCSR     ;CLEAR  BREAK BIT
```

```
 2630 012432  042777  000004  170220          BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                       ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                       ;** WITH TERMINAL.
```

```
                                ;;*****************************************************************
                                ;*TEST 42       TEST THAT 'FR' ERROR CAN BE SET DURING BREAK
                                ;;*****************************************************************
      012440  000004            TST42:  SCOPE
2635  012442  032777  002000  166370        BIT     #BIT10,@SWR     ;IS THE 'TEST ERROR FLAGS' BIT SET
2636  012450  001470                        BEQ     TST43           ;BR TO NEXT TEST, IF NOT SET
2637  012452  032777  000400  166360        BIT     #BIT8,@SWR      ;IS BREAK FUNCTION ENABLED
2638  012460  001464                        BEQ     TST43           ;BR TO NEXT TEST, IF NOT SET
2639  012462  032767  000001  170312        BIT     #BIT0,FLAG44    ;** IS THIS A 11/44
2640  012470  001407                        BEQ     9$              ;** NO
2641  012472  005767  170126                TST     CTSTFL          ;** YES THIS IS 11/44. IS THIS THE CONSOLE
2642                                                                  ;** SLU
2643  012476  001404                        BEQ     9$              ;** NO
2644  012500  032777  000010  166332        BIT     #BIT03,@SWR     ;** THIS IS THE CONSOLE SLU.SHOULD THE FRAME
2645                                                                  ;** ERROR TEST BE PERFORMED
2646  012506  001451                        BEQ     TST43           ;** NO
2647  012510  000005                9$:     RESET                   ;CLEAR EVERYTHING
2648  012512  052777  000004  170120        BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2649  012520  005000                        CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
      012522  012701  000002                MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                    ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                    ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
      012526  105777  170102        42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
      012532  100405                        BMI     43$             ;**
      012534  005300                        DEC     R0              ;**
      012536  001373                        BNE     42$             ;**
      012540  005301                        DEC     R1              ;**
      012542  001371                        BNE     42$             ;**
      012544  000402                        BR      .+6             ;**
      012546  005777  170064        43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2650  012552  052777  000001  170060        BIS     #BIT0,@TCSR     ;SEND BREAK
2651  012560  005077  170056                CLR     @TBUF           ;TRANSMIT A CHARACTER TO TIME BREAK
2652  012564  105777  170044        1$:     TSTB    @RCSR           ;WAIT FOR RCVR DONE
2653  012570  100375                        BPL     1$
2654  012572  042777  000001  170040        BIC     #BIT0,@TCSR     ;CLEAR  BREAK BIT
2655  012600  042777  000004  170052        BIC     #BIT2,@CTCSR    ;** DISABLE MAINTENANCE MODE FOR
                                                                    ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                    ;** WITH TERMINAL.
2656  012606  032777  020000  170022        BIT     #BIT13,@F  JF   ;CHECK FOR FRAMING ERROR FLAG
2657  012614  001001                        BNE     2$              ;BR, IF SET
2658
2659  012616  104104                        ERROR+104
2660                                                                ;BREAK DID NOT SET FRAMING ERROR
2661  012620  032777  100000  170010  2$:     BIT     #BIT15,@RBUF    ;TEST 'ERROR' FLAG
2662  012626  001001                        BNE     3$              ;BR, IF SET
2663
2664  012630  104114                        ERROR+114
2665                                                                ;'ERROR' FLAG DID NOT SET WITH 'OR' F AG
2666  012632                        3$:
```

```
                                ;;*****************************************************************
                                ;*TEST 43       TEST DATA PATH FROM XMIT TO REC USING MAINT WRAP
                                ;*****************************************************************
012632  000004                TST43.  SCOPE
2671
2672 012634  000005                    RESET                       ;CLEAR EVERYTHING
2673 012636  052777  000004  167774    BIS     #BIT2,@TCSR         ;SET MAINTENANCE WRAP
2674                                                                ;TRANSMIT A BINARY COUNT PATTERN - UP
2675                                                                ;TO THE BIT POSITION INDICATED BY THE
2676                                                                ;CONTENTS OF LOCATION '$USWR'
2677 012644  005000                    CLR     R0                  ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
     012646  012701  000002            MOV     #2,R1               ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                    ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                    ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
     012652  105777  167756    42$:    TSTB    @RCSR               ;** CHECK FOR RECEIVER DONE
     012656  100405                    BMI     43$                 ;**
     012660  005300                    DEC     R0                  ;**
     012662  001373                    BNE     42$                 ;**
     012664  005301                    DEC     R1                  ;**
     012666  001371                    BNE     42$                 ;**
     012670  000402                    BR      .+6                 ;**
     012672  005777  167740    43$:    TST     @RBUF               ;** READ TO CLEAR DONE
2678 012676  005001                    CLR     R1                  ;CLEAR REGISTER FOR TEST DATA
2679 012700  105201            1$:     INCB    R1                  ;INCREMENT THE TEST DATA
2680 012702  032767  000001  170072    BIT     #BIT0,FLAG44        ;** 11/44 CPU
2681 012710  001406                    BEQ     5$                  ;** TEST ALL DATA
2682 012712  122701  000020            CMPB    #20,R1              ;** CHECK  FOR CONT-P IN TEST DATA
2683 012716  001770                    BEQ     1$                  ;** DO NOT XMIT ^P
2684 012720  122701  000220            CMPB    #220,R1             ;**
2685 012724  001765                    BEQ     1$                  ;** DO NOT XMIT 220
2686 012726  010177  167710    5$:     MOV     R1,@TBUF            ;XMIT A CHARACTER
2687 012732  105777  167676    2$:     TSTB    @RCSR               ;WAIT FOR RECEIVER DONE
2688 012736  100375                    BPL     2$
2689 012740  017702  167672            MOV     @RBUF,R2            ;GET RECEIVED CHARACTER
2690 012744  043701  001112            BIC     @#$USWR,R1          ;CLEAR LOWEST UNUSED DATA BIT POSITITON IN TEST DATA
2691 012750  020102                    CMP     R1,R2               ;COMPARE DATA
2692 012752  001003                    BNE     3$                  ;BR, IF NON-COMPARE
2693 012754  105701                    TSTB    R1                  ;TEST XMIT DATA FOR ZERO
2694 012756  001411                    BEQ     4$                  ;BR, IF FINISHED
2695 012760  000747                    BR      1$                  ;CONTINUE IF NOT
2696 012762  010167  166036    3$:     MOV     R1,$GDDAT           ;STORE THE EXPECTED DATA
2697 012766  010267  166034            MOV     R2,$BDDAT           ;STORE RECEIVED DATA
2698 012772  042777  000004  167660    BIC     #BIT2,@CTCSR        ;** DISABLE MAINTENANCE MODE FOR
                                                                    ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                    ;** WITH TERMINAL.
2699 013000  104105                    ERROR+105                   ;DATA COMPARE DATA
2700
2701 013002                    4$:
2702 013002  042777  000004  167650    BIC     #BIT2,@CTCSR        ;** DISABLE MAINTENANCE MODE FOR
                                                                    ;** CONSOLE TO ALLOW FOR COMMUNICATION
                                                                    ;** WITH TERMINAL.
2703
2704
2705
2706                            ;;*****************************************************************
```

```
                                        ;*TEST 44       TEST DATA PATHS USING WRAP CABLE
                                        ;;*****************************************************************
     013010  000004                     TST44:  SCOPE
2707 013012  032777  000200  166020             BIT     #BIT7,@SWR      ;IS THIS TEST ENABLED
2708 013020  001444                             BEQ     TST45           ;BR, IF NOT
2709 013022  000005                             RESET                   ;CLEAR EVERYTHING
2710 013024  005001                             C_R     R1              ;CLEAR REGISTER FOR TEST DATA
2711                                                                     ;TRANSMIT A BINARY COUNT PATTERN - UP
2712                                                                     ;TO THE BIT POSITION INDICATED BY THE
2713                                                                     ;CONTENTS OF LOCATION '$USWR''
2714 013026  105201                     1$:     INCB    R1              ;INCREMENT THE TEST DATA
2715 013030  032767  000001  167744             BIT     #BIT0,FLAG44    ;11/44 CPU
2716 013036  001406                             BEQ     5$              ;TEST ALL DATA
2717 013040  122701  000020                     CMPB    #20,R1          ;CHECK TEST DATA FOR ^P
2718 013044  001770                             BEQ     1$              ;DO NOT XMIT ^P
2719 013046  122701  000220                     CMPB    #220,R1
2720 013052  001765                             BEQ     1$
2721 013054  010177  167562             5$:     MOV     R1,@TBUF        ;XMIT A CHARACTER
2722 013060  005000                             CLR     R0              ;CLEAR A TIMER
2723 013062  105777  167546             2$:     TSTB    @RCSR           ;WAIT FOR RECEIVER DONE
2724 013066  100403                             BMI     3$              ;BR IF DONE
2725 013070  005200                             INC     R0              ;INCREMENT TIMER IF NOT
2726 013072  001373                             BNE     2$              ;BR IF TIME REMAINS
2727
2728 013074  104064                             ERROR+64                ;RECEIVER DONE NOT SET
2729
2730 013076  017702  167534             3$:     MOV     @RBUF,R2        ;GET RECEIVED CHARACTER
2731 013102  043701  001112                     BIC     @#$USWR,R1      ;CLEAR LOWEST UNUSED DATA BIT POSITITON IN TEST DATA
2732 013106  020102                             CMP     R1,R2           ;COMPARE DATA
2733 013110  001003                             BNE     4$              ;BR, IF NON-COMPARE
2734 013112  105701                             TSTB    R1              ;TEST XMIT DATA FOR ZERO
2735 013114  001406                             BEQ     TST45           ;BR, IF FINISHED
2736 013116  000743                             BR      1$              ;CONTINUE IF NOT
2737 013120  010167  165700             4$:     MOV     R1,$GDDAT       ;STORE EXPECTED DATA
2738 013124  010267  165676                     MOV     R2,$BDDAT       ;STORE RECEIVED DATA
2739
2740 013130  104106                             ERROR+106               ;DATA COMPARE ERROR WITH WRAP CABLE
```

```
                                ;;*****************************************************************
                                ;*TEST 45        TEST DL11-W LOGIC BY EXERCISING THE XMIT,REC, & CLOCK
                                ;;*****************************************************************
013132  000004                  TST45:  SCOPE
2745 013134  000005                     RESET                   ;CLEAR EVERYTHING
2746 013136  004767  001376              JSR     PC,WRPSW        ;SET PRIORITY TO 7
2747 013142  000340              .WORD   340
2748 013144  017703  167500              MOV     @TVECT,R3       ;SAVE XMIT VECTOR
2749 013150  017704  167470              MOV     @RVECT,R4       ;SAVE RECEIVE VECTOR
2750 013154  017705  167516              MOV     @RTCVT,R5       ;SAVE CLOCK VECTOR
2751 013160  017767  167466  167260      MOV     @TPSW,STPSW     ;SAVE XMIT PSW VECTOR
2752 013166  017767  167454  167254      MOV     @RPSW,SRPSW     ;SAVE RECEIVE PSW VECTOR
2753 013174  017767  167500  167250      MOV     @RTCPSW,SCPSW   ;SAVE CLOCK PSW VECTOR
2754 013202  012777  013614  167440      MOV     #XMIT,@TVECT    ;POINT TRANSMIT VECTOR TO TRANSMIT ROUTINE
2755 013210  012777  000200  167434      MOV     #200,@TPSW      ;NO MULTIPLE INTERUPTS ALLOWED
2756 013216  012777  013666  167420      MOV     #RCV,@RVECT     ;POINT RECEIVE VECTOR TO RECEIVE ROUTINE
2757 013224  012777  000200  167414      MOV     #200,@RPSW      ;NO MULT INTERUPTS
2758 013232  005767  167366              TST     CTSTFL          ;IS CONSOLE UNDER TEST?
2759 013236  001415                      BEQ     1$              ;IF NOT SKIP CLOCK SET UP
2760 013240  032777  000100  165572      BIT     #BIT6,@SWR      ;IF YES, ARE CLOCK TEST DISABLED?
2761 013246  001011                      BNE     1$              ;IF YES, SKIP CLOCK SET UP
2762 013250  012777  013702  167420      MOV     #CLK,@RTCVT     ;POINT VECTOR TO CLOCK INTERRUPT ROUTINE
2763 013256  012777  000300  167414      MOV     #300,@RTCPSW    ;NO MULT INTERUPTS
2764 013264  052777  000100  167402      BIS     #BIT6,@LKS      ;ENABLE CLOCK INTERRUPTS
2765 013272  052777  000004  167340  1$: BIS     #BIT2,@TCSR     ;SET MAINTENANCE WRAP
2766 013300  005000                      CLR     R0              ;** DELAY ENOUGH TIME TO ALLOW ANY CHARACTERS
013302  012701  000002                  MOV     #2,R1           ;** THAT MIGHT BE IN THE PROCESS OF BEING
                                                                 ;** RECEIVED TO FINISH AFTER MAINTENANCE
                                                                 ;** WRAP FOR THE UART UNDER TEST IS ENABLED.
013306  105777  167322          42$:    TSTB    @RCSR           ;** CHECK FOR RECEIVER DONE
013312  100405                          BMI     43$             ;**
013314  005300                          DEC     R0              ;**
013316  001373                          BNE     42$             ;**
013320  005301                          DEC     R1              ;**
013322  001371                          BNE     42$             ;**
013324  000402                          BR      .+6             ;**
013326  005777  167304          43$:    TST     @RBUF           ;** READ TO CLEAR DONE
2767 013332  052777  000100  167300      BIS     #BIT6,@TCSR     ;ENABLE TRANSMIT INTERRUPTS
2768 013340  052777  000100  167266      BIS     #BIT6,@RCSR     ;ENABLE RECEIVE INTERRUPTS
2769 013346  005067  167070              CLR     XMTCNT          ;CLEAR XMIT INTERRUPT COUNTER
2770 013352  005067  167062              CLR     RCVCNT          ;CLEAR RCV INTERRUPT COUNTER
2771 013356  005001                      CLR     R1              ;CLEAR A REGISTER FOR TEST DATA USE
2772 013360  005000                      CLR     R0              ;CLEAR TIMER
2773 013362  012702  002454              MOV     #BUF,R2         ;POINT R2 TO RECEIVE DATA STORAGE
2774 013366  005077  167250              CLR     @TBUF           ;SEND FIRST CHARACTER
2775 013372  004767  001142              JSR     PC,WRPSW        ;SET PSW TO PRIORITY 3
2776 013376  000140                      .WORD   140
2777                                                             ;WAIT FOR INTERRUPTS
2778 013400  000240          2$:     NOP                         ;STALL
2779 013402  000240                  NOP                         ;STALL
2780 013404  062700  000000              ADD     #0,R0           ;ADD INSTRUCTIONS ARE USED TO LENGTHEN LOOP TIME
2781 013410  062700  000001              ADD     #1,R0           ;  TO COVER THE SLOWEST BAUD RATE ON THE FASTEST CPU
2782 013414  001371                      BNE     2$
2783 013416  032777  000100  167214      BIT     #BIT6,@TCSR     ;FINISHED ENTIRE TRANSMISSION
2784 013424  001402                      BEQ     3$              ;BR, IF INTERRPUTS ARE DISABLED (FINISHED)
```

```
2785 013426  000005                          RESET                    ;CLEAR EVERYTHING
2786
2787 013430  104107                          ERROR+107                ;TRANSMIT INTERRUPT TIMEOUT IN MAIN. DATA TEST
2788
2789 013432  026767  167004  167000  3$:     CMP      XMTCNT,RCVCNT   ;COMPARE THE NUMBER OF INTERRUPTS
2790 013440  001402                          BEQ      4$              ;BR, IF EQUAL
2791 013442  000005                          RESET                    ;CLEAR EVERYTHING
2792
2793 013444  104110                          ERROR+110                ;RECEIVER DID NOT GET FULL TRANSMISSION
2794                                                                   ;   IF RCVCNT=0, NO DATA RECEIVED
2795                                                                   ;   IF RCVCNT=?, THEN (XMTCNT-RCVCNT)
2796                                                                   ;   EQUALS THE NO. OF INTERRUPTS LOST.
2797
```

```
2799
2800
2801 013446  005767  167152          4$:     TST     CTSTFL          ;IS CONCOLE UNDER TEST?
2802 013452  001410                          BEQ     5$              ;IF NOT, SKIP CLOCK COUNT CHECK
2803 013454  032777  000100  165356          BIT     #BIT6,@SWR      ;IF YES, ARE CLOCK TESTS DISABLED?
2804 013462  001004                          BNE     5$              ;IF YES, SKIP CLOCK COUNT CHECK
2805 013464  005767  166754                  TST     CLKCNT          ;CHECK FOR AT LESST ONE CLOCK INTERRUPT
2806 013470  001001                          BNE     5$              ;BR IF INTERRUPTS OCCURRED
2807
2808 013472  104113                          ERROR+113               ;NO CLOCK INTERRUPTS IN EXERCISER
2809
2810 013474  000005                  5$:     RESET                   ;CLEAR EVERYTHING
2811 013476  012700  002454                  MOV     #BUF,R0         ;LOAD RECEIVED DATA POINTER TO R0
2812 013502  005001                          CLR     R1              ;SET UP REGISTER FOR COMPARISON
2813 013504  022001                  COMP:   CMP     (R0)+,R1        ;COMPARE XMIT & RCV DATA
2814 013506  001014                          BNE     6$              ;BR, IF NOT EQUAL
2815 013510  105201                  9$:     INCB    R1              ;INCREMENT COMPARE DATA
2816 013512  032767  000001  167262          BIT     #BIT0,FLAG44    ;11/44 CPU
2817 013520  001403                          BEQ     8$              ;YES SKIP
2818 013522  122701  000020                  CMPB    #20,R1          ;SKIP 20 DATA IF 11/44
2819 013526  001770                          BEQ     9$              ;SKIP 20
2820 013530  032701  000040          8$:     BIT     #BIT5,R1        ;FINISHED CHECKING RECEIVED DATA?
2821 013534  001763                          BEQ     COMP            ;BR, IF NOT FINISHED
2822 013536  000405                          BR      7$              ;BR TO END OF TEST
2823
2824 013540  014067  165262          6$      MOV     -(R0),$BDDAT    ;STORE BAD DATA FOR ERROR REPORT
2825 013544  010167  165254                  MOV     R1,$GDDAT       ;STORE GOOD DATA FOR ERROR REPORT
2826 013550  104111                          ERROR+111               ;DATA COMPARE ERROR IN EXERCISER
2827
2828 013552  010377  167072          7$:     MOV     R3,@TVECT       ;RESTORE XMIT VECTOR
2829 013556  010477  167062                  MOV     R4,@RVECT       ;RESTORE RECEIVE VECTOR
2830 013562  010577  167110                  MOV     R5,@RTCVT       ;RESTORE CLOCK VECTOR
2831 013566  016777  166654  167056          MOV     STPSW,@TPSW     ;RESTORE XMIT PSW VECTOR
2832 013574  016777  166650  167044          MOV     SRPSW,@RPSW     ;RESTORE RECEIVE PSW VECTOR
2833 013602  016777  166644  167070          MOV     SCPSW,@RTCPSW   ;RESTORE CLOCK PSW VECTOR
2834 013610  000167  000530                  JMP     ENDEV           ;GOTO NEXT TEST
2835
2836 013614  005267  166622          XMIT:   INC     XMTCNT          ;INCREMENT XMIT INTERRUPT COUNTER
2837 013620  105201                  1$:     INCB    R1              ;INCREMENT TEST DATA
2838 013622  032767  000001  167152          BIT     #BIT0,FLAG44    ;11/44 CPU
2839 013630  001403                          BEQ     2$              ;TEST ALL DATA
2840 013632  122701  000020                  CMPB    #20,R1          ;CHECK DATA FOR ^P
2841 013636  001770                          BEQ     1$              ;DO NOT XMIT ^P
2842 013640  032701  000040          2$:     BIT     #BIT5,R1        ;SEND DATA PATTERN FROM 00 --> 37
2843 013644  001404                          BEQ     XCONT           ;BR, IF MORE DATA TO BE SENT
2844 013646  042777  000100  166764          BIC     #BIT6,@TCSR     ;CLEAR XMIT INTERRUPT ENABLE
2845 013654  000402                          BR      XRET            ;RETURN, WITHOUT SENDING ANY MORE DATA
2846 013656  110177  166760          XCONT:  MOVB    R1,@TBUF        ;SEND NEW CHARACTER
2847 013662  005000                  XRET:   CLR     R0              ;CLEAR TIMER
2848 013664  000002                          RTI                     ;RETURN
2849
2850 013666  017722  166744          RCV:    MOV     @RBUF,(R2)+     ;STORE RECEIVED DATA
2851 013672  005267  166542                  INC     RCVCNT          ;INCREMENT RCV INTERRUPT COUNTER
2852 013676  005000                          CLR     R0              ;CLEAR TIMER
2853 013700  000002                          RTI                     ;RETURN
2854
2855 013702  005267  166536          CLK:    INC     CLKCNT          ;INCREMENT CLOCK INTERRUPT COUNT
```

```
 2856 013706  000002                    RTI                    ;RETURN
 2857
```

```
                        ;*****************************************************************************
                        ;       WRAPAROUND TESTING- AUTO INITIATION OF T/A CONSOLE TEST
                        ;
                        ;
                        ;
                        ;
                                RCSR58 = 176500
                                RBUF58 = 176502
                                TCSR58 = 176504
                                TBUF58 = 176506
                                BGNADD = DEVADR
                                ENDADD = ENDADR
                        ;
                        ;;*****************************************************************
                        ;*TEST 46        TEST CONSOLE WITH WRAP AROUND
                        ;;*****************************************************************
013710  000004          TST46:  SCOPE
                        ;*****************************************************************************
                        ;
                        ; MAIN LINE TEST
                        ;
                        ; THIS TEST PUTS COMMANDS OUT OVER THE SERIAL LINE WHICH IS WRAPPED
                        ; AROUND TO THE CONSOLE AND RECEIVES THE RESPONSES
                        ;
                        ; CONTROL P IS SEND TO GET THE CONSOLE'S ATTENTION AND THEN
                        ; T/A(A FOR APT) IS SENT.  SINCE THE CPU IS HALTED DURING THE TESTING
                        ; THE PROGRAM CAN NOT SEE THE CHARS RETURNING, THUS THE PROGRAM WILL
                        ; SIT IN A LOOP WAITING FOR A 'B'' TO BE PRINTED BY THE CONSOLE AS A
                        ; SIGNAL TO APT THAT THE TESTING IS DONE. ALSO SINCE THE TESTING
                        ; INVOLES WRITTING TO THE CPU'S MEMORY A CHECKSUM IS CALCULATED AND THE
                        ; MEMORY TO BE USED INSIDE THIS PROGRAMS SPACE IS SAVE BEFORE TESTING
                        ; AND RESTORED AFTER TEST WITH ANOTHER CHECKSUM CALCULATION
                        ;
                        ;*****************************************************************************

013712  032777  000004  165120  WRAP:   BIT     #BIT2,@SWR              ;RUN THIS TEST ONLY IF
013720  001451                          BEQ     10$                     ;SW BIT 2 IS ON

013722  016767  164050  166504          MOV     PSW,SAVEPS              ;SAVE OLD PSW
013730  012767  000340  164040          MOV     #340,PSW                ;PUT IN NOW PSW
013736  012706  002432                  MOV     #JIMSTK,SP              ;USE MY STACK (SO NO CLOBER)

013742  005067  166372                  CLR     LOC1
013746  012767  000100  166366          MOV     #100,LOC2               ;TIMING LOOP COUNTERS

013754  004567  000274                  JSR     R5,SAVETE               ;SAVE LOCATIONS T/A WRITES

013760  004567  000076                  JSR     R5,CHKSUM               ;CALCULATE CHECKSUM
013764  010467  166446                  MOV     R4,OLDSUM               ;SAVE OLD CHECKSUM

013770  012700  002564                  MOV     #CNTLP,R0
013774  004567  000102                  JSR     R5,PUTLIN               ;SEND OUT CONTROL P

014000  012700  002566                  MOV     #PROMPT,R0
014004  004567  000124                  JSR     R5,GETLIN               ;GET CRLF CONSOLE>>>

014010  012700  002610                  MOV     #TA,R0
```

```
2913 014014  004567  000062                    JSR     R5,PUTLIN               ;SEND OUT T/A<CRLF>
2914
2915 014020  004567  000154                    JSR     R5,GETB                 ;GET THE A FROM ''-TESTB''
2916
2917 014024  004567  000260                    JSR     R5,RESTTE               ;RESTORE LOCATIONS T/A WRITES
2918
2919 014030  004567  000026                    JSR     R5,CHKSUM               ;RECALCULATE CHECKSUM
2920 014034  020467  166376                    CMP     R4,OLDSUM
2921 014040  001401                            BEQ     10$
2922 014042  000000                            HALT
2923 014044  012706  001000          10$:      MOV     #1000,SP                ;RETURN THEIR SP
2924 014050  016767  166360  163720            MOV     SAVEPS,PSW              ;RETURN PSW
2925 014056  000167  000316                    JMP     $EOP                    ;BR TO END OF PASS ROUTINE
2926
2927
2928                        ;*****************************************************************************
2929                        ;
2930                        ; ROUTINE TO CALCULATE CHECKSUM ON PROGRAM
2931                        ;
2932                        ; INPUT CONDITIONS
2933                        ;
2934                        ;       BGNADD   ADDRESS TO START CHECK SUM (INCLUSIVE)
2935                        ;       ENDADD   ADDRESS TO END CHECK SUM (EXCLUSIVE)
2936                        ;
2937                        ; OUTPUT CONDITIONS
2938                        ;
2939                        ;       REG4 = CHECK SUM
2940                        ;
2941                        ;*****************************************************************************
2942
2943
2944 014062  012700  003014  CHKSUM:           MOV     #BGNADD,R0              ;GET STARTING ADDRESS
2945 014066  005004                            CLR     R4                      ;RESET SUM
2946 014070  062004          1$:               ADD     (R0)+,R4                ;ADD WORD TO SUM
2947 014072  022700  024746                    CMP     #ENDADD,R0              ;CHECK FOR END
2948 014076  001374                            BNE     1$                      ;IF NOT DONE LOOP
2949 014100  000205                            RTS     R5                      ;DONE RETURN
2950
2951
2952                        ;*****************************************************************************
2953                        ;
2954                        ; THIS ROUTINE OUTPUTS TO THE SERIAL LINE CHARS STARTING AT
2955                        ; THE ADDRESS IN REG0 UNTIL IT HITS A <377>
2956                        ;
2957                        ;*****************************************************************************
2958
2959
2960 014102  112001          PUTLIN:           MOVB    (R0)+,R1                ;GET DATA
2961 014104  001412                            BEQ     10$                     ;END OF DATA
2962 014106  004567  000122          1$:       JSR     R5,TIMER                ;PROVIDE FOR TIMOUT
2963 014112  032767  000200  162364            BIT     #BIT7,TCSR58            ;TEST FOR XMIT READY
2964 014120  001772                            BEQ     1$                      ;WAIT FOR XMIT READY
2965 014122  110167  162360                    MOVB    R1,TBUF58               ;OUTPUT CHAR
2966 014126  000167  177750                    JMP     PUTLIN                  ;REPETE
2967 014132  000205          10$:              RTS     R5                      ;RETURN
2968
2969                        ;*****************************************************************************
```

```
                                        ;
                                        ; THIS ROUTINE INPUTS A CHARS FROM THE SERIAL LINE AND COMPARES
                                        ; IT WITH THE EXPECTED VALUES POINTED TO BY REG0 UNTIL NULL<00>
                                        ;
                                        ;*****************************************************************************

014134  112001                  GETLIN:   MOVB    (R0)+,R1              ;GET EXPECTED CHAR
014136  105201                            INCB    R1
014140  001416                            BEQ     10$                   ;IF NULL EXIT
014142  105301                            DECB    R1
014144  004567  000064            1$:     JSR     R5,TIMER              ;PROVIDE FOR TIMOUT
014150  032767  000200  162322            BIT     #BIT7,RCSR58          ;TEST FOR REC READY
014156  001772                            BEQ     1$                    ;WAIT FOR REC READY
014160  116702  162316                    MOVB    RBUF58,R2
014164  042702  000200                    BIC     #BIT7,R2              ;STRIP PARITY
014170  120102                            CMPB    R1,R2                 ;ARE THEY THE SAME
014172  001760                            BEQ     GETLIN                ;SAME GET MORE
014174  000000                            HALT                          ;NOT SAME HALT
014176  000205                  10$:      RTS     R5                    ;RETURN

                                        ;*****************************************************************************
                                        ;
                                        ; THIS ROUTINE INPUTS CHARS UNTIL IT GETS THE CHAR 'B'
                                        ; AND THEN RETURNS
                                        ;
                                        ;*****************************************************************************

014200  004567  000030            GETB:   JSR     R5,TIMER              ;OUT TIMING LOOP OUT
014204  032767  000200  162266            BIT     #BIT7,RCSR58          ;TEST OFR REC READY
014212  001772                            BEQ     GETB                  ;NOT DONE YET
014214  116702  162262                    MOVB    RBUF58,R2
014220  042702  000200                    BIC     #BIT7,R2              ;STRIP PARITY
014224  122702  000102                    CMPB    #102,R2               ;CHECK FOR 'B'
014230  001363                            BNE     GETB                  ;NOT 'B' REPETE
014232  000205                            RTS     R5                    ;WAS 'B' RETURN

                                        ;*****************************************************************************
                                        ;
                                        ; THIS ROUTINE IS USED AS A TIME OUT FEATURE
                                        ; WHEN THE TIMING LOOPS BOTH REACH 0 THIS ROUTINE WI
                                        ; CAUSE A HALT
                                        ;
                                        ;*****************************************************************************

014234  005367  166100            TIMER:  DEC     LOC1
014240  001004                            BNE     10$                   ;DECREMPNT TIMING LOOPS
014242  005367  166074                    DEC     LOC2
014246  001001                            BNE     10$
014250  000000                            HALT                          ;IF ZERO THIS ROUTINE
014252  000205                  10$:      RTS     R5                    ;EXECUTED R3 TIMES


                                        ;*****************************************************************************
```

```
3027                                    ;
3028                                    ; THIS ROUTINE SAVES THE LOCATIONS WRITTEN BY THE T/A CONSOLE TEST
3029                                    ; SO THEY MAY BE RESTORED LATER
3030                                    ;
3031                                    ;*********************************************************************
3032
3033 014254  016767  163520  166062  SAVETE:         MOV     0,SAVE0                 ;SAVE LOCATION 0
3034 014262  012702  000002                          MOV     #2,R2                   ;SET UP INDIRECT PNTER
3035 014266  012701  002346                          MOV     #SAVLOC,R1              ;SET UP STORAGE LOC. PNTER
3036 014272  011221                  1$:             MOV     (R2),(R1)+              ;GET WORD AND SAVE
3037 014274  000241                                  CLC                             ;DONT ROT IN ANY BITS
3038 014276  006102                                  ROL     R2                      ;SET NEXT ADDRESS
3039 014300  020227  024746                          CMP     R2,#ENDADD              ;SEE IF AT END
3040 014304  100772                                  BMI     1$                      ;NO REPETE
3041 014306  000205                                  RTS     R5
3042
3043
3044                                    ;*********************************************************************
3045                                    ;
3046                                    ; THIS ROUTINE RESTORES THE SAVED LOCATIONS THAT T/A WRITES INTO
3047                                    ;
3048                                    ;*********************************************************************
3049
3050 014310  016767  166030  163462  RESTTE:         MOV     SAVE0,0
3051 014316  012702  000002                          MOV     #2,R2                   ;SET UP INDIRECT PNTER
3052 014322  012701  002346                          MOV     #SAVLOC,R1              ;SET UP STORAGE LOC. PNTER
3053 014326  012112                  1$:             MOV     (R1)+,(R2)              ;GET WORD AND RESTORE
3054 014330  000241                                  CLC                             ;DONT ROT IN ANY BITS
3055 014332  006102                                  ROL     R2                      ;SET NEXT ADDRESS
3056 014334  020227  024746                          CMP     R2,#ENDADD              ;SEE IF AT END
3057 014340  100772                                  BMI     1$                      ;NO REPETE
3058 014342  000205                                  RTS     R5
3059
3060
```

```
                                        ;END OF DEVICE PASS ROUTINE
                                        .EVEN
014344  005067  164432          ENDEV:  CLR     $TSTNM          ;CLEAR TEST NO. COUNT FOR SCOPE ROUTINE
014350  005267  164522                  INC     $DEVCT          ;INCREMENT DEVICE COUNTER
014354  026767  166250  164514          CMP     TMP2,$DEVCT     ;ALL DEVICES TESTED
014362  001002                          BNE     NOEOP           ;BR, IF NO
014364  000167  177322                  JMP     WRAP            ;EXECUTE WRAP AROUND AFTER ALL DEVICES
014370  005067  166230          NOEOP:  CLR     CTSTFL          ;CLEAR CONSOLE UNDER TEST FLAG
014374  000167  167450                  JMP     TSTDEV          ;GO TEST NEXT DEVICE


                                .SBTTL  END OF PASS ROUTINE

                                ;;**********************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO GOAGIN

014400                          $EOP:
014400  000004                          SCOPE
014402  005067  164374                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
014406  005267  164462                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
014412  042767  100000  164454          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
014420  005327                          DEC     (PC)+           ;;LOOP?
014422  000001          $EOPCT: .WORD   1
014424  003015                          BGT     $DOAGN          ;;YES
014426  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
014430  000001          $ENDCT: .WORD   1
014432  014422                          $EOPCT
014434  104401  014470                  TYPE    ,ENDMG          ;;TYPE "END PASS"
014440  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
014444  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
014446  000005                          RESET                   ;;CLEAR THE WORLD
014450  004710          $ENDAD: JSR     PC,(R0)                 ;;GO TO MONITOR
014452  000240                          NOP                     ;;SAVE ROOM
014454  000240                          NOP                     ;;FOR
014456  000240                          NOP                     ;;ACT11
014460                          $DOAGN:
014460  000137                          JMP     @(PC)+          ;;RETURN
014462  014504          $RTNAD: .WORD   GOAGIN
014464     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
                                .EVEN
3076 014470     015     012     105  ENDMG:  .ASCIZ  <CR><LF>/END PASS /
     014473     116     104     040
     014476     120     101     123
     014501     123     040     000
```

```
3078
3079 014504  005067  164366          GOAGIN: CLR     $DEVCT          ;CLEAR DEVICE COUNT
3080 014510  022767  000001  166112          CMP     #1,TMP2         ;IS THERE ONLY ONE DEVICE UNDER TEST?
3081 014516  001004                          BNE     RSTRT           ;BR, IF NOT
3082 014520  012706  001000                  MOV     #1000,SP                ;RESET STACK POINTER
3083 014524  000167  167442                  JMP     TST1            ;GO DO ANOTHER PASS
3084
3085 014530  005067  164344          RSTRT:  CLR     $UNIT           ;CLEAR UNIT NUMBER
3086 014534  000167  167234                  JMP     BEGIN
3087
3088 014540  011646                  WRPSW:  MOV(SP),-(SP)           ;COPY RETUN PC
3089 014542  013616                          MOV     @(SP)+,(SP)     ;MOVE NEW PSW TO STACK
3090 014544  062746  000002                  ADD     #2,-(SP)        ;ADJUST JSR RETURN
3091 014550  000002                          RTI                     ;POP RETURN PC & NEW PSW
3092
3093                                 ;SUBROUTINE TO REPORT UNEXPECTED OR ERRONEOUS TRAPS OR INTERRUPTS
3094
3095 014552  012600                  CATCH:  MOV     (SP)+,R0        ;GET ADDRESS OF TRAP VECTOR + 4
3096 014554  162700  000004                  SUB     #4,R0           ;ADJUST TO POINT TO TRAP ADDRESS
3097 014560  010067  166036                  MOV     R0,BDVECT       ;STORE TRAP OR INTERRUPT ADDRESS
3098 014564  016667  000002  166026          MOV     2(SP),OLDPC     ;GET PC WHERE TRAP OR INTERRUPT OCCURRED
3099 014572  104112                          ERROR+112               ;REPORT ERROR
3100
3101 014574  000000                          HALT                    ;PROGRAM MUST BE RESTARTED AT THIS POINT
3102
```

```
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                ;*SAVE THE ERROR ITEM NUMBER AND 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
                                ;*SW09=1         LOOP IN ERROR
                                ;*CALL
                                ;*      ERROR+N ;;ERROR=EMT AND N=ERROR ITEM NUMBER
                                ;;*****************************************************************

014576                          $ERROR:
014576  105267  164201          7$:     INCB    $ERFLG          ;SET THE ERROR FLAG
014602  001775                          BEQ     7$              ;DON'T LET FLAG GO TO ZERO
014604  016777  164172  164230          MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER AND ERROR FLAG
014612  005267  164174                  INC     $ERTTL          ;INCREMENT ERROR COUNT
014616  011667  164174                  MOV     (SP),$ERRPC     ;GET ADDRESS OF ERROR INSTRUCTION
014622  162767  000002  164166          SUB     #2,$ERRPC
014630  117767  164162  164156          MOVB    @$ERRPC,$ITEMB  ;STRIP AND SAVE THE ERROR ITEM CODE
014636  032777  020000  164174          BIT     #BIT13,@SWR     ;SKIP TYPEOUT IF SET
014644  001004                          BNE     20$             ;SKIP TYPEOUTS
014646  004767  000106                  JSR     PC,$ERRTYP      ;GO TO USER ERROR ROUTINE
014652  104401  001063                  TYPE    ,$CRLF
014656                          20$:
014656  122767  000001  164222          CMPB    #APTENV,$ENV    ;RUNNING IN APT MODE
014664  001007                          BNE     2$              ;NO, SKIP APT ERROR REPORT
014666  116767  164122  000004          MOVB    $ITEMB,21$      ;SET ITEM NUMBER AS ERROR NUMBER
014674  004767  000562                  JSR     PC,$ATY4        ;REPORT FATAL ERROR TO APT
014700     000                  21$:    .BYTE   0
014701     000                          .BYTE   0
014702  000777                  22$:    BR      22$             ;APT ERROR LOOP
014704  005777  164130          2$:     TST     @SWR            ;HALT ON ERROR
014710  100001                          BPL     3$              ;SKIP IF CONTINUE
014712  000000                          HALT                    ;HALT ON ERROR!
014714  104406                  3$:     CKSWR                   ;TEST FOR CHANGE IN SOFT-SWR
014716  032777  001000  164114          BIT     #BIT09,@SWR     ;LOOP ON ERROR SWITCH SET?
014724  001402                          BEQ     4$              ;BR IF NO
014726  016716  164056                  MOV     $LPERR,(SP)     ;FUDGE RETURN FOR LOOPING
014732  005767  164122          4$:     TST     $ESCAPE         ;CHECK FOR AN ESCAPE ADDRESS
014736  001402                          BEQ     5$              ;BR IF NONE
014740  016716  164114                  MOV     $ESCAPE,(SP)    ;FUDGE RETURN ADDRESS FOR ESCAPE
014744                          5$:
014744  022737  014450  000042          CMP     #$ENDAD,@#42    ;ACT-11 AUTO-ACCEPT?
014752  001001                          BNE     6$              ;BR IF NO
014754  000000                          HALT                    ;YES
014756                          6$:
014756  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.

014760                  $ERRTYP:
014760  104401  001063          TYPE    ,$CRLF          ;;''CARRIAGE RETURN'' & 'LINE FEED''
014764  010046                  MOV     R0,-(SP)        ;;SAVE R0
014766  005000                  CLR     R0              ;;PICKUP THE ITEM INDEX
014770  153700  001014          BISB    @#$ITEMB,R0
014774  001004                  BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                        ;;TYPE THE PC OF THE ERROR
014776  016746  164014          MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                        ;;ERROR ADDRESS
015002  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
015004  000426                  BR      6$              ;;GET OUT
015006  005300          1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
015010  006300                  ASL     R0              ;;      WORK FOR THE ERROR TABLE
015012  006300                  ASL     R0
015014  006300                  ASL     R0
015016  062700  001146          ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
015022  012067  000004          MOV     (R0)+,2$        ;;PICKUP 'ERROR MESSAGE'' POINTER
015026  001404                  BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
015030  104401                  TYPE                    ;;TYPE THE 'ERROR MESSAGE''
015032  000000          2$:     .WORD   0               ;;''ERROR MESSAGE'' POINTER GOES HERE
015034  104401  001063          TYPE    ,$CRLF          ;;''CARRIAGE RETURN'' & 'LINE FEED''
015040  012067  000004          MOV     (R0)+,4$        ;;PICKUP 'DATA HEADER'' POINTER
015044  001404                  BEQ     5$              ;;SKIP TYPEOUT IF 0
015046  104401                  TYPE                    ;;TYPE THE 'DATA HEADER''
015050  000000          4$:     .WORD   0               ;;''DATA HEADER'' POINTER GOES HERE
015052  104401  001063          TYPE    ,$CRLF          ;;''CARRIAGE RETURN'' & 'LINE FEED''
015056  011000          5$:     MOV     (R0),R0         ;;PICKUP 'DATA TABLE'' POINTER
015060  001004                  BNE     7$              ;;GO TYPE THE DATA
015062  012600          6$:     MOV     (SP)+,R0        ;;RESTORE R0
015064  104401  001063          TYPE    ,$CRLF          ;;''CARRIAGE RETURN'' & 'LINE FEED''
015070  000207                  RTS     PC              ;;RETURN
015072                  7$:
015072  013046                  MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
015074  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
015076  005710                  TST     (R0)            ;;IS THERE ANOTHER NUMBER?
015100  001770                  BEQ     6$              ;;BR IF NO
015102  104401  015110          TYPE    ,8$             ;;TYPE TWO(2) SPACES
015106  000771                  BR      7$              ;;LOOP
015110    040     040     000   8$:     .ASCIZ  /  /    ;;TWO(2) SPACES
                                .EVEN
```

```
3159
3160                                    .SBTTL  POWER DOWN AND UP ROUTINES
3161                                    ;;*****************************************************************
3162                                    ;*POWER DOWN ROUTINE
3163                                    ;;*****************************************************************
3164 015114  012737  015254  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;SET FOR FAST UP
3165 015122  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;PRIO:7
3166 015130  010046                          MOV     R0,-(SP)        ;PUSH R0 ON STACK
3167 015132  010146                          MOV     R1,-(SP)        ;PUSH R1 ON STACK
3168 015134  010246                          MOV     R2,-(SP)        ;PUSH R2 ON STACK
3169 015136  010346                          MOV     R3,-(SP)        ;PUSH R3 ON STACK
3170 015140  010446                          MOV     R4,-(SP)        ;PUSH R4 ON STACK
3171 015142  010546                          MOV     R5,-(SP)        ;PUSH R5 ON STACK
3172 015144  017746  163670                  MOV     @SWR,-(SP)      ;PUSH @SWR ON STACK
3173 015150  010667  000104                  MOV     SP,$SAVR6       ;SAVE SP
3174 015154  012737  015166  000024          MOV     #$PWRUP,@#PWRVEC ;SET UP VECTOR
3175 015162  000000                          HALT
3176 015164  000776                          BR      .-2             ;HANG UP
3177
3178
3179                                    ;;*****************************************************************
3180                                    ;*POWER UP ROUTINE
3181                                    ;;*****************************************************************
3182 015166  012737  015254  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;SET FOR FAST DOWN
3183 015174  016706  000060                  MOV     $SAVR6,SP       ;GET SP
3184 015200  012677  163634                  MOV     (SP)+,@SWR      ;POP STACK INTO @SWR
3185 015204  012605                          MOV     (SP)+,R5
3186 015206  012604                          MOV     (SP)+,R4        ;POP STACK INTO R4
3187 015210  012603                          MOV     (SP)+,R3        ;POP STACK INTO R3
3188 015212  012602                          MOV     (SP)+,R2        ;POP STACK INTO R2
3189 015214  012601                          MOV     (SP)+,R1        ;POP STACK INTO R1
3190 015216  012600                          MOV     (SP)+,R0        ;POP STACK INTO R0
3191 015220  012737  015114  000024          MOV     #$PWRDN,@#PWRVEC ;SET UP THE POWER DOWN VECTOR
3192 015226  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;PRIO:7
3193 015234  005067  000020                  CLR     $SAVR6          ;WAIT LOOP FOR THE TTY
3194 015240  005267  000014          1$:     INC     $SAVR6          ;WAIT FOR THE INC
3195 015244  001375                          BNE     1$              ;OF WORD
3196 015246  104401                          TYPE                    ;REPORT THE POWER FAILURE
3197 015250  015262                  $PWRMG: .WORD   $POWER          ;POWER FAIL MESSAGE POINTER
3198 015252  000002                          RTI
3199 015254  000000                  $ILLUP: HALT                    ;THE POWER UP SEQUENCE WAS STARTED
3200 015256  000776                          BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE
3201 015260  000000                  $SAVR6: 0                       ;PUT THE SP HERE
3202 015262     015     012     120  $POWER: .ASCIZ  <15><12>'POWER''
     015265     117     127     105
     015270     122     000
3203
```

```
3205
3206                                    .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
                                        ;*SW09=1         LOOP ON ERROR
                                        ;*CALL
                                        ;*      SCOPE           ;;SCOPE-IOT

015272                                  $SCOPE:
015272  104406                                 CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
015274  032777  040000  163536          1$:    BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
015302  001052                                 BNE     $OVER           ;;YES IF SW14=1
                                        ;#####START OF CODE FOR THE XOR TESTER#####
015304  000416                          $XTSTR: BR      6$              ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
015306  013746  000004                         MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
015312  012737  015332  000004                 MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
015320  005737  177060                         TST     @#177060        ;;TIME OUT ON XOR?
015324  012637  000004                         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
015330  000421                                 BR      $SVLAD          ;;GO TO THE NEXT TEST
015332  022626                          5$:    CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
015334  012637  000004                         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
015340  000407                                 BR      7$              ;;LOOP ON THE PRESENT TEST
015342                                  6$:;#####END OF CODE FOR THE XOR TESTER#####
015342  105767  163435                  2$:    TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
015346  001412                                 BEQ     $SVLAD          ;;BR IF NO
015350  032777  001000  163462                 BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
015356  001404                                 BEQ     4$              ;;BR IF NO
015360  016767  163424  163420          7$:    MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
015366  000420                                 BR      $OVER
015370  105067  163407                  4$:    CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
015374  105267  163402                  $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
015400  116767  163376  163464                 MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
015406  011667  163374                         MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
015412  011667  163372                         MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
015416  005067  163436                         CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
015422  112767  000001  163365                 MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
015430  016777  163346  163404          $OVER: MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
015436  016716  163344                         MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
015442  000002                                 RTI                     ;;FIXES PS
3207
```

```
3209
3210                                    ;;*****************************************************************
3211                                    .SBTTL  APT COMMUNICATIONS ROUTINE
3212                                    ;;*****************************************************************
3213
3214 015444  112767  000001  000236  $ATY1:  MOVB    #1,$FFLG        ;TO REPORT FATAL ERROR
3215 015452  112767  000001  000226  $ATY3:  MOVB    #1,$MFLG        ;TO TYPE A MESSAGE
3216 015460  000403                   BR      $ATYC
3217 015462  112767  000001  000220  $ATY4:  MOVB    #1,$FFLG        ;TO ONLY REPORT FATAL ERROR
3218 015470                           $ATYC:
3219 015470  010046                   MOV     R0,-(SP)        ;PUSH R0 ON STACK
3220 015472  010146                   MOV     R1,-(SP)        ;PUSH R1 ON STACK
3221 015474  105767  000206           TSTB    $MFLG           ;SHOULD TYPE A MESSAGE?
3222 015500  001450                   BEQ     5$              ;IF NOT: BR
3223 015502  122767  000001  163376   CMPB    #APTENV,$ENV    ;OPERATING UNDER APT?
3224 015510  001031                   BNE     3$              ;IF NOT: BR
3225 015512  132767  000100  163367   BITB    #APTSPOOL,$ENVM ;SHOULD SPOOL MESSAGE?
3226 015520  001425                   BEQ     3$              ;IF NOT: BR
3227 015522  017600  000004           MOV     @4(SP),R0       ;GET MESSAGE ADDRESS
3228 015526  062766  000002  000004   ADD     #2,4(SP)        ;BUMP RETURN ADDRESS
3229 015534  005767  163326           1$:     TST     $MSGTYPE                ;SEE IF DONE W/ LAST XMISSION?
3230 015540  001375                   BNE     1$              ;IF NOT: WAIT
3231 015542  010067  163334           MOV     R0,$MSGAD       ;PUT ADDRESS IN MAILBOX
3232 015546  105720                   2$:     TSTB    (R0)+           ;FIND END OF MESSAGE
3233 015550  001376                   BNE     2$
3234 015552  166700  163324           SUB     $MSGAD,R0       ;SUB START OF MESSAGE
3235 015556  006200                   ASR     R0              ;GET MESSAGE LENGTH IN WORDS
3236 015560  010067  163320           MOV     R0,$MSGLGT      ;PUT LENGTH IN MAILBOX
3237 015564  012767  000004  163274   MOV     #4,$MSGTYPE     ;TELL APT TO TAKE MESSAGE
3238 015572  000413                   BR      5$
3239 015574  017667  000004  000016   3$.     MOV     @4(SP),4$       ;PUT MSG ADDR IN JSR LINKAGE
3240 015602  062766  000002  000004   ADD     #2,4(SP)        ;BUMP RETURN ADDRESS
3241 015610  016746  162162           MOV     177776,-(SP)    ;PUSH 177776 ON STACK
3242 015614  004767  000072           JSR     PC,$TYPE        ;CALL TYPE MACRO
3243 015620  000000                   4$:     .WORD   0
3244 015622                           5$:
3245 015622  105767  000062           10$.    TSTB    $FFLG           ;SHOULD REPORT FATAL ERROR?
3246 015626  001413                   BEQ     12$             ;IF NOT: BR
3247 015630  005767  163252           TST     $ENV            ;RUNNING UNDER APT?
3248 015634  001410                   BEQ     12$             ;IF NOT: BR
3249 015636  005767  163224           11$.    TST     $MSGTYPE        ;FINISHED LAST MESSAGE?
3250 015642  001375                   BNE     11$             ;IF NOT: WAIT
3251 015644  017667  000004  163216   MOV     @4(SP),$FATAL   ;GET ERROR #
3252 015652  005267  163210           INC     $MSGTYPE        ;TELL APT TO TAKE ERROR
3253 015656  062766  000002  000004   12$:    ADD     #2,4(SP)        ;BUMP RETURN ADDRESS
3254 015664  105067  000020           CLRB    $FFLG           ;CLEAR FATAL FLAG
3255 015670  105067  000013           CLRB    $LFLG           ;CLEAR LOG FLAG
3256 015674  105067  000006           CLRB    $MFLG           ;CLEAR MESSAGE FLAG
3257 015700  012601                   MOV     (SP)+,R1        ;POP STACK INTO R1
3258 015702  012600                   MOV     (SP)+,R0        ;POP STACK INTO R1
3259 015704  000207                   RTS     PC              ;RETURN
3260 015706     000                   $MFLG:  .BYTE   0
3261 015707     000                   $LFLG:  .BYTE   0               ;LOG FLAG
3262 015710     000                   $FFLG:  .BYTE   0               ;FATAL FLAG
3263
3264                                           .EVEN
3265  000200                           APTSIZE=200
```

APT COMMUNICATIONS ROUTINE SEQ 0095

```
3266            000001                  APTENV=001
3267            000100                  APTSPOOL=100
3268            000040                  APTCSUP=040
3269
```

```
3271
3272                                    .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 FIRST ADDRESS OF AN ASCIZ STRING
                                        ;*OR
                                        ;*      TYPE
                                        ;*      MESADR
                                        ;*

015712  105767  163141          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
015716  100002                          BPL     1$              ;;BR IF YES
015720  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
015722  000430                          BR      3$              ;;LEAVE
015724  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
015726  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
015732  122767  000001  163146          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
015740  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
015742  132767  000100  163137          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
015750  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
015752  010067  000004                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
015756  004767  177470                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
015762  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
015764  132767  000040  163115  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
015772  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
015774  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
015776  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
016000  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
016002  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
016004  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
016010  000002                          RTI                     ;;RETURN
016012  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
016016  001430                          BEQ     8$
016020  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
016024  001006                          BNE     5$
016026  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
016030  104401                          TYPE                    ;;TYPE A CR AND LF
016032  001063                          $CRLF
016034  105067  000200                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
016040  000755                          BR      2$              ;;GET NEXT CHARACTER
016042  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
016046  126726  163004          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
016052  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
016054  016746  162774                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
016060  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
016064  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
016066  004767  000032                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
016072  105367  000142                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
```

```
016076  000770                          BR      7$              ;;LOOP

                                ;HORIZONTAL TAB PROCESSOR

016100  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
016104  004767  000014          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
016110  132767  000007  000122          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
016116  001372                          BNE     9$              ;;TAB STOP
016120  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
016122  000724                          BR      2$              ;;GET NEXT CHARACTER
016124  105777  162720          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
016130  100375                          BPL     $TYPEC
016132  116677  000002  162712          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
016140  105777  162700                  TSTB    @$TKS           ;;SEE IF KEYBOARD IS TALKING.
016144  100021                          BPL     2$              ;;BRANCH IF IT ISN'T.
016146  017746  162674                  MOV     @$TKB,-(SP)     ;;PUSH CHARACTER ONTO STACK.
016152  042716  177600                  BIC     #177600,(SP)    ;;BIT CLEAR TOP BYTE AND PARITY BIT.
016156  022726  000023                  CMP     #23,(SP)+       ;;SEE IF THIS IS A ^S.
016162  001012                          BNE     2$              ;;BRANCH TO CONTINUE IF IT ISN'T.
016164  105777  162654          3$:     TSTB    @$TKS           ;;WAIT FOR ANOTHER INPUT.
016170  100375                          BPL     3$              ;;BRANCH BACK IF NOT READY.
016172  017746  162650                  MOV     @$TKB,-(SP)     ;;PUSH NEXT CHARACTER ON STACK.
016176  042716  177600                  BIC     #177600,(SP)    ;;BIT CLEAR TOP BYTE AND PARITY BIT.
016202  022726  000021                  CMP     #21,(SP)+       ;;SEE IF THIS IS A ^Q.
016206  001366                          BNE     3$              ;;BRANCH BACK FOR MORE WAIT IF NOT.
016210  122766  000015  000002  2$:     CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
016216  001003                          BNE     1$              ;;BRANCH IF NO
016220  105067  000014                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
016224  000406                          BR      $TYPEX          ;;EXIT
016226  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
016234  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
016236  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
016240  000000                $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
016242  000207                $TYPEX: RTS     PC

3273                            .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

016244  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
016250  116667  000001  000211          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
016256  112667  000207                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
016262  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
016266  000406                          BR      $TYPON
016270  112767  000001  000171  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
016276  112767  000006  000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
016304  112767  000005  000154  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
016312  010346                          MOV     R3,-(SP)        ;;SAVE R3
016314  010446                          MOV     R4,-(SP)        ;;SAVE R4
016316  010546                          MOV     R5,-(SP)        ;;SAVE R5
016320  116704  000145                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
016324  005404                          NEG     R4
016326  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
016332  110467  000132                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
016336  116704  000125                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
016342  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
016346  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
016350  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
016352  000404                          BR      3$              ;;GO DO MSB
016354  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
016356  006105                          ROL     R5
016360  006105                          ROL     R5
016362  010503                          MOV     R5,R3
016364  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
016366  105367  000076                  DECB    $OMODE          ;;TYPE THIS DIGIT?
016372  100016                          BPL     7$              ;;BR IF NO
016374  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
016400  001002                          BNE     4$              ;;TEST FOR 0
016402  005704                          TST     R4              ;;SUPPRESS THIS 0?
016404  001403                          BEQ     5$              ;;BR IF YES
016406  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
016410  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
016414  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
016420  110367  000040                  MOVB    R3,8$           ;;SAVE FOR TYPING
016424  104401  016464                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
016430  105367  000032          7$:     DECB    $OCNT           ;;COUNT BY 1
016434  003347                          BGT     2$              ;;BR IF MORE TO DO
016436  002402                          BLT     6$              ;;BR IF DONE
016440  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
016442  000744                          BR      2$              ;;GO DO THE LAST DIGIT
016444  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
016446  012604                          MOV     (SP)+,R4        ;;RESTORE R4
016450  012603                          MOV     (SP)+,R3        ;;RESTORE R3
016452  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
016460  012616                          MOV     (SP)+,(SP)
016462  000002                          RTI                     ;;RETURN
016464     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
016465     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
016466     000          $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
016467     000          $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
016470  000000          $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
```

```
                                .SBTTL  TTY INPUT ROUTINE

                                ;;*****************************************************************
                                .ENABL  LSB

                                ;;*****************************************************************
                                ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
                                ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
                                ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
                                ;*WHEN OPERATING IN TTY FLAG MODE.
016472  022767  000176  162340  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
016500  001074                        BNE     15$             ;;BRANCH IF NO
016502  105777  162336                TSTB    @$TKS           ;;CHAR THERE?
016506  100071                        BPL     15$             ;;IF NO, DON'T WAIT AROUND
016510  117746  162332                MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
016514  042716  177600                BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
016520  022726  000007                CMP     #7,(SP)+        ;;IS IT A CONTROL G?
016524  001062                        BNE     15$             ;;NO, RETURN TO USER
016526  126727  162302  000001        CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
016534  001456                        BEQ     15$             ;;BRANCH IF YES

016536  104401  017217                TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
016542  104401  017224        $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
016546  016746  161424                MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
016552  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
016554  104401  017235                TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
016560  005046                9$:     CLR     -(SP)           ;;CLEAR COUNTER
016562  005046                        CLR     -(SP)           ;;THE NEW SWR
016564  105777  162254        7$:     TSTB    @$TKS           ;;CHAR THERE?
016570  100375                        BPL     7$              ;;IF NOT TRY AGAIN

016572  117746  162250                MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
016576  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII



016602  021627  000025        9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
016606  001005                        BNE     10$             ;;BRANCH IF NOT
016610  104401  017212                TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
016614  062706  000006        20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
016620  000757                        BR      19$             ;;LET'S TRY IT AGAIN


016622  021627  000015        10$:    CMP     (SP),#15        ;;IS IT A <CR>?
016626  001022                        BNE     16$             ;;BRANCH IF NO
016630  005766  000004                TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
016634  001403                        BEQ     11$             ;;BRANCH IF YES
016636  016677  000002  162174        MOV     2(SP),@SWR      ;;SAVE NEW SWR
016644  062706  000006        11$:    ADD     #6,SP           ;;CLEAR UP STACK
016650  104401  001063        14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
016654  126727  162155  000001        CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
016662  001003                        BNE     15$             ;;BRANCH IF NOT
016664  012777  000100  162152        MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
016672  000002                15$:    RTI                     ;;RETURN
016674  004767  177224        16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
016700  021627  000060                CMP     (SP),#60        ;;CHAR < 0?
```

```
016704  002420                          BLT     18$             ;;BRANCH IF YES
016706  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
016712  003015                          BGT     18$             ;;BRANCH IF YES
016714  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
016720  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
016724  001403                          BEQ     17$             ;;BRANCH IF YES
016726  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
016730  006316                          ASL     (SP)            ;;   CHAR OVER TO MAKE
016732  006316                          ASL     (SP)            ;;   ROOM FOR NEW ONE.
016734  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
016740  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
016744  000707                          BR      7$              ;;GET THE NEXT ONE
016746  104401  001062          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
016752  000720                          BR      20$             ;;SIMULATE CONTROL-U
                                .DSABL  LSB

                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*CALL:
                                ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                ;

016754  011646          $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
016756  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
016764  105777  162054          1$:     TSTB    @$TKS           ;;WAIT FOR
016770  100375                          BPL     1$              ;;A CHARACTER
016772  117766  162050  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
017000  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
017006  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
017014  001013                          BNE     3$              ;;BRANCH IF NO
017016  105777  162022          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
017022  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
017024  117746  162016                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
017030  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
017034  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
017040  001366                          BNE     2$              ;;IF NOT DISCARD IT
017042  000750                          BR      1$              ;;YES, RESUME
017044  026627  000004  000140  3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
017052  002407                          BLT     4$              ;;BRANCH IF YES
017054  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
017062  003003                          BGT     4$              ;;BRANCH IF YES
017064  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
017072  000002                  4$:     RTI                     ;;GO BACK TO USER
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                ;*CALL:
                                ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
                                ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

017074  010346          $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
017076  012703  017202  1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
017102  022703  017212  2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
017106  101405                          BLOS    4$              ;;BR IF YES
```

```
017110  104407                          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
017112  112613                          MOVB    (SP)+,(R3)      ;;GET CHARACTER
017114  122713  000177          10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
017120  001003                          BNE     3$              ;;SKIP IF NOT
017122  104401  001062          4$:     TYPE    ,$QUES          ;;TYPE A '?'
017126  000763                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
017130  111367  000044          3$:     MOVB    (R3),9$         ;;PUT THE CHARACTER
017134  104401  017200                  TYPE    ,9$
017140  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
017144  001356                          BNE     2$              ;;LOOP IF NOT RETURN
017146  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
017152  104401  001064                  TYPE    ,$LF            ;;TYPE A LINE FEED
017156  012603                          MOV     (SP)+,R3        ;;RESTORE R3
017160  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
017162  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
017170  012766  017202  000004          MOV     #$TTYIN,4(SP)
017176  000002                          RTI                     ;;RETURN
017200     000                  9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
017201     000                          .BYTE   0               ;;TERMINATOR
017202                          $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
017212     136     125     015  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL 'U'
017215     012     000
017217     136     107     015  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL 'G'
017222     012     000
017224     015     012     123  $MSWR:  .ASCIZ  <15><12>/SWR - /
017227     127     122     040
017232     075     040     000
017235     040     040     116  $MNEW:  .ASCIZ  /  NEW - /
017240     105     127     040
017243     075     040     000
3278
```

```
3280
3281
3282                                    .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 DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                        ;*GO TO THAT ROUTINE.

017246  010046                 $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
017250  016600  000002                 MOV     2(SP),R0        ;;GET TRAP ADDRESS
017254  005740                         TST     -(R0)           ;;BACKUP BY 2
017256  111000                         MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
017260  006300                         ASL     R0              ;;POSITION FOR INDEXING
017262  016000  017302                 MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
017266  000200                         RTS     R0              ;;GO TO ROUTINE


                                        ;;THIS IS USE TO HANDLE THE ''GETPRI'' MACRO

017270  011646                 $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
017272  016666  000004  000002         MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
017300  000002                         RTI                     ;;RESTORE THE PSW

                                    .SBTTL  TRAP TABLE

                                    ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                    ;*BY THE ''TRAP'' INSTRUCTION.

                                    ;       ROUTINE
                                    ;       -------
017302  017270                 $TRPAD: .WORD   $TRAP2
017304  015712                         $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
017306  016270                         $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
017310  016244                         $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
017312  016304                         $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)

017314  016542                         $GTSWR  ;;CALL=GTSWR    TRAP+5(104405)  GET SOFT-SWR SETTING

017316  016472                         $CKSWR  ;;CALL=CKSWR    TRAP+6(104406)  TEST FOR CHANGE IN SOFT-SWR
017320  016754                         $RDCHR  ;;CALL=RDCHR    TRAP+7(104407)  TTY TYPEIN CHARACTER ROUTINE
017322  017074                         $RDLIN  ;;CALL=RDLIN    TRAP+10(104410) TTY TYPEIN STRING ROUTINE
3283
```

```
                                        .SBTTL  ECHO TEST
                                ;;**************************************************************
                                ;*THIS ROUTINE WILL ECHO ANY CHARACTER TYPED
                                ;*AT THE CONSOLE
                                ;*THE TEST IS HALTED BY TYPING A CONTROL-C
                                ;*TEST CAN BE RESTARTED AFTER HALTING BY JUST CONTINUING
                                ;;**************************************************************
017324                          ECHO:
017324  000005                          RESET                   ;CLEAR EVERYTHING
017326  112777  000052  163326          MOVB    #'*,@CTBUF      ;TRANSMIT PROMPT '*'
017334  105777  163314          2$:     TSTB    @CRCSR          ;WAIT FOR INPUT
017340  100375                          BPL     2$
017342  117777  163310  163312          MOVB    @CRBUF,@CTBUF   ;ECHO INPUT
017350  017700  163302                  MOV     @CRBUF,R0       ;STORE INPUT
017354  100023                          BPL     5$              ;BR IF 'ERROR'NOT SET
017356  052701  010000                  BIS     #BIT12,R1       ;SET PARITY ERROR TEST MASK
017362  030100                          BIT     R1,R0           ;CHECK  FOR PARITY ERROR FLAG
017364  001403                          BEQ     3$              ;BR IF NOT SET
017366  004767  000056                  JSR     PC,MSG          ;REPORT PARITY ERROR
017372  017476                          MPAR
017374  006301                  3$:     ASL     R1              ;SHIFT MASK TO TEST 'FR' FLAG
017376  030100                          BIT     R1,R0           ;TEST FOR FRAMING ERROR FLAG
017400  001403                          BEQ     4$              ;BR IF NOT SET
017402  004767  000042                  JSR     PC,MSG          ;REPSORT FRAMING ERROR
017406  017507                          MFR
017410  006301                  4$:     ASL     R1              ;SHIFT MASK TO TEST 'OR' FLAG
017412  030100                          BIT     R1,R0           ;TEST FOR OVERFLOW ERROR
017414  001403                          BEQ     5$              ;BR IF NOT SET
017416  004767  000026                  JSR     PC,MSG          ;REPORT OVERFLOW ERROR
017422  017521                          MOR
017424  042700  000200          5$:     BIC     #BIT7,R0        ;CLEAR ANY PARITY BIT
017430  022700  000003                  CMP     #3,R0           ;WAS INPUT CONTROL-C
017434  001337                          BNE     2$              ;BR IF NOT
017436  004767  000006                  JSR     PC,MSG          ;REPORT PROGRAM STOP
017442  017534                          MSTOP
017444  000000                          HALT                    ;END OF TEST HALT
017446  000726                          BR      ECHO            ;AFTER END OF TEST HALT
                                                                ;   PRESS CONTINUE TO RESTART ECHO TEST

017450  013600                  MSG:    MOV     @(SP)+,R0       ;PICK UP MESSAGE POINTER
017452  062746  000002                  ADD     #2,-(SP)        ;ADJUST RETURN PC
017456  105777  163176          WAIT:   TSTB    @CTCSR          ;WAIT FOR XMIT DONE
017462  100375                          BPL     WAIT
017464  112077  163172                  MOVB    (R0)+,@CTBUF    ;SEND CHARACTER
017470  105710                          TSTB    (R0)            ;IS THIS END OF MESSAGE?
017472  001371                          BNE     WAIT            ;BR IF NOT
017474  000207                          RTS     PC              ;RETURN

017476    015   012   120   MPAR:     .ASCIZ  <CR><LF>/PARITY/
017501    101   122   111
017504    124   131   000
017507    015   012   106   MFR:      .ASCIZ  <CR><LF>/FRAMING/
017512    122   101   115
017515    111   116   107
017520    000
017521    015   012   117   MOR:      .ASCIZ  <CR><LF>/OVERFLOW/
017524    126   105   122
```

```
        017527      106      114      117
        017532      127      000
  3336  017534      015      012      123  MSTOP:  .ASCIZ  <CR><LF>/STOP/
        017537      124      117      120
        017542      000
```

```
3338
3339
3340                                    .EVEN
3341
3342                                .SBTTL  TERMINAL OUTPUT TEST
3343
3344                                ;;**********************************************************************
3345                                ;*THIS ROUTINE WILL OUTPUT ALL WRITABLE CHARACTERS FOR THE
3346                                ;*THE OCTAL CODE 040 --> 377
3347                                ;*32 CHARACTERS ARE PRINTED ON EACH LINE
3348                                ;*THE PATTERN IS REPEATED EVERY THREE LINES
3349                                ;*
3350                                ;;**********************************************************************
3351
3352 017544  012701  000040        OUTTST: MOV     #40,R1          ;LOAD FIRST WRITABLE CHARACTER
3353 017550  012700  000040        1$:     MOV     #40,R0          ;LOAD CHAR COUNT PER LINE
3354 017554  105777  163100        2$:     TSTB    @CTCSR          ;WAIT FOR DONE
3355 017560  100375                        BPL     2$
3356 017562  010177  163074                MOV     R1,@CTBUF       ;TRANSMIT A CHARACTER
3357 017566  105201                        INCB    R1              ;INCREMENT CHARACTER CODE
3358 017570  005300                        DEC     R0              ;DECREMENT CHAR COUNT
3359 017572  001370                        BNE     2$              ;BR IF LINE NOT COMPLETE
3360 017574  004767  177650                JSR     PC,MSG          ;SSUE CR,LINE FEED
3361
3362 017600  001063                        $CRLF
3363 017602  105777  163046                TSTB    @CRCSR          ;ANY CHARACTER RECEIVED?
3364 017606  100404                        BMI     3$              ;BR IF YES
3365 017610  032701  000200                BIT     #BIT7,R1        ;FINISHED ONE PASS OF WRITABLE CHARACTERS?
3366 017614  001353                        BNE     OUTTST          ;BR IF YES
3367 017616  000754                        BR      1$              ;IF NOT WRITE NEXT LINE
3368
3369 017620  005077  163032        3$:     CLR     @CRBUF          ;CLEAR RECEIVER
3370 017624  000000                        HALT                    ;STOP TEST
3371 017626  000746                        BR      OUTTST          ;RESTART TEST IF CONTINUED
```

```
3373
3374
3375 017630  103  101  116  EM1:   .ASCIZ  /CAN NOT ACCESS TCSR/
     017633  040  116  117
     017636  124  040  101
     017641  103  103  105
     017644  123  123  040
     017647  124  103  123
     017652  122  000
3376 017654  103  101  116  EM2:   .ASCIZ  /CAN NOT ACCESS TBUF/
     017657  040  116  117
     017662  124  040  101
     017665  103  103  105
     017670  123  123  040
     017673  124  102  125
     017676  106  000
3377 017700  124  103  123  EM3:   .ASCIZ  /TCSR DONE NOT CLEARED WITH TBUF FULL/
     017703  122  040  104
     017706  117  116  105
     017711  040  116  117
     017714  124  040  103
     017717  114  105  101
     017722  122  105  104
     017725  040  127  111
     017730  124  110  040
     017733  124  102  125
     017736  106  040  106
     017741  125  114  114
     017744  000
3378 017745  124  103  123  EM4:   .ASCIZ  /TCSR DONE NOT SET/
     017750  122  040  104
     017753  117  116  105
     017756  040  116  117
     017761  124  040  123
     017764  105  124  000
3379 017767  124  103  123  EM5:   .ASCIZ  /TCSR DONE NOT SET WITH RESET/
     017772  122  040  104
     017775  117  116  105
     020000  040  116  117
     020003  124  040  123
     020006   05  124  040
     020011  127  111  124
     020014  110  040  122
     020017  105  123  105
     020022  124  000
3380 020024  103  101  116  EM6:   .ASCIZ  /CAN NOT ACCESS RCSR/
     020027  040  116  117
     020032  124  040  101
     020035  103  103  105
     020040  123  123  040
     020043  122  103  123
     020046  122  000
3381 020050  103  101  116  EM7:   .ASCIZ  /CAN NOT ACCESS RBUF/
     020053  040  116  117
     020056  124  040  101
     020061  103  103  105
     020064  123  123  040
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                020067  122     102     125
                020072  106     000
     3382       020074  103     101     116     EM10:   .ASCIZ  /CAN NOT ACCESS LKS/
                020077  040     116     117
                020102  124     040     101
                020105  103     103     105
                020110  123     123     040
                020113  114     113     123
                020116  000
     3383       020117  102     111     124     EM11:   .ASCIZ  /BIT0 OF TCSR NOT CLEAR AFTER RESET/
                020122  060     040     117
                020125  106     040     124
                020130  103     123     122
                020133  040     116     117
                020136  124     040     103
                020141  114     105     101
                020144  122     040     101
                020147  106     124     105
                020152  122     040     122
                020155  105     123     105
                020160  124     000
     3384       020162  103     101     116     EM12:   .ASCIZ  /CAN NOT SET BIT0 OF TCSR/
                020165  040     116     117
                020170  124     040     123
                020173  105     124     040
                020176  102     111     124
                020201  060     040     117
                020204  106     040     124
                020207  103     123     122
                020212  000
     3385       020213  103     101     116     EM13:   .ASCIZ  /CAN NOT CLEAR BIT0 OF TCSR/
                020216  040     116     117
                020221  124     040     103
                020224  114     105     101
                020227  122     040     102
                020232  111     124     060
                020235  040     117     106
                020240  040     124     103
                020243  123     122     000
     3386       020246  122     105     123     EM14:   .ASCIZ  /RESET DID NOT CLEAR BIT0 OF TCSR/
                020251  105     124     040
                020254  104     111     104
                020257  040     116     117
                020262  124     040     103
                020265  114     105     101
                020270  122     040     102
                020273  111     124     060
                020276  040     117     106
                020301  040     124     103
                020304  123     122     000
     3387       020307  102     111     124     EM15:   .ASCIZ  /BIT2 OF TCSR NOT CLEAR AFTER RESET/
                020312  062     040     117
                020315  106     040     124
                020320  103     123     122
                020323  040     116     117
                020326  124     040     103
                020331  114     105     101
```

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                020334  122     040     101
                020337  106     124     105
                020342  122     040     122
                020345  105     123     105
                020350  124     000
3388            020352  103     101     116     EM16:   .ASCIZ  /CAN NOT SET BIT2 OF TCSR/
                020355  040     116     117
                020360  124     040     123
                020363  105     124     040
                020366  102     111     124
                020371  062     040     117
                020374  106     040     124
                020377  103     123     122
                020402  000
3389            020403  103     101     116     EM17:   .ASCIZ  /CAN NOT CLEAR BIT2 OF TCSR/
                020406  040     116     117
                020411  124     040     103
                020414  114     105     101
                020417  122     040     102
                020422  111     124     062
                020425  040     117     106
                020430  040     124     103
                020433  123     122     000
3390            020436  122     105     123     EM20:   .ASCIZ  /RESET DID NOT CLEAR BIT2 OF TCSR/
                020441  105     124     040
                020444  104     111     104
                020447  040     116     117
                020452  124     040     103
                020455  114     105     101
                020460  122     040     102
                020463  111     124     062
                020466  040     117     106
                020471  040     124     103
                020474  123     122     000
3391            020477  102     111     124     EM21:   .ASCIZ  /BIT6 OF TCSR NOT CLEAR AFTER RESET/
                020502  066     040     117
                020505  106     040     124
                020510  103     123     122
                020513  040     116     117
                020516  124     040     103
                020521  114     105     101
                020524  122     040     101
                020527  106     124     105
                020532  122     040     122
                020535  105     123     105
                020540  124     000
3392            020542  130     115     111     EM22:   .ASCIZ  /XMIT INTERRUPT AT PRIORITY 7/
                020545  124     040     111
                020550  116     124     105
                020553  122     122     125
                020556  120     124     040
                020561  101     124     040
                020564  120     122     111
                020567  117     122     111
                020572  124     131     040
                020575  067     000
3393            020577  103     101     116     EM23:   .ASCIZ  /CAN NOT SET BIT6 OF TCSR/
```

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        020602  040     116     117
        020605  124     040     123
        020610  105     124     040
        020613  102     111     124
        020616  066     040     117
        020621  106     040     124
        020624  103     123     122
        020627  000
  3394  020630  103     101     116  EM24:   .ASCIZ  /CAN NOT CLEAR BIT6 OF TCSR/
        020633  040     116     117
        020636  124     040     103
        020641  114     105     101
        020644  122     040     102
        020647  111     124     066
        020652  040     117     106
        020655  040     124     103
        020660  123     122     000
  3395  020663  122     105     123  EM25:   .ASCIZ  /RESET DID NOT CLEAR BIT6 OF TCSR/
        020666  105     124     040
        020671  104     111     104
        020674  040     116     117
        020677  124     040     103
        020702  114     105     101
        020705  122     040     102
        020710  111     124     066
        020713  040     117     106
        020716  040     124     103
        020721  123     122     000
  3396  020724  102     111     124  EM26:   .ASCIZ  /BIT6 OF RCSR NOT CLEAR AFTER RESET/
        020727  066     040     117
        020732  106     040     122
        020735  103     123     122
        020740  040     116     117
        020743  124     040     103
        020746  114     105     101
        020751  122     040     101
        020754  106     124     105
        020757  122     040     122
        020762  105     123     105
        020765  124     000
  3397  020767  122     103     126  EM27:   .ASCIZ  /RCVR INTERRUPT WITH PRIORITY 7/
        020772  122     040     111
        020775  116     124     105
        021000  122     122     125
        021003  120     124     040
        021006  127     111     124
        021011  110     040     120
        021014  122     111     117
        021017  122     111     124
        021022  131     040     067
        021025  000
  3398  021026  103     101     116  EM30:   .ASCIZ  /CAN NOT SET BIT6 OF RCSR/
        021031  040     116     117
        021034  124     040     123
        021037  105     124     040
        021042  102     111     124
        021045  066     040     117
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                021050  106     040     122
                021053  103     123     122
                021056  000
  3399          021057  103     101     116     EM31:   .ASCIZ  /CAN NOT CLEAR BIT6 OF RCSR/
                021062  040     116     117
                021065  124     040     103
                021070  114     105     101
                021073  122     040     102
                021076  111     124     066
                021101  040     117     106
                021104  040     122     103
                021107  123     122     000
  3400          021112  103     101     116     EM32:   .ASCIZ  /CAN NOT CLEAR BIT6 OF RCSR WITH RESET/
                021115  040     116     117
                021120  124     040     103
                021123  114     105     101
                021126  122     040     102
                021131  111     124     066
                021134  040     117     106
                021137  040     122     103
                021142  123     122     040
                021145  127     111     124
                021150  110     040     122
                021153  105     123     105
                021156  124     000
  3401          021160  102     111     124     EM33:   .ASCIZ  /BIT6 OF LKS NOT CLEAR AFTER RESET/
                021163  066     040     117
                021166  106     040     114
                021171  113     123     040
                021174  116     117     124
                021177  040     103     114
                021202  105     101     122
                021205  040     101     106
                021210  124     105     122
                021213  040     122     105
                021216  123     105     124
                021221  000
  3402          021222  114     113     123     EM34:   .ASCIZ  /LKS INTERRUPT WITH PRIORITY 7/
                021225  040     111     116
                021230  124     105     122
                021233  122     125     120
                021236  124     040     127
                021241  111     124     110
                021244  040     120     122
                021247  111     117     122
                021252  111     124     131
                021255  040     067     000
  3403          021260  103     101     116     EM35:   .ASCIZ  /CAN NOT SET BIT6 OF LKS/
                021263  040     116     117
                021266  124     040     123
                021271  105     124     040
                021274  102     111     124
                021277  066     040     117
                021302  106     040     114
                021305  113     123     000
  3404          021310  103     101     116     EM36:   .ASCIZ  /CAN NOT CLEAR BIT6 OF LKS/
                021313  040     116     117
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                021316  124     040     103
                021321  114     105     101
                021324  122     040     102
                021327  111     124     066
                021332  040     117     106
                021335  040     114     113
                021340  123     000
3405            021342  122     105     123     EM37:   .ASCIZ  /RESET DID NOT CLEAR BIT6 OF LKS/
                021345  105     124     040
                021350  104     111     104
                021353  040     116     117
                021356  124     040     103
                021361  114     105     101
                021364  122     040     102
                021367  111     124     066
                021372  040     117     106
                021375  040     114     113
                021400  123     000
3406            021402  104     125     101     EM40:   .ASCIZ  /DUAL ADDRESSING ERROR/
                021405  114     040     101
                021410  104     104     122
                021413  105     123     123
                021416  111     116     107
                021421  040     105     122
                021424  122     117     122
                021427  000
3407            021430  102     111     124     EM41:   .ASCIZ  /BIT6 OF LKS NOT SET AFTER RESET/
                021433  066     040     117
                021436  106     040     114
                021441  113     123     040
                021444  116     117     124
                021447  040     123     105
                021452  124     040     101
                021455  106     124     105
                021460  122     040     122
                021463  105     123     105
                021466  124     000
3408            021470  103     101     116     EM42:   .ASCIZ  /CAN NOT CLEAR BIT7 OF LKS/
                021473  040     116     117
                021476  124     040     103
                021501  114     105     101
                021504  122     040     102
                021507  111     124     067
                021512  040     117     106
                021515  040     114     113
                021520  123     000
3409            021522  102     111     124     EM43:   .ASCIZ  /BIT7 OF LKS DOES NOT SET/
                021525  067     040     117
                021530  106     040     114
                021533  113     123     040
                021536  104     117     105
                021541  123     040     116
                021544  117     124     040
                021547  123     105     124
                021552  000
3410            021553  122     124     103     EM44:   .ASCIZ  /RTC INTERRUPT AT PRIORITY 7/
                021556  040     111     116
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                021561  124     105     122
                021564  122     125     120
                021567  124     040     101
                021572  124     040     120
                021575  122     111     117
                021600  122     111     124
                021603  131     040     067
                021606  000
3411            021607  122     124     103     EM45:   .ASCIZ  /RTC INTERRUPTS WHEN DISABLED/
                021612  040     111     116
                021615  124     105     122
                021620  122     125     120
                021623  124     123     040
                021626  127     110     105
                021631  116     040     104
                021634  111     123     101
                021637  102     114     105
                021642  104     000
3412            021644                  EM47:
3413            021644  122     124     103     EM46:   .ASCIZ  /RTC INTERRUPT DID NOT OCCUR/
                021647  040     111     116
                021652  124     105     122
                021655  122     125     120
                021660  124     040     104
                021663  111     104     040
                021666  116     117     124
                021671  040     117     103
                021674  103     125     122
                021677  000
3414            021700  122     124     103     EM50:   .ASCIZ  /RTC DOUBLE INTERRUPT/
                021703  040     104     117
                021706  125     102     114
                021711  105     040     111
                021714  116     124     105
                021717  122     122     125
                021722  120     124     000
3415            021725  122     105     123     EM51:   .ASCIZ  /RESET DID NOT INTERRUPT/
                021730  105     124     040
                021733  104     111     104
                021736  040     116     117
                021741  124     040     111
                021744  116     124     105
                021747  122     122     125
                021752  120     124     000
3416            021755  122     124     103     EM52:   .ASCIZ  /RTC INTERRUPT DID NOT CLEAR WITH BIT7 OF LKS/
                021760  040     111     116
                021763  124     105     122
                021766  122     125     120
                021771  124     040     104
                021774  111     104     040
                021777  116     117     124
                022002  040     103     114
                022005  105     101     122
                022010  040     127     111
                022013  124     110     040
                022016  102     111     124
                022021  067     040     117
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        022024  106  040  114
        022027  113  123  000
  3417  022032  103  114  117  EM53:   .ASCIZ  /CLOCK REPEATABILITY/
        022035  103  113  040
        022040  122  105  120
        022043  105  101  124
        022046  101  102  111
        022051  114  111  124
        022054  131  000
  3418  022056  130  115  111  EM54:   .ASCIZ  /XMIT INTERRUPTS WHEN DISABLED/
        022061  124  040  111
        022064  116  124  105
        022067  122  122  125
        022072  120  124  123
        022075  040  127  110
        022100  105  116  040
        022103  104  111  123
        022106  101  102  114
        022111  105  104  000
  3419  022114  130  115  111  EM56:   .ASCIZ  /XMIT INTERRUPTS AT PRIORITY 7/
        022117  124  040  111
        022122  116  124  105
        022125  122  122  125
        022130  120  124  123
        022133  040  101  124
        022136  040  120  122
        022141  111  117  122
        022144  111  124  131
        022147  040  067  000
  3420  022152  130  115  111  EM57:   .ASCIZ  /XMIT INTERRUPTS WITH ENABLE CLEAR/
        022155  124  040  111
        022160  116  124  105
        022163  122  122  125
        022166  120  124  123
        022171  040  127  111
        022174  124  110  040
        022177  105  116  101
        022202  102  114  105
        022205  040  103  114
        022210  105  101  122
        022213  000
  3421  022214                   EM55:
  3422  022214  130  115  111  EM60:   .ASCIZ  /XMIT DID NOT INTERRUPT/
        022217  124  040  104
        022222  111  104  040
        022225  116  117  124
        022230  040  111  116
        022233  124  105  122
        022236  122  125  120
        022241  124  000
  3423  022243  130  115  111  EM61:   .ASCIZ  /XMIT RE-INTERRUPTED/
        022246  124  040  122
        022251  105  055  111
        022254  116  124  105
        022257  122  122  125
        022262  120  124  105
        022265  104  000
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3424 022267  114  117  101  EM62:   .ASCIZ  /LOADING TBUF DID NOT CLEAR INTERRUPT/
     022272  104  111  116
     022275  107  040  124
     022300  102  125  106
     022303  040  104  111
     022306  104  040  116
     022311  117  124  040
     022314  103  114  105
     022317  101  122  040
     022322  111  116  124
     022325  105  122  122
     022330  125  120  124
     022333  000
3425 022334  122  103  126  EM63:   .ASCIZ  /RCVR ACTIVE NOT SET/
     022337  122  040  101
     022342  103  124  111
     022345  126  105  040
     022350  116  117  124
     022353  040  123  105
     022356  124  000
3426 022360  122  103  126  EM64:   .ASCIZ  /RCVR DONE NEVER SET/
     022363  122  040  104
     022366  117  116  105
     022371  040  116  105
     022374  126  105  122
     022377  040  123  105
     022402  124  000
3427 022404  122  103  126  EM65:   .ASCIZ  /RCVR ACTIVE NOT CLEARED WITH DONE SET/
     022407  122  040  101
     022412  103  124  111
     022415  126  105  040
     022420  116  117  124
     022423  040  103  114
     022426  105  101  122
     022431  105  104  040
     022434  127  111  124
     022437  110  040  104
     022442  117  116  105
     022445  040  123  105
     022450  124  000
3428 022452  122  105  123  EM66:   .ASCIZ  /RESET DID NOT CLEAR RCVR DONE/
     022455  105  124  040
     022460  104  111  104
     022463  040  116  117
     022466  124  040  103
     022471  114  105  101
     022474  122  040  122
     022477  103  126  122
     022502  040  104  117
     022505  116  105  000
3429 022510  122  104  122  EM67:   .ASCIZ  /RDR ENABLE DID NOT CLEAR RCVR DONE/
     022513  040  105  116
     022516  101  102  114
     022521  105  040  104
     022524  111  104  040
     022527  116  117  124
     022532  040  103  114
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        022535  105     101     122
        022540  040     122     103
        022543  126     122     040
        022546  104     117     116
        022551  105     000
  3430  022553  122     105     101     EM70:   .ASCIZ  /READING RBUF DID NOT CLEAR RCVR DONE/
        022556  104     111     116
        022561  107     040     122
        022564  102     125     106
        022567  040     104     111
        022572  104     040     116
        022575  117     124     040
        022600  103     114     105
        022603  101     122     040
        022606  122     103     126
        022611  122     040     104
        022614  117     116     105
        022617  000
  3431  022620  122     103     126     EM71:   .ASCIZ  /RCVR INTERRUPTS WITH ENABLE CLEAR/
        022623  122     040     111
        022626  116     124     105
        022631  122     122     125
        022634  120     124     123
        022637  040     127     111
        022642  124     110     040
        022645  105     116     101
        022650  102     114     105
        022653  040     103     114
        022656  105     101     122
        022661  000
  3432  022662  122     103     126     EM73:   .ASCIZ  /RCVR INTERRUPTS AT PRIORITY 7/
        022665  122     040     111
        022670  116     124     105
        022673  122     122     125
        022676  120     124     123
        022701  040     101     124
        022704  040     120     122
        022707  111     117     122
        022712  111     124     131
        022715  040     067     000
  3433  022720  122     103     126     EM74:   .ASCIZ  /RCVR INT RQST PASSED WITH ENABLE CLEAR/
        022723  122     040     111
        022726  116     124     040
        022731  122     121     123
        022734  124     040     120
        022737  101     123     123
        022742  105     104     040
        022745  127     111     124
        022750  110     040     105
        022753  116     101     102
        022756  114     105     040
        022761  103     114     105
        022764  101     122     000
  3434  022767                        EM72:
  3435  022767  122     103     126     EM75:   .ASCIZ  /RCVR DID NOT INTERRUPT/
        022772  122     040     104
        022775  111     104     040
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        023000  116     117     124
        023003  040     111     116
        023006  124     105     122
        023011  122     125     120
        023014  124     000
  3436  023016  122     103     126  EM76:   .ASCIZ  /RCVR RE-INTERRUPTED/
        023021  122     040     122
        023024  105     055     111
        023027  116     124     105
        023032  122     122     125
        023035  120     124     105
        023040  104     000
  3437  023042  122     105     101  EM77:   .ASCIZ  /READING RBUF DID NOT CLEAR INTERRUPT/
        023045  104     111     116
        023050  107     040     122
        023053  102     125     106
        023056  040     104     111
        023061  104     040     116
        023064  117     124     040
        023067  103     114     105
        023072  101     122     040
        023075  111     116     124
        023100  105     122     122
        023103  125     120     124
        023106  000
  3438  023107  122     105     123  EM100:  .ASCIZ  /RESET DID NOT CLEAR RCVR INTERRUPT/
        023112  105     124     040
        023115  104     111     104
        023120  040     116     117
        023123  124     040     103
        023126  114     105     101
        023131  122     040     122
        023134  103     126     122
        023137  040     111     116
        023142  124     105     122
        023145  122     125     120
        023150  124     000
  3439  023152  047     117     122  EM101:  .ASCIZ  /'OR' FLAG DID NOT SET/
        023155  047     040     106
        023160  114     101     107
        023163  040     104     111
        023166  104     040     116
        023171  117     124     040
        023174  123     105     124
        023177  000
  3440  023200  047     105     122  EM102:  .ASCIZ  /'ERROR' NOT SET WITH 'OR' FLAG/
        023203  122     117     122
        023206  047     040     116
        023211  117     124     040
        023214  123     105     124
        023217  040     127     111
        023222  124     110     040
        023225  047     117     122
        023230  047     040     106
        023233  114     101     107
        023236  000
  3441  023237  102     122     105  EM103:  .ASCIZ  /BREAK DID NOT XMIT ALL ZEROES/
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        023242  101  113  040
        023245  104  111  104
        023250  040  116  117
        023253  124  040  130
        023256  115  111  124
        023261  040  101  114
        023264  114  040  132
        023267  105  122  117
        023272  105  123  000
3442    023275  102  122  105  EM104:  .ASCIZ  /BREAK DID NOT SET 'FR' ERROR/
        023300  101  113  040
        023303  104  111  104
        023306  040  116  117
        023311  124  040  123
        023314  105  124  040
        023317  047  106  122
        023322  047  040  105
        023325  122  122  117
        023330  122  000
3443    023332  104  101  124  EM105:  .ASCIZ  /DATA COMPARE ERROR/
        023335  101  040  103
        023340  117  115  120
        023343  101  122  105
        023346  040  105  122
        023351  122  117  122
        023354  000
3444    023355  104  101  124  EM106:   ASCIZ  /DATA COMPARE ERROR WITH CABLE/
        023360  101  040  103
        023363  117  115  120
        023366  101  122  105
        023371  040  105  122
        023374  122  117  122
        023377  040  127  111
        023402  124  110  040
        023405  103  101  102
        023410  114  105  000
3445    023413  124  111  115  EM107:  .ASCIZ  /TIMEOUT IN EXERCISER TEST/
        023416  105  117  125
        023421  124  040  111
        023424  116  040  105
        023427  130  105  122
        023432  103  111  123
        023435  105  122  040
        023440  124  105  123
        023443  124  000
3446    023445  111  116  103  EM110:  .ASCIZ  /INCORRECT RECEIVE COUNT/
        023450  117  122  122
        023453  105  103  124
        023456  040  122  105
        023461  103  105  111
        023464  126  105  040
        023467  103  117  125
        023472  116  124  000
3447    023475  104  101  124  EM111:  .ASCIZ  /DATA COMPARE ERROR IN EXERCISER/
        023500  101  040  103
        023503  117  115  120
        023506  101  122  105
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        023511  040     105     122
        023514  122     117     122
        023517  040     111     116
        023522  040     105     130
        023525  105     122     103
        023530  111     123     105
        023533  122     000
3448    023535  124     122     101     EM112:  .ASCIZ  /TRAP CATCHER/
        023540  120     040     103
        023543  101     124     103
        023546  110     105     122
        023551  000
3449    023552  116     117     040     EM113:  .ASCIZ  /NO CLK INTERRUPT IN EXERCISER/
        023555  103     114     113
        023560  040     111     116
        023563  124     105     122
        023566  122     125     120
        023571  124     040     111
        023574  116     040     105
        023577  130     105     122
        023602  103     111     123
        023605  105     122     000
3450    023610  042     105     122     EM114:  .ASCIZ  /''ERROR'' NOT SET WITH ''FR'' FLAG/
        023613  122     117     122
        023616  042     040     116
        023621  117     124     040
        023624  123     105     124
        023627  040     127     111
        023632  124     110     040
        023635  042     106     122
        023640  042     040     106
        023643  114     101     107
        023646  000
3451    023647  122     103     126     EM115:  .ASCIZ  /RCV ACTIVE NOT CLEAR WITH INIT/
        023652  040     101     103
        023655  124     111     126
        023660  105     040     116
        023663  117     124     040
        023666  103     114     105
        023671  101     122     040
        023674  127     111     124
        023677  110     040     111
        023702  116     111     124
        023705  000
3452    023706  122     103     126     EM116:  .ACCIZ  /RCV ACTIVE WITHOUT ''START'' BIT/
        023711  040     101     103
        023714  124     111     126
        023717  105     040     127
        023722  111     124     110
        023725  117     125     124
        023730  040     042     123
        023733  124     101     122
        023736  124     042     040
        023741  102     111     124
        023744  000
3453    023745  122     104     122     EM117:  .ASCIZ  /RDR ENABLE NOT CLEAR WITH RCV ACTIVE/
        023750  040     105     116
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        023753  101     102     114
        023756  105     040     116
        023761  117     124     040
        023764  103     114     105
        023767  101     122     040
        023772  127     111     124
        023775  110     040     122
        024000  103     126     040
        024003  101     103     124
        024006  111     126     105
        024011  000
  3454
  3455  024012  124     105     123   DH1:    .ASCIZ  /TEST#   ERROR#  TCSR/
        024015  124     043     040
        024020  040     040     105
        024023  122     122     117
        024026  122     043     040
        024031  040     124     103
        024034  123     122     000
  3456  024037  124     105     123   DH2:    .ASCIZ  /TEST#   ERR PC  TBUF/
        024042  124     043     040
        024045  040     040     105
        024050  122     122     040
        024053  120     103     040
        024056  040     124     102
        024061  125     106     000
  3457  024064  124     105     123   DH6:    .ASCIZ  /TEST#   ERR PC  RCSR/
        024067  124     043     040
        024072  040     040     105
        024075  122     122     040
        024100  120     103     040
        024103  040     122     103
        024106  123     122     000
  3458  024111  124     105     123   DH7:    .ASCIZ  /TEST#   ERR PC  RBUF/
        024114  124     043     040
        024117  040     040     105
        024122  122     122     040
        024125  120     103     040
        024130  040     122     102
        024133  125     106     000
  3459  024136  124     105     123   DH10:   .ASCIZ  /TEST#   ERR PC  LKS/
        024141  124     043     040
        024144  040     040     105
        024147  122     122     040
        024152  120     103     040
        024155  040     114     113
        024160  123     000
  3460  024162  124     105     123   DH40:   .ASCIZ  /TEST#   ERR PC  GOOD    BAD/
        024165  124     043     040
        024170  040     040     105
        024173  122     122     040
        024176  120     103     040
        024201  040     107     117
        024204  117     104     040
        024207  040     040     040
        024212  102     101     104
        024215  000
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 3461 024216  124  105  123  DH53:   .ASCIZ  /TEST#   ERR PC  LKS     CNT1    CNT2/
      024221  124  043  040
      024224  040  040  105
      024227  122  122  040
      024232  120  103  040
      024235  040  114  113
      024240  123  040  040
      024243  040  040  040
      024246  103  116  124
      024251  061  040  040
      024254  040  040  103
      024257  116  124  062
      024262  000
 3462 024263  124  105  123  DH103:  .ASCIZ  /TEST#   ERR PC  RCSR    DATA/
      024266  124  043  040
      024271  040  040  105
      024274  122  122  040
      024277  120  103  040
      024302  040  122  103
      024305  123  122  040
      024310  040  040  040
      024313  104  101  124
      024316  101  000
 3463 024320  124  105  123  DH105:  .ASCIZ  /TEST#   ERR PC  RCSR    GOOD    BAD/
      024323  124  043  040
      024326  040  040  105
      024331  122  122  040
      024334  120  103  040
      024337  040  122  103
      024342  123  122  040
      024345  040  040  040
      024350  107  117  117
      024353  104  040  040
      024356  040  040  102
      024361  101  104  000
 3464 024364  124  105  123  DH110:  .ASCIZ  /TEST#   ERR PC  RCSR    TRANS   RCV/
      024367  124  043  040
      024372  040  040  105
      024375  122  122  040
      024400  120  103  040
      024403  040  122  103
      024406  123  122  040
      024411  040  040  040
      024414  124  122  101
      024417  116  123  040
      024422  040  040  122
      024425  103  126  000
 3465 024430  124  105  123  DH112:  .ASCIZ  /TEST#   ERR PC  RCSR    OLDPC   TRAP ADR/
      024433  124  043  040
      024436  040  040  105
      024441  122  122  040
      024444  120  103  040
      024447  040  122  103
      024452  123  122  040
      024455  040  040  040
      024460  117  114  104
      024463  120  103  040
```

```
                024466  040     040     124
                024471  122     101     120
                024474  040     101     104
                024477  122     000
 3466                                           .EVEN
 3467 024502    015     012     103     M1:    .ASCIZ  <CR><LF>/CZDLDDO DL11-W,1144 MFM SLU/
      024505    132     104     114
      024510    104     104     060
      024513    040     104     114
      024516    061     061     055
      024521    127     054     061
      024524    061     064     064
      024527    040     115     106
      024532    115     040     123
      024535    114     125     000
 3468                                           .EVEN
 3469 024540    015     012             M2:    .ASCII  <CR><LF>
 3470 024542    040     040     040     M2A:   .ASCIZ  /   DEVICES UNDER TEST  /
      024545    104     105     126
      024550    111     103     105
      024553    123     040     125
      024556    116     104     105
      024561    122     040     124
      024564    105     123     124
      024567    040     040     000
 3471
 3472                                           .EVEN
 3473 024572    001072  001016  002640  DT1:   .WORD   $TESTN,$ERRPC,TCSR,0
      024600    000000
 3474 024602    001072  001016  002642  DT2:   .WORD   $TESTN,$ERRPC,TBUF,0
      024610    000000
 3475 024612    001072  001016  002634  DT6:   .WORD   $TESTN,$ERRPC,RCSR,0
      024620    000000
 3476 024622    001072  001016  002636  DT7:   .WORD   $TESTN,$ERRPC,RBUF,0
      024630    000000
 3477 024632    001072  001016  002674  DT10:  .WORD   $TESTN,$ERRPC,LKS,0
      024640    000000
 3478 024642    001072  001016  001020  DT40:  .WORD   $TESTN,$ERRPC,$GDADR,$BDADR,0
      024650    001022  000000
 3479 024654    001072  001016  002674  DT53:  .WORD   $TESTN,$ERRPC,LKS,FIRST,SECND,0
      024662    002336  002616  000000
 3480 024670    001072  001016  002634  DT103: .WORD   $TESTN,$ERRPC,RCSR,$BDDAT,0
      024676    001026  000000
 3481 024702    001072  001016  002634  DT105: .WORD   $TESTN,$ERRPC,RCSR,$GDDAT,$BDDAT,0
      024710    001024  001026  000000
 3482 024716    001072  001016  002634  DT110: .WORD   $TESTN,$ERRPC,RCSR,XMTCNT,RCVCNT,0
      024724    002442  002440  000000
 3483 024732    001072  001016  002634  DT112: .WORD   $TESTN,$ERRPC,RCSR,OLDPC,BDVECT,0
      024740    002620  002622  000000
 3484 024746    000000          ENDADR: .WORD  0                ;END ADDRESS FOR CHECKSUM AND SAVE AREA
 3485                                                           ;OF WRAP AROUND CONSOLE TEST
 3486
 3487           000001                          .END
```

.MAIN. MACRO M1111 20-SEP-79 10:37 PAGE 123-16
SYMBOL TABLE

SEQ 0122

```
ABASE = 176500        BGNADD= 003014        DH110   024364        EM27    020767        GETLIN  014134
ACDW1 = 000000        BIT0  = 000001        DH112   024430        EM3     017700        GOAGIN  014504
ACDW2 = 000000        BIT00 = 000001        DH2     024037        EM30    021026        GTSWR - 104405
ACPUOP= 000000        BIT01 = 000002        DH40    024162        EM31    021057        HT    = 000011
ADDW0 = 000000        BIT02 = 000004        DH53    024216        EM32    021112        ID      004620
ADDW1 = 000000        BIT03 = 000010        DH6     024064        EM33    021160        INIT    003462
ADDW10= 000000        BIT04 = 000020        DH7     024111        EM34    021222        IOTVEC= 000020
ADDW11= 000000        BIT05 = 000040        DISPLA  001042        EM35    021260        JIMSTK  002432
ADDW12= 000000        BIT06 = 000100        DISPRE  000174        EM36    021310        LF    = 000012
ADDW13= 000000        BIT07 = 000200        DSWR  = 177570        EM37    021342        LKS     002674
ADDW14= 000000        BIT08 = 000400        DT1     024572        EM4     017745        LOC1    002340
ADDW15= 000000        BIT09 = 001000        DT10    024632        EM40    021402        LOC2    002342
ADDW2 = 000000        BIT1  = 000002        DT103   024670        EM41    021430        MANL    003502
ADDW3 = 000000        BIT10 = 002000        DT105   024702        EM42    021470        MFPT  = 000007
ADDW4 = 000000        BIT11 = 004000        DT110   024716        EM43    021522        MFR     017507
ADDW5 = 000000        BIT12 = 010000        DT112   024732        EM44    021553        MUR     017521
ADDW6 = 000000        BIT13 = 020000        DT2     024602        EM45    021607        MPAR    017476
ADDW7 = 000000        BIT14 = 040000        DT40    024642        EM46    021644        MSG     017450
ADDW8 = 000000        BIT15 = 100000        DT53    024654        EM47    021644        MSTOP   017534
ADDW9 = 000000        BIT2  = 000004        DT6     024612        EM5     017767        M1      024502
ADEVCT= 000000        BIT3  = 000010        DT7     024622        EM50    021700        M2      024540
ADEVM = 000000        BIT4  = 000020        DVADT   003664        EM51    021725        M2A     024542
ADR     004132        BIT5  = 000040        ECHO    017324        EM52    021755        NOEOP   014370
ADRTBL  002702        BIT6  = 000100        EMTVEC= 000030        EM53    022032        OLDPC   002620
AENV  = 000000        BIT7  = 000200        EM1     017630        EM54    022056        OLDSUM  002436
AENVM = 000000        BIT8  = 000400        EM10    020074        EM55    022214        OUTTST  017544
AFATAL= 000000        BIT9  = 001000        EM100   023107        EM56    022114        PIRQ  = 177772
AMADR1= 000000        BPT   = 000003        EM101   023152        EM57    022152        PIRQVE= 000240
AMADR2= 000000        BPTVEC= 000014        EM102   023200        EM6     020024        PROMPT  002566
AMADR3= 000000        BUF     002454        EM103   023237        EM60    022214        PR0   = 000000
AMADR4= 000000        CATCH   014552        EM104   023275        EM61    022243        PR1   = 000040
AMAMS1= 000000        CHKSUM  014062        EM105   023332        EM62    022267        PR2   = 000100
AMAMS2= 000000        CKSWR = 104406        EM106   023355        EM63    022334        PR3   = 000140
AMAMS3= 000000        CLK     013702        EM107   023413        EM64    022360        PR4   = 000200
AMAMS4= 000000        CLKCNT  002444        EM11    020117        EM65    022404        PR5   = 000240
AMSGAD= 000000        CMPARE  007244        EM110   023445        EM66    022452        PR6   = 000300
AMSGLG= 000000        CNTLP   002564        EM111   023475        EM67    022510        PR7   = 000340
AMSGTY= 000000        COMP    013504        EM112   023535        EM7     020050        PS    = 177776
AMTYP1= 000000        CONT    006246        EM113   023552        EM70    022553        PSW   = 177776
AMTYP2= 000000        CONT41  012400        EM114   023610        EM71    022620        PUTLIN  014102
AMTYP3= 000000        CR    = 000015        EM115   023647        EM72    022767        PWRVEC= 000024
AMTYP4= 000000        CRBUF   002656        EM116   023706        EM73    022662        RBUF    002636
APASS = 000000        CRCSR   002654        EM117   023745        EM74    022720        RBUF58= 176502
APRIOR= 000000        CRLF  - 000200        EM12    020162        EM75    022767        RCSR    002634
APTCSU= 000040        CRPSW   002666        EM13    020213        EM76    023016        RCSR58= 176500
APTENV= 000001        CRVECT  002664        EM14    020246        EM77    023042        RCV     013666
APTSIZ= 000200        CTBUF   002662        EM15    020307        ENDADD= 024746        RCVCNT  002440
APTSPO= 000100        CTCSR   002660        EM16    020352        ENDADR  024746        RCVDON  010266
APTSZD  003636        CTPSW   002672        EM17    020403        ENDB7   004676        RDCHR = 104407
ASWREG= 000000        CTSTFL  002624        EM2     017654        ENDEV   014344        RDLIN = 104410
ATESTN= 000000        CTVECT  002670        EM20    020436        ENDMG   014470        RESTTE  014310
AUNIT - 000000        DDISP = 177570        EM21    020477        ENDSTK  002412        RESVEC= 000010
AUSWR = 000400        DEVADR  003014        EM22    020542        ERROR = 104000        RPSW    002646
AVECT1= 000300        DH1     024012        EM23    020577        ERRVEC= 000004        RSTRT   014530
AVECT2  000000        DH10    024136        EM24    020630        FIRST   002336        RTCPSW  002700
BDVECT  002622        DH103   024263        EM25    020663        FLAG44  003002        RTCVT   002676
BEGIN   003774        DH105   024320        EM26    020724        GETB    014200        RVECT   002644
```

.MAIN. MACRO M'111 20-SEP-79 10:37 PAGE 123-17
SYMBOL TABLE

SEQ 0123

```
R6     =%000006        TCSR    002640  TST7    005012  $ERMAX  001015  $PASS   001074
R7     =%000007        TCSR58= 176504  TURBUF  003006  $ERROR  014576  $PASTM  000506
SAVEPS  002434         TIMER   014234  TURCSR  003004  $ERRPC  001016  $POWER  015262
SAVETE  014254         TKVEC = 000060  TUTBUF  003012  $ERRTB  001146  $PWRDN  015114
SAVEO   002344         TMP1    002626  TUTCSR  003010  $ERRTY  014760  $PWRMG  015250
SAVLOC  002346         TMP2    002630  TVECT   002650  $ERTTL  001012  $PWRUP  015166
SCOPE = 000004         TMP3    002632  TYPE  = 104401  $ESCAP  001060  $QUES   001062
SCPSW   002452         TOLER   007256  TYPOC = 104402  $ETABL  001106  $RDCHR  016754
SECND   002616         TPSW    002652  TYPON = 104404  $ETEND  001146  $RDLIN  017074
SETADR  004100         TPVEC = 000064  TYPOS = 104403  $FATAL  001070  $RDSZ = 000010
SHIFT   003740         TRAPVE= 000034  VCTADR  003670  $FFLG   015710  $RTNAD  014462
SIZE    003512         TRTVEC= 000014  VCTTBL  002742  $FILLC  001056  $SAVR6  015260
SRPSW   002450         TSTDEV  004050  VECT    004152  $FILLS  001055  $SCOPE  015272
STACK = 001100         TSTDVM  003646  WACTV   010150  $GDADR  001020  $SETUP= 000137
START   003046         TST1    004172  WAIT    017456  $GDDAT  001024  $STUP = 177777
STKLMT= 177774         TST10   005044  WDONE   010302  $GET42  014440  $SVLAD  015374
STPSW   002446         TST11   005252  WRAP    013712  $GTSWR  016542  $SVPC = 000500
SWR     001040         TST12   005404  WRPSW   014540  $HIBTS  000500  $SWR  = 161000
SWREG   000176         TST13   005544  WT      010236  $ICNT   001004  $SWREG  001110
SW0   = 000001         TST14   005614  XCONT   013656  $ILLUP  015254  $SWRMK= 000000
SW00  = 000001         TST15   005764  XMIT    013614  $INTAG  001035  $TESTN  001072
SW01  = 000002         TST16   006154  XMITCNT 002442  $ITEMB  001014  $TKB    001046
SW02  = 000004         TST17   006262  XRET    013662  $LF     001064  $TKS    001044
SW03  = 000010         TST2    004244  $APTHD  000500  $LFLG   015707  $TN   = 000047
SW04  = 000020         TST20   006504  $ATYC   015470  $LPADR  001006  $TPB    001052
SW05  = 000040         TST21   006660  $ATY1   015444  $LPERR  001010  $TPFLG  001057
SW06  = 000100         TST22   007002  $ATY3   015452  $MADR1  001120  $TPS    001050
SW07  = 000200         TST23   007136  $ATY4   015462  $MADR2  001124  $TRAP   017246
SW08  - 000400         TST24   007324  $AUTOB  001034  $MADR3  001130  $TRAP2  017270
SW09  - 001000         TST25   007432  $BASE   001142  $MADR4  001134  $TRP  = 000011
SW1   - 000002         TST26   007560  $BDADR  001022  $MAIL   001066  $TRPAD  017302
SW10  - 002000         TST27   007722  $BDDAT  001026  $MAMS1  001116  $TSTM   000504
SW11  - 004000         TST3    004316  $CHARC  016240  $MAMS2  001122  $TSTNM  001002
SW12  = 010000         TST30   010066  $CKSWR  016472  $MAMS3  001126  $TTYIN  017202
SW13  = 020000         TST31   010402  $CMTAG  001000  $MAMS4  001132  $TYPE   015712
SW14  = 040000         TST32   010504  $CM3   = 000000  $MBADR  000502  $TYPEC  016124
SW15  - 100000         TST33   010640  $CNTLG  017217  $MFLG   015706  $TYPEX  016242
SW2   = 000004         TST34   011050  $CNTLU  017212  $MNEW   017235  $TYPOC  016270
SW3     000010         TST35   011262  $CPUOP  001114  $MSGAD  001102  $TYPON  016304
SW4   = 000020         TST36   011476  $CRLF   001063  $MSGLG  001104  $TYPOS  016244
SW5   - 000040         TST37   011652  $DEVCT  001076  $MSGTY  001066  $UNIT   001100
SW6   = 000100         TST4    004466  $DEVM   001144  $MSWR   017224  $UNITM  000510
SW7   = 000200         TST40   012020  $DOAGN  014460  $MTYP1  001117  $USWR   001112
SW8   - 000400         TST41   012214  $ENDAD  014450  $MTYP2  001123  $VECT1  001136
SW9   = 001000         TST42   012440  $ENDCT  014430  $MTYP3  001127  $VECT2  001140
TA      002610         TST43   012632  $ENULL  014464  $MTYP4  001133  $XTSTR  015304
TBITVE= 000014         TST44   013010  $ENV    001106  $NULL   001054  $$GET4= 000000
TBUF    002642         TST45   013132  $ENVM   001107  $NWJST- 000001  $OFILL  016467
TBUF58- 176506         TST46   013710  $EOP    014400  $OCNT   016466  .$ERRT  001146
TCLOCK  005536         TST5    004714  $EOPCT  014422  $OMODE  016470  .$X   - 000500
TCONS   004020         TST6    004760  $ERFLG  001003  $OVER   015430

. ABS.  024750      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  60528 WORDS  ( 237 PAGES)
```

DYNAMIC MEMORY: 20434 WORDS (78 PAGES)

SEQ 0124

.MAIN. MACRO M1111 20-SEP-79 10:37 PAGE 123-18
SYMBOL TABLE

SEQ 0125

ELAPSED TIME: 00:05:26
C7DLDDO,CZDLDDO/NL:TOC/CRF/-SP=CZDLDDO.SML,CZDLDDO.P11

CZDLDDO CREATED BY MACRO ON 20-SEP-79 AT 10:40 PAGE 1
SYMBOL CROSS REFERENCE CREF SEQ 0126

SYMBOL		VALUE	REFERENCES			
ABASE	=	176500	#73-852	76-900	76-900	
ACDW1	=	000000	76-900			
ACDW2	=	000000	76-900			
ACPUOP	=	000000	76-900	76-900		
ADDW0	=	000000	76-900			
ADDW1	=	000000	76-900			
ADDW10	=	000000	76-900			
ADDW11	=	000000	76-900			
ADDW12	=	000000	76-900			
ADDW13	=	000000	76-900			
ADDW14	=	000000	76-900			
ADDW15	=	000000	76-900			
ADDW2	=	000000	76-900			
ADDW3	=	000000	76-900			
ADDW4	=	000000	76-900			
ADDW5	=	000000	76-900			
ADDW6	=	000000	76-900			
ADDW7	=	000000	76-900			
ADDW8	=	000000	76-900			
ADDW9	=	000000	76-900			
ADEVCT	=	000000	76-900	76-900		
ADEVM	=	000000	76-900	76-900		
AD..		004132	#77-1512	77-1515		
ADRTBL		002702	#77-1358	77-1369	77-1510	
AENV	=	000000	76-900	76-900		
AENVM	=	000000	76-900	76-900		
AFATAL	=	000000	76-900	76-900		
AMADR1	=	000000	76-900	76-900		
AMADR2	=	000000	76-900	76-900		
AMADR3		000000	76-900	76-900		
AMADR4	=	000000	76-900	76-900		
AMAMS1	=	000000	76-900	76-900		
AMAMS2	=	000000	76-900	76-900		
AMAMS3	=	000000	76-900	76-900		
AMAMS4	=	000000	76-900	76-900		
AMSGAD	=	000000	76-900	76-900		
AMSGLG	=	000000	76-900	76-900		
AMSGTY	=	000000	76-900	76-900		
AMTYP1	=	000000	76-900	76-900		
AMTYP2	=	000000	76-900	76-900		
AMTYP3	=	000000	76-900	76-900		
AMTYP4	=	000000	76-900	76-900		
APASS	=	000000	76-900	76-900		
APRIOR	=	000000	76-900			
APTCSU	=	000040	#117-3268	118-3272		
APTENV	=	000001	113-3130	117-3223	#117-3266	118-3272
APTSIZ		000200	77-1394	#117-3265		
APTSPO		000100	117-3225	#117-3267	118-3272	
APTSZD		003636	77-1415	77-1417	#77-1443	
ASWREG		000000	76-900	76-900		
ATESTN		000000	76-900	76-900		
AUNIT		000000	76-900	76-900		

SYMBOL	VALUE	REFERENCES								
AUSWR	= 000400	#73-854	76-900	76-900						
AVECT1	= 000300	#73-853	76-900	76-900						
AVECT2	= 000000	76-900	76-900							
BDVECT	002622	#77-1321	*112-3097	123-3483						
BEGIN	003774	#77-1485	112-3086							
BGNADD	= 003014	#110-2868	110-2944							
BIT0	= 000001	#73-850	77-1412	77-1487	82-1704	82-1714	82-1723	82-1724	82-1729	82-1730
		82-1739	82-1741	82-1743	93-2120	97-2267	97-2311	98-2347	98-2350	98-2356
		98-2361	104-2561	105-2596	105-2611	105-2618	105-2624	105-2629	106-2639	106-2650
		106-2654	107-2680	107-2715	109-2816	109-2838				
BIT00	- 000001	#73-850	73-850							
BIT01	= 000002	#73-850	73-850							
BIT02	= 000004	#73-850	73-850							
BIT03	= 000010	#73-850	73-850	82-1709	104-2566	105-2601	106-2644			
BIT04	= 000020	#73-850	73-850							
BIT05	= 000040	#73-850	73-850							
BIT06	= 000100	#73-850	73-850							
BIT07	= 000200	#73-850	73-850							
BIT08	= 000400	#73-850	73-850							
BIT09	= 001000	#73-850	73-850	113-3141	116-3206					
BIT1	= 000002	#73-850	77-1485	87-1891						
BIT10	= 002000	#73-850	104-2559	106-2635						
BIT11	= 004000	#73-850	97-2274	97-2284	97-2294	97-2313				
BIT12	= 010000	#73-850	121-3300							
BIT13	= 020000	#73-850	106-2656	113-3125						
BIT14	= 040000	#73-850	104-2579	116-3206						
BIT15	= 100000	#73-850	104-2584	106-2661						
BIT2	- 000004	#73-850	79-1564	79-1575	79-1576	79-1581	79-1582	79-1592	79-1594	79-1597
		79-1603	79-1615	79-1628	79-1638	80-1658	96-2242	96-2258	97-2270	97-2278
		97-2290	97-2297	97-2300	97-2307	97-2315	97-2323	97-2328	98-2333	98-2339
		98-2351	98-2364	99-2376	99-2385	99-2389	99-2400	99-2405	100-2417	100-2431
		100-2442	100-2446	101-2462	101-2467	102-2504	102-2509	103-2535	104-2570	104-2578
		105-2605	105-2619	105-2625	105-2630	106-2648	106-2655	107-2673	107-2698	107-2702
		108-2765	110-2891							
BIT3	= 000010	#73-850								
BIT4	= 000020	#73-850	77-1408	77-1480	79-1649	87-1892	93-2131			
BIT5	000040	#73-850	77-1416	109-2820	109-2842					
BIT6	= 000100	#73-850	84-1757	84-1767	84-1768	84-1774	84-1775	84-1780	84-1782	85-1797
		85-1807	85-1808	85-1814	85-1815	85-1821	85-1823	86-1834	86-1846	86-1852
		86-1862	86-1863	86-1869	86-1870	86-1874	86-1876	87-1903	87-1904	88-1924
		89-1951	89-1959	89-1984	89-1992	90-2002	90-2011	90-2032	91-2039	91-2045
		91-2055	92-2066	92-2072	92-2082	93-2096	93-2097	94-2139	94-2152	94-2160
		95-2167	95-2174	95-2184	96-2202	96-2211	96-2227	96-2237	96-2243	96-2254
		99-2374	99-2375	99-2395	99-2404	100-2424	100-2436	101-2468	101-2485	102-2503
		102-2517	103-2534	103-2547	108-2760	108-2764	108-2767	108-2768	108-2783	109-2803
		109-2844								
BIT7	000200	#73-850	77-1414	88-1931	88-1932	88-1934	88-1935	89-1958	89-1983	90-2010
		91-2044	92-2071	92-2075	107-2707	110-2963	110-2982	110-2985	110-3001	110-3004
		121-3315	122-3365							
BIT8	000400	#73-850	82-1702	105-2594	106-2637					
BIT9	001000	#73-850								
BPT	= 000003	#73-857								

SYMBOL	VALUE	REFERENCES
BPTVEC	= 000014	#73-850
BUF	002454	#77-1313 108-2773 109-2811
CATCH	014552	73-875 #112-3095
CHKSUM	014062	110-2903 110-2919 #110-2944
CKSWR	= 104406	113-3140 116-3206 #120-3282
CLK	013702	108-2762 #109-2855
CLKCNT	002444	#77-1309 109-2805 *109-2855
CMPARE	007244	93-2113 #93-2116
CNTLP	002564	#77-1314 110-2906
COMP	013504	#109-2813 109-2821
CONT	006246	#88-1941 88-1944
CONT41	012400	105-2614 #105-2622
CR	= 000015	#73-850 77-1315 77-1315 77-1316 111-3076 118-3272 118-3272 121-3333 121-3334 121-3335 121-3336 123-3467 123-3469
CRBUF	002656	#77-1345 121-3297 121-3298 122-3369
CRCSR	002654	#77-1344 77-1434 77-1491 121-3295 122-3363
CRLF	= 000200	#73-850 118-3272 118-3272
CRPSW	002666	#77-1349
CRVECT	002664	#77-1348
CTBUF	002662	#77-1347 121-3294 121-3297 121-3328 122-3356
CTCSR	002660	#77-1346 79-1615 79-1628 79-1638 96-2258 97-2278 97-2297 97-2307 97-2315 97-2323 97-2328 98-2339 98-2364 99-2385 99-2389 99-2400 99-2405 100-2431 100-2442 100-2446 101-2467 102-2509 104-2578 105-2619 105-2625 105-2630 106-2655 107-2698 107-2702 121-3326 122-3354
CTPSW	002672	#77-1351
CTSTFL	002624	#77-1327 *77-1384 *77-1410 *77-1490 78-1535 78-1552 79-1567 79-1585 79-1613 79-1626 82-1706 82-1716 82-1732 86-1834 86-1846 88-1924 89-1951 90-2002 91-2039 92-2066 93-2096 104-2563 105-2598 106-2641 108-2758 109-2801 *111-3070
CTVECT	002670	#77-1350
DDISP	= 177570	#73-850 76-900 77-1394
DEVADR	003014	#77-1369 77-1419 77-1451 110-2868
DH1	024012	77-904 77-914 77-919 77-924 77-944 77-949 77-954 77-959 77-964 77-969 77-974 77-979 77-984 77-989 77-994 77-999 77-1004 77-1119 77-1124 77-1129 77-1134 77-1139 77-1144 77-1149 #123-3455
DH10	024136	77-939 77-1034 77-1039 77-1044 77-1049 77-1054 77-1064 77-1069 77-1074 77-1079 77-1084 77-1089 77-1094 77-1099 77-1104 77-1109 77-1273 #123-3459
DH103	024263	77-1233 #123-3462
DH105	024320	77-1243 77-1248 77-1263 #123-3463
DH110	024364	77-1258 #123-3464
DH112	024430	77-1268 #123-3465
DH2	024037	77-909 #123-3456
DH40	024162	77-1059 #123-3460
DH53	024216	77-1114 #123-3461
DH6	024064	77-929 77-1009 77-1014 77-1019 77-1024 77-1029 77-1154 77-1159 77-1164 77-1169 77-1174 77-1179 77-1184 77-1189 77-1194 77-1199 77-1204 77-1208 77-1213 77-1218 77-1224 77-1229 77-1238 77-1253 77-1278 77-1283 77-1288 77-1293 #123-3457
DH7	024111	77-934 #123-3458
DISPLA	001042	#76-900 *77-1394 *77-1394 113-3120 116-3206
DISPRE	000174	#73-886 77-1394
DSWR	- 177570	#73-850 76-900 77-1394
DT1	024572	77-905 77-915 77-920 77-925 77-945 77-950 77-955 77-960 77-965

SYMBOL	VALUE	REFERENCES								
		77-970	77-975	77-980	77-985	77-990	77-995	77-1000	77-1005	77-1120
		77-1125	77-1130	77-1135	77-1140	77-1145	77-1150	#123-3473		
DT10	024632	77-940	77-1035	77-1040	77-1045	77-1050	77-1055	77-1065	77-1070	77-1075
		77-1080	77-1085	77-1090	77-1095	77-1100	77-1105	77-1110	77-1274	#123-3477
DT103	024670	77-1234	#123-3480							
DT105	024702	77-1244	77-1249	77-1264	#123-3481					
DT110	024716	77-1259	#123-3482							
DT112	024732	77-1269	#123-3483							
DT2	024602	77-910	#123-3474							
DT40	024642	77-1060	#123-3478							
DT53	024654	77-1115	#123-3479							
DT6	024612	77-930	77-1010	77-1015	77-1020	77-1025	77-1030	77-1155	77-1160	77-1165
		77-1170	77-1175	77-1180	77-1185	77-1190	77-1195	77-1200	77-1205	77-1209
		77-1214	77-1219	77-1225	77-1230	77-1239	77-1254	77-1279	77-1284	77-1289
		77-1294	#123-3475							
DT7	024622	77-935	#123-3476							
DVADT	003664	77-1449	#77-1451							
ECHO	017324	73-891	#121-3292	121-3321						
EMTVEC	= 000030	#73-850	77-1394	77-1394						
EM1	017630	77-903	#123-3375							
EM10	020074	77-938	#123-3382							
EM100	023107	77-1217	#123-3438							
EM101	023152	77-1223	#123-3439							
EM102	023200	77-1228	#123-3440							
EM103	023237	77-1232	#123-3441							
EM104	023275	77-1237	#123-3442							
EM105	023332	77-1242	#123-3443							
EM106	023355	77-1247	#123-3444							
EM107	023413	77-1252	#123-3445							
EM11	020117	77-943	#123-3383							
EM110	023445	77-1257	#123-3446							
EM111	023475	77-1262	#123-3447							
EM112	023535	77-1267	#123-3448							
EM113	023552	77-1272	#123-3449							
EM114	023610	77-1277	#123-3450							
EM115	023647	77-1282	#123-3451							
EM116	023706	77-1287	#123-3452							
EM117	023745	77-1292	#123-3453							
EM12	020162	77-948	#123-3384							
EM13	020213	77-953	#123-3385							
EM14	020246	77-958	#123-3386							
EM15	020307	77-963	#123-3387							
EM16	020352	77-968	#123-3388							
EM17	020403	77-973	#123-3389							
EM2	017654	77-908	#123-3376							
EM20	020436	77-978	#123-3390							
EM21	020477	77-983	#123-3391							
EM22	020542	77-988	#123-3392							
EM23	020577	77-993	#123-3393							
EM24	020630	77-998	#123-3394							
EM25	020663	77-1003	#123-3395							
EM26	020724	77-1008	#123-3396							

SYMBOL		VALUE	REFERENCES			
EM27		020767	77-1013	#123-3397		
EM3		017700	77-913	#123-3377		
EM30		021026	77-1018	#123-3398		
EM31		021057	77-1023	#123-3399		
EM32		021112	77-1028	#123-3400		
EM33		021160	77-1033	#123-3401		
EM34		021222	77-1038	#123-3402		
EM35		021260	77-1043	#123-3403		
EM36		021310	77-1048	#123-3404		
EM37		021342	77-1053	#123-3405		
EM4		017745	77-918	#123-3378		
EM40		021402	77-1058	#123-3406		
EM41		021430	77-1063	#123-3407		
EM42		021470	77-1068	#123-3408		
EM43		021522	77-1073	#123-3409		
EM44		021553	77-1078	#123-3410		
EM45		021607	77-1083	#123-3411		
EM46		021644	77-1088	#123-3413		
EM47		021644	77-1093	#123-3412		
EM5		017767	77-923	#123-3379		
EM50		021700	77-1098	#123-3414		
EM51		021725	77-1103	#123-3415		
EM52		021755	77-1108	#123-3416		
EM53		022032	77-1113	#123-3417		
EM54		022056	77-1118	#123-3418		
EM55		022214	77-1123	#123-3421		
EM56		022114	77-1128	#123-3419		
EM57		022152	77-1133	#123-3420		
EM6		020024	77-928	#123-3380		
EM60		022214	77-1138	#123-3422		
EM61		022243	77-1143	#123-3423		
EM62		022267	77-1148	#123-3424		
EM63		022334	77-1153	#123-3425		
EM64		022360	77-1158	#123-3426		
EM65		022404	77-1163	#123-3427		
EM66		022452	77-1168	#123-3428		
EM67		022510	77-1173	#123-3429		
EM7		020050	77-933	#123-3381		
EM70		022553	77-1178	#123-3430		
EM71		022620	77-1183	#123-3431		
EM72		022767	77-1188	#123-3434		
EM73		022662	77-1193	#123-3432		
EM74		022720	77-1198	#123-3433		
EM75		022767	77-1203	#123-3435		
EM76		023016	77-1207	#123-3436		
EM77		023042	77-1212	#123-3437		
ENDADD	=	024746	#110-2869	110-2947	110-3039	110-3056
ENDADR		024746	110-2869	#123-3484		
ENDB7		004676	79-1633	79-1650	#79-1652	
ENDEV		014344	109-2834	#111-3065		
ENDMG		014470	111-3075	#111-3076		
ENDSTK		002412	#77-1303			

SYMBOL	VALUE	REFERENCES								
ERROR	= 104000	#73-850	78-1537	78-1554	79-1569	79-1579	79-1587	79-1598	79-1616	79-1629
		80-1668	80-1680	81-1692	82-1718	82-1727	82-1734	82-1744	84-1759	84-1764
		84-1771	84-1777	84-1785	85-1799	85-1804	85-1811	85-1818	85-1826	86-1841
		86-1854	86-1859	86-1866	86-1872	86-1879	87-1914	88-1929	88-1938	88-1946
		89-1967	89-1980	89-1989	90-2016	90-2029	91-2059	92-2087	93-2129	94-2149
		94-2158	95-2182	95-2195	96-2217	96-2231	96-2259	97-2280	97-2287	97-2298
		97-2308	97-2316	97-2324	98-2342	98-2359	98-2365	99-2391	99-2401	100-2433
		100-2448	101-2474	101-2491	102-2521	103-2552	104-2581	104-2586	105-2620	105-2627
		106-2659	106-2664	107-2699	107-2728	107-2740	108-2787	108-2793	109-2808	109-2826
		112-3099								
ERRVEC	- 000004	#73-850	77-1394	77-1394	77-1394	116-3206	116-3206	116-3206	116-3206	
FIRST	002336	#77-1298	*93-2114	93-2116	123-3479					
FLAG44	003002	#77-1360	*77-1387	77-1403	82-1704	93-2120	97-2267	97-2311	98-2347	104-2561
		105-2596	106-2639	107-2680	107-2715	109-2816	109-2838			
GETB	014200	110-2915	#110-3000	110-3002	110-3006					
GETLIN	014134	110-2910	#110-2977	110-2987						
GNS	= ******	120-3282	120-3282	120-3282	120-3282	120-3282	120-3282	120-3282	120-3282	120-3282
		120-3282	120-3282	120-3282	120-3282	120-3282	120-3282	120-3282		
GOAGIN	014504	111-3075	#112-3079							
GTSWR	= 104405	#120-3282								
HT	= 000011	#73-850	118-3272	118-3272						
ID	004620	77-1411	79-1622	79-1630	#79-1637					
INIT	003462	77-1409	#77-1412							
IOTVEC	= 000020	#73-850	77-1394	77-1394						
JIMSTK	002432	#77-1304	110-2896							
LF	- 000012	#73-850	77-1315	77-1315	77-1316	111-3076	118-3272	118-3272	121-3333	121-3334
		121-3335	121-3336	123-3467	123-3469					
LKS	002674	#77-1354	86-1837	86-1852	86-1862	86-1863	86-1869	86-1870	86-1874	86-1876
		87-1894	88-1926	88-1931	88-1932	88-1934	88-1935	88-1941	89-1958	89-1959
		89-1960	89-1969	89-1973	89-1983	89-1984	89-1985	89-1992	90-2010	90-2011
		90-2012	90-2032	91-2044	91-2045	91-2046	91-2055	92-2071	92-2072	92-2073
		92-2075	92-2082	93-2097	93-2102	93-2103	93-2105	93-2106	93-2109	108-2764
		123-3477	123-3479							
LOC1	002340	#77-1299	*110-2898	*110-3018						
LOC2	002342	#77-1300	*110-2899	*110-3020						
MANL	003502	77-1413	#77-1416							
MFPT	- 000007	#73-851	77-1400							
MFR	017507	121-3309	#121-3334							
MOR	017521	121-3314	#121-3335							
MPAR	017476	121-3304	#121-3333							
MSG	017450	121-3303	121-3308	121-3313	121-3318	#121-3324	122-3360			
MSTOP	017534	121-3319	#121-3336							
M1	024502	79-1646	#123-3467							
M2	024540	79-1648	#123-3469							
M2A	024542	*77-1482	#123-3470							
NOEOP	014370	111-3068	#111-3070							
OLDPC	002620	#77-1320	*112-3098	123-3483						
OLDSUM	002436	#77-1306	*110-2904	110-2920						
OUTTST	017544	73-892	#122-3352	122-3366	122-3371					
PIRQ	177772	#73-850								
PIRQVE	000240	#73-850								
PROMPT	002566	#77-1315	110-2909							

SYMBOL	VALUE	REFERENCES								
PR0	= 000000	#73-850								
PR1	= 000040	#73-850								
PR2	= 000100	#73-850								
PR3	= 000140	#73-850								
PR4	= 000200	#73-850								
PR5	= 000240	#73-850								
PR6	= 000300	#73-850								
PR7	= 000340	#73-850								
PS	= 177776	#73-850	73-850							
PSW	= 177776	#73-850	110-2894	*110-2895	*110-2924					
PUTLIN	014102	110-2907	110-2913	#110-2960	110-2966					
PWRVEC	= 000024	#73-850	77-1394	77-1394	115-3164	115-3165	115-3174	115-3182	115-3191	115-3192
RBUF	002636	#77-1334	81-1688	97-2271	98-2334	98-2338	98-2352	99-2377	100-2418	101-2463
		102-2505	102-2510	103-2536	104-2571	104-2579	104-2584	105-2606	105-2610	105-2622
		106-2649	106-2656	106-2661	107-2677	107-2689	107-2730	108-2766	109-2850	123-3476
RBUF58	= 176502	#110-2865	110-2984	110-3003						
RCSR	002634	#77-1333	77-1492	77-1511	80-1676	85-1797	85-1807	85-1808	85-1814	85-1815
		85-1821	85-1823	87-1896	97-2271	97-2274	97-2284	97-2294	97-2303	97-2313
		97-2320	98-2334	98-2336	98-2340	98-2350	98-2352	98-2354	98-2356	98-2361
		98-2362	99-2375	99-2377	99-2383	99-2395	99-2404	100-2418	100-2422	100-2424
		100-2436	101-2463	101-2465	101-2468	101-2485	102-2503	102-2505	102-2507	102-2517
		103-2534	103-2536	103-2538	103-2547	104-2571	105-2606	105-2608	105-2613	106-2649
		106-2652	107-2677	107-2687	107-2723	108-2766	108-2768	123-3475	123-3480	123-3481
		123-3482	123-3483							
RCSR58	= 176500	#110- 364	110-2982	110-3001						
RCV	013666	108-2756	#109-2850							
RCVCNT	002440	#77-1307	*108-2770	108-2789	*109-2851	123-3482				
RCVDON	010266	97-2268	97-2295	#97-2300						
RDCHR	= 104407	119-3277	#120-3282							
RDLIN	= 104410	#120-3282								
RESTTE	014310	110-2917	#110-3050							
RESVEC	= 000010	#73-850								
RPSW	002646	#77-1338	101-2457	101-2459	101-2487	108-2752	108-2757	109-2832		
RSTRT	014530	112-3081	#112-3085							
RTCPSW	002700	#77-1356	89-1955	89-1957	89-1994	90-2005	90-2007	90-2034	108-2753	108-2763
		109-2833								
RTCVT	002676	#77-1355	86-1848	86-1849	86-1881	89-1954	89-1956	89-1970	89-1982	89-1993
		90-2004	90-2006	90-2019	90-2033	91-2042	91-2043	91-2061	92-2069	92-2070
		92-2089	108-2750	108-2762	109-2830					
RVECT	002644	#77-1337	85-1793	85-1794	85-1828	99-2378	99-2379	99-2394	99-2407	100-2415
		100-2416	100-2437	100-2450	101-2456	101-2458	101-2478	101-2486	101-2493	102-2501
		102-2502	102-2523	103-2532	103-2533	103-2554	108-2749	108-2756	109-2829	
R6	=%000006	#73-850	*77-1394	*77-1394	77-1394					
R7	%000007	#73-850								
SAVEPS	002434	#77-1305	*110-2894	110-2924						
SAVETE	014254	110-2901	#110-3033							
SAVEO	002344	#77-1301	*110-3033	110-3050						
SAVLOC	002346	#77-1302	110-3035	110-3052						
SCOPE	= 000004	#73-850	78-1528	78-1545	79-1562	79-1602	80-1657	80-1673	81-1685	82-1701
		84-1751	85-1791	86-1833	86-1845	87-1885	88-1923	89-1950	90-2001	91-2038
		92-2065	93-2095	94-2138	95-2166	96-2201	96-2236	97-2266	98-2331	98-2346
		99-2373	100-2411	101-2454	102-2497	103-2528	104-2558	105-2593	106-2634	107-2670

SYMBOL	VALUE	REFERENCES								
		107-2706	108-2744	110-2871	111-3075					
SCPSW	002452	#77-1312	*108-2753	109-2833						
SECND	002616	#77-1319	*93-2128	123-3479						
SETADR	004100	77-1500	#77-1506							
SHIFT	003740	#77-1472	77-1481							
SIZE	003512	#77-1419								
SRPSW	002450	#77-1311	*108-2752	109-2832						
STACK	= 001100	#73-850								
START	003046	73-890	#77-1381							
STKLMT	= 177774	#73-850								
STPSW	002446	#77-1310	*108-2751	109-2831						
SWR	001040	#76-900	77-1394	*77-1394	77-1394	*77-1394	*77-1394	77-1408	77-1416	79-1649
		82-1702	82-1709	86-1834	86-1846	87-1892	88-1924	89-1951	90-2002	91-2039
		92-2066	93-2096	93-2131	104-2559	104-2566	105-2594	105-2601	106-2635	106-2637
		106-2644	107-2707	108-2760	109-2803	110-2891	113-3125	113-3137	113-3141	115-3172
		115-3184	116-3206	116-3206	119-3277	119-3277				
SWREG	000176	#73-887	77-1394	119-3277	119-3277					
SW0	= 000001	#73-850								
SW00	= 000001	#73-850	73-850							
SW01	= 000002	#73-850	73-850							
SW02	= 000004	#73-850	73-850							
SW03	= 000010	#73-850	73-850							
SW04	= 000020	#73-850	73-850							
SW05	= 000040	#73-850	73-850							
SW06	= 000100	#73-850	73-850							
SW07	= 000200	#73-850	73-850							
SW08	= 000400	#73-850	73-850							
SW09	= 001000	#73-850	73-850							
SW1	= 000002	#73-850								
SW10	= 002000	#73-850								
SW11	= 004000	#73-850								
SW12	= 010000	#73-850								
SW13	= 020000	#73-850								
SW14	= 040000	#73-850								
SW15	= 100000	#73-850								
SW2	= 000004	#73-850								
SW3	= 000010	#73-850								
SW4	= 000020	#73-850								
SW5	= 000040	#73-850								
SW6	= 000100	#73-850								
SW7	= 000200	#73-850								
SW8	= 000400	#73-850								
SW9	= 001000	#73-850								
TA	002610	#77-1316	110-2912							
TBITVE	= 000014	#73-850								
TBUF	002642	#77-1336	78-1548	79-1604	79-1609	80-1659	80-1662	96-2244	96-2247	97-2273
		97-2302	98-2335	98-2353	99-2382	100-2421	101-2464	102-2506	103-2537	104-2573
		105-2607	106-2651	107-2686	107-2721	108-2774	109-2846	123-3474		
TBUF58	176506	#110-2867	*110-2965							
TCLOCK	005536	79-1651	#86-1832							
TCONS	004020	77-1488	#77-1490							
TCSR	002640	#77-1335	78-1531	79-1564	79-1575	79-1576	79-1581	79-1582	79-1592	79-1594

SYMBOL	VALUE	REFERENCES								
		79-1597	79-1603	79-1605	79-1610	79-1621	80-1658	80-1660	80-1665	82-1714
		82-1723	82-1724	82-1729	82-1730	82-1739	82-1741	82-1743	84-1757	84-1767
		84-1768	84-1774	84-1775	84-1780	84-1782	94-2139	94-2142	94-2152	94-2160
		95-2167	95-2172	95-2174	95-2184	96-2202	96-2209	96-2211	96-2227	96-2237
		96-2242	96-2243	96-2245	96-2254	97-2270	97-2290	97-2300	98-2333	98-2351
		99-2374	99-2376	100-2417	101-2462	102-2504	103-2535	104-2570	104-2574	105-2605
		105-2611	105-2618	105-2624	105-2629	106-2648	106-2650	106-2654	107-2673	108-2765
		108-2767	108-2783	109-2844	123-3473					
TCSR58	= 176504	#110-2866	110-2963							
TIMER	014234	110-2962	110-2981	110-3000	#110-3018					
*KVEC	= 000060	#73-850								
TMP1	002626	#77-1328	*77-1486	*77-1502	77-1508	*77-1509				
TMP2	002630	#77-1329	*77-1420	*77-1428	*77-1438	*77-1443	*77-1447	77-1467	111-3067	112-3080
TMP3	002632	#77-1330	*77-1485	77-1499	*77-1501	*77-1507				
TOLER	007256	93-2118	#93-2120							
TPSW	002652	#77-1340	77-1494	96-2204	96-2206	96-2234	108-2751	108-2755	109-2831	
TPVEC	= 000064	#73-850								
TRAPVE	= 000034	#73-850	77-1394	77-1394						
TRTVEC	= 000014	#73-850								
TSTDEV	004050	77-1489	#77-1499	77-1504	111-3071					
TSTDVM	003646	#77-1445	77-1450							
TST1	004172	77-1496	77-1522	#78-1528	112-3083					
TST10	005044	#82-1701								
TST11	005252	#84-1751								
TST12	005404	#85-1791								
TST13	005544	#86-1833								
TST14	005614	86-1834	86-1834	#86-1845						
TST15	005764	86-1846	86-1846	#87-1885						
TST16	006154	#88-1923								
TST17	006262	88-1924	88-1924	88-1942	#89-1950					
TST2	004244	#78-1545								
TST20	006504	89-1951	89-1951	#90-2001						
TST21	006660	90-2002	90-2002	#91-2038						
TST22	007002	91-2039	91-2039	#92-2065						
TST23	007136	92-2066	92-2066	#93-2095						
TST24	007324	93-2096	93-2096	93-2132	#94-2138					
TST25	007432	#95-2166								
TST26	007560	#96-2201								
TST27	007722	#96-2236								
TST3	004316	#79-1562								
TST30	010066	#97-2266								
TST31	010402	#98-2331								
TST32	010504	#98-2346								
TST33	010640	#99-2373								
TST34	011050	#100-2411								
TST35	011262	#101-2454								
TST36	011476	#102-2497								
TST37	011652	#103-2528								
TST4	004466	#79-1602								
TST40	012020	#104-2558								
TST41	012214	104-2560	104-2568	#105-2593						
TST42	012440	105-2595	105-2603	#106-2634						

SYMBOL	VALUE	REFERENCES								
TST43	012632	106-2636	106-2638	106-2646	#107-2670					
TST44	013010	#107-2706								
TST45	013132	107-2708	107-2735	#108-2744						
TST46	013710	#110-2871								
TST5	004714	#80-1657								
TST6	004760	#80-1673								
TST7	005012	#81-1685								
TURBUF	003006	#77-1362								
TURCSR	003004	#77-1361								
TUTBUF	003012	#77-1364								
TUTCSR	003010	#77-1363								
TVECT	002650	#77-1339	84-1753	84-1754	84-1787	94-2140	94-2141	94-2151	94-2162	95-2170
		95-2171	95-2185	95-2197	96-2203	96-2205	96-2220	96-2233	96-2240	96-2241
		96-2261	108-2748	108-2754	109-2828					
TYPE	- 104401	79-1645	79-1647	111-3075	113-3128	114-3156	114-3156	114-3156	114-3156	114-3156
		114-3156	114-3156	115-3196	118-3272	118-3273	119-3277	119-3277	119-3277	119-3277
		119-3277	119-3277	119-3277	119-3277	119-3277	#120-3282			
TYPOC	- 104402	114-3156	114-3156	119-3277	#120-3282					
TYPON	= 104404	#120-3282								
TYPOS	- 104403	#120-3282								
VCTADR	003670	77-1441	#77-1455							
VCTTBL	002742	#77-1359	77-1455	77-1517						
VECT	004152	#77-1518	77-1521							
WACTV	010150	#97-2274	97-2277							
WAIT	017456	#121-3326	121-3327	121-3330						
WDONE	010302	#97-2303	97-2306							
WRAP	013712	#110-2891	111-3069							
WRPSW	014540	84-1755	85-1795	86-1850	89-1952	89-1971	90-2008	90-2020	91-2040	91-2049
		92-2067	92-2076	92-2090	94-2144	95-2168	95-2186	96-2207	96-2221	96-2238
		96-2248	99-2380	100-2413	100-2438	101-2460	101-2479	102-2499	102-2511	103-2530
		103-2541	108-2746	108-2775	#112-3088					
WT	010236	#97-2291	97-2293							
XCONT	013656	109-2843	#109-2846							
XMIT	013614	108-2754	#109-2836							
XMTCNT	002442	#77-1308	*108-2769	108-2789	*109-2836	123-3482				
XRET	013662	109-2845	#109-2847							
$APTHD	000500	74-897	#74-897							
$ASTAT	- ******	78-1539	78-1556	79-1572	79-1589	79-1618	79-1631	82-1720	82-1736	
$ATYC	015470	117-3216	#117-3218							
$ATY1	015444	#117-3214								
$ATY3	015452	#117-3215	118-3272							
$ATY4	015462	78-1539	78-1556	79-1572	79-1589	79-1618	79-1631	82-1720	82-1736	113-3133
		#117-3217								
$AUTOB	001034	#76-900	119-3277	119-3277	119-3277					
$BASE	001142	#76-900	77-1370	77-1424	77-1432					
$BDADR	001022	#76-900	*87-1897	*87-1898	87-1899	*87-1901	87-1902	87-1903	87-1906	123-3478
$BDDAT	001026	#76-900	*105-2613	*107-2697	*107-2738	*109-2824	123-3480	123-3481		
$CHARC	016240	*118-3272	*118-3272	118-3272	*118-3272	#118-3272				
$CKSWR	016472	#119-3277	120-3282	120-3282						
$CMTAG	001000	#76-900	77-1394	77-1394	77-1394	77-1394	77-1394	77-1394		
$CM3	000000	#76-900	76-900							
$CNTLG	017217	119-3277	#119-3277							

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SYMBOL CROSS REFERENCE CREF SEQ 0136

SYMBOL	VALUE	REFERENCES							
$CNTLU	017212	119-3277	#119-3277						
$CPUOP	001114	#76-900							
$CRLF	001063	#76-900	113-3128	114-3156	114-3156	114-3156	114-3156	118-3272	118-3272	118-3272
		119-3277	119-3277	119-3277	122-3362					
$DEVCT	001076	#76-900	*77-1385	79-1643	*111-3066	111-3067	*112-3079			
$DEVM	001104	#76-900	*77-1421	*77-1427	*77-1430	*77-1437	77-1444	77-1487	77-1499	
$DOAGN	014460	111-3075	111-3075	#111-3075						
$ENDAD	014450	74-896	#111-3075	113-3148						
$ENDCT	014430	77-1394	#111-3075							
$ENULL	014464	#111-3075								
$ENV	001106	#76-900	77-1412	113-3130	117-3223	117-3247	118-3272			
$ENVM	001107	#76-900	77-1394	77-1414	117-3225	118-3272	118-3272			
$EOP	014400	93-2133	110-2925	#111-3075						
$EOPCT	014422	*77-1394	#111-3075	111-3075						
$ERFLG	001003	#76-900	*113-3118	116-3206	116-3206	*116-3206	116-3206	116-3206		
$ERMAX	001015	#76-900	*77-1394	*116-3206	116-3206	116-3206				
$ERROR	014576	77-1394	#113-3117							
$ERRPC	001016	#76-900	*113-3122	*113-3123	113-3124	114-3156	123-3473	123-3474	123-3475	123-3476
		123-3477	123-3478	123-3479	123-3480	123-3481	123-3482	123-3483		
$ERRTB	001146	#77-900	114-3156							
$ERRTY	014760	113-3127	#114-3156							
$ERTTL	001012	#76-900	*113-3121							
$ESCAP	001060	#76-900	*77-1394	113-3144	113-3146	*116-3206				
$ETABL	001106	#76-900								
$ETEND	001146	74-897	#76-900							
$FATAL	001070	#76-900	*77-1381	*117-3251						
$FFLG	015710	*117-3214	*117-3217	117-3245	*117-3254	#117-3262				
$FILLC	001056	#76-900	118-3272	118-3272	118-3272					
$FILLS	001055	#76-900	118-3272	118-3272						
$GDADR	001020	#76-900	*87-1894	*87-1896	87-1897	87-1899	87-1904	123-3478		
$GDDAT	001024	#76-900	*87-1902	87-1906	*107-2696	*107-2737	*109-2825	123-3481		
$GET42	014440	#111-3075								
$GTSWR	016542	#119-3277	120-3282	120-3282						
$HIBTS	000500	#74-897								
$ICNT	001004	#76-900								
$ILLUP	015254	115-3164	115-3182	#115-3199						
$INTAG	001035	#76-900	119-3277	119-3277	119-3277					
$ITEMB	001014	#76-900	*113-3124	113-3132	114-3156					
$LF	001064	#76-900	118-3272	118-3272	119-3277	119-3277	119-3277			
$LFLG	015707	*117-3255	#117-3261							
$LPADR	001006	#76-900	*77-1394	*116-3206	*116-3206	116-3206	116-3206	116-3206		
$LPERR	001010	#76-900	*77-1394	113-3143	116-3206	*116-3206	116-3206	116-3206		
$MADR1	001120	#76-900								
$MADR2	001124	#76-900								
$MADR3	001130	#76-900								
$MADR4	001134	#76-900								
$MAIL	001066	74-897	74-897	#76-900	77-1394	116-3206	118-3272			
$MAMS1	001116	#76-900								
$MAMS2	001122	#76-900								
$MAMS3	001126	#76-900								
$MAMS4	001132	#76-900								
$MBADR	000502	#74-897								

SYMBOL CROSS REFERENCE CREF

SYMBOL	VALUE	REFERENCES								
$MFLG	015706	*117-3215	117-3221	*117-3256	#117-3260					
$MNEW	017235	119-3277	#119-3277							
$MSGAD	001102	#76-900	*117-3231	117-3234						
$MSGLG	001104	#76-900	*117-3236							
$MSGTY	001066	#76-900	*77-1382	117-3229	*117-3237	117-3249	*117-3252			
$MSWR	017224	119-3277	#119-3277							
$MTYP1	001117	#76-900								
$MTYP2	001123	#76-900								
$MTYP3	001127	#76-900								
$MTYP4	001133	#76-900								
$NULL	001054	#76-900	118-3272	118-3272	118-3272					
$NWTST	- 000001	#78-1528	78-1528	#78-1528	#78-1545	78-1545	#78-1545	#79-1562	79-1562	#79-1562
		#79-1602	79-1602	#79-1602	#80-1657	80-1657	#80-1657	#80-1673	80-1673	#80-1673
		#81-1685	81-1685	#81-1685	#82-1701	82-1701	#82-1701	#84-1751	84-1751	#84-1751
		#85-1791	85-1791	#85-1791	#86-1833	86-1833	#86-1833	#86-1845	86-1845	#86-1845
		#87-1885	87-1885	#87-1885	#88-1923	88-1923	#88-1923	#89-1950	89-1950	#89-1950
		#90-2001	90-2001	#90-2001	#91-2038	91-2038	#91-2038	#92-2065	92-2065	#92-2065
		#93-2095	93-2095	#93-2095	#94-2138	94-2138	#94-2138	#95-2166	95-2166	#95-2166
		#96-2201	96-2201	#96-2201	#96-2236	96-2236	#96-2236	#97-2266	97-2266	#97-2266
		#98-2331	98-2331	#98-2331	#98-2346	98-2346	#98-2346	#99-2373	99-2373	#99-2373
		#100-2411	100-2411	#100-2411	#101-2454	101-2454	#101-2454	#102-2497	102-2497	#102-2497
		#103-2528	103-2528	#103-2528	#104-2558	104-2558	#104-2558	#105-2593	105-2593	#105-2593
		#106-2634	106-2634	#106-2634	#107-2670	107-2670	#107-2670	#107-2706	107-2706	#107-2706
		#108-2744	108-2744	#108-2744	#110-2871	110-2871	#110-2871			
$OCNT	016466	*118-3273	*118-3273	#118-3273						
$OMODE	016470	*118-3273	*118-3273	118-3273	*118-3273	*118-3273	#118-3273			
$OVER	015430	116-3206	116-3206	#116-3206						
$PASS	001074	#76-900	*77-1394	79-1641	*111-3075	*111-3075	111-3075	111-3075		
$PASTM	000506	#74-897								
$POWER	015262	115-3197	#115-3202							
$PWRDN	015114	77-1394	#115-3164	115-3191						
$PWRMG	015250	#115-3197								
$PWRUP	015166	115-3174	#115-3182							
$QUES	001062	#76-900	118-3272	118-3272	119-3277	119-3277	119-3277	119-3277		
$RDCHR	016754	#119-3277	120-3282	120-3282						
$RDDEC	= ******	120-3282								
$RDLIN	017074	#119-3277	120-3282	120-3282						
$RDOCT	= ******	120-3282								
$RDSZ	= 000010	#119-3277	119-3277							
$RTNAD	014462	#111-3075								
$R2A	= ******	120-3282								
$SAVRE	= ******	120-3282								
$SAVR6	015260	*115-3173	115-3183	*115-3193	*115-3194	#115-3201				
$SCOPE	015272	77-1394	#116-3206							
$SETUP	000137	#73-882	73-882	#73-882	73-882	#73-882	73-882	#73-882	73-882	#73-882
		73-882	#73-882	73-882	#73-882	77-1394	77-1394	77-1394	77-1394	77-1394
		77-1394	77-1394	77-1394	77-1394	77-1394	77-1394	77-1394	111-3075	111-3075
		116-3206	119-3277	119-3277						
$STUP	177777	#73-882	#73-882	73-882	#73-882	#73-882	73-882	#73-882	#73-882	73-882
		#73-882	#73-882	73-882	#73-882	#73-882	73-882	#73-882	#73-882	73-882
$SVLAD	015374	116-3206	116-3206	#116-3206						
$SVPC	000500	#74-896	74-896							

SYMBOL	VALUE	REFERENCES								
$SWR	= 161000	#73-856	76-900	76-900	76-900	77-1394	77-1394	77-1394	77-1394	77-1394
		78-1528	78-1545	79-1562	79-1602	80-1657	80-1673	81-1685	82-1701	84-1751
		85-1791	86-1833	86-1845	87-1885	88-1923	89-1950	90-2001	91-2038	92-2065
		93-2095	94-2138	95-2166	96-2201	96-2236	97-2266	98-2331	98-2346	99-2373
		100-2411	101-2454	102-2497	103-2528	104-2558	105-2593	106-2634	107-2670	107-2706
		108-2744	110-2871	111-3075	111-3075	111-3075	111-3075	111-3075	116-3206	116-3206
		116-3206	116-3206	116-3206	116-3206	116-3206	116-3206	116-3206	116-3206	116-3206
		116-3206	116-3206	116-3206	116-3206	116-3206	116-3206	116-3206	116-3206	
$SWREG	001110	#76-900	77-1394							
$SWRMK	- 000000	116-3206								
$TESTN	001072	#76-900	*77-1383	*116-3206	123-3473	123-3474	123-3475	123-3476	123-3477	123-3478
		123-3479	123-3480	123-3481	123-3482	123-3483				
$TKB	001046	#76-900	118-3272	118-3272	119-3277	119-3277	119-3277	119-3277	119-3277	119-3277
$TKS	001044	#76-900	118-3272	118-3272	119-3277	119-3277	119-3277	119-3277	119-3277	119-3277
		119-3277								
$TN	000047	#73-855	78-1528	78-1528	#78-1528	78-1545	78-1545	#78-1545	79-1562	79-1562
		#79-1562	79-1602	79-1602	#79-1602	80-1657	80-1657	#80-1657	80-1673	80-1673
		#80-1673	81-1685	81-1685	#81-1685	82-1701	82-1701	#82-1701	84-1751	84-1751
		#84-1751	85-1791	85-1791	#85-1791	*86-1832	86-1833	86-1833	#86-1833	86-1834
		86-1845	86-1845	#86-1845	86-1846	87-1885	87-1885	#87-1885	88-1923	88-1923
		#88-1923	88-1924	89-1950	89-1950	#89-1950	89-1951	90-2001	90-2001	#90-2001
		90-2002	91-2038	91-2038	#91-2038	91-2039	92-2065	92-2065	#92-2065	92-2066
		93-2095	93-2095	#93-2095	93-2096	94-2138	94-2138	#94-2138	95-2166	95-2166
		#95-2166	96-2201	96-2201	#96-2201	96-2236	96-2236	#96-2236	97-2266	97-2266
		#97-2266	98-2331	98-2331	#98-2331	98-2346	98-2346	#98-2346	99-2373	99-2373
		#99-2373	100-2411	100-2411	#100-2411	101-2454	101-2454	#101-2454	102-2497	102-2497
		#102-2497	103-2528	103-2528	#103-2528	104-2558	104-2558	#104-2558	105-2593	105-2593
		#105-2593	106-2634	106-2634	#106-2634	107-2670	107-2670	#107-2670	107-2706	107-2706
		#107-2706	108-2744	108-2744	#108-2744	110-2871	110-2871	#110-2871		
$TPB	001052	#76-900	118-3272	118-3272	118-3272					
$TPFLG	001057	#76-900	118-3272	118-3272	118-3272					
$TPS	001050	#76-900	100-2419	118-3272	118-3272	118-3272				
$TRAP	017246	77-1394	#120-3282							
$TRAP2	017270	#120-3282	120-3282							
$TRP	= 000011	#120-3282	120-3282	120-3282	120-3282	120-3282	#120-3282	120-3282	120-3282	120-3282
		120-3282	#120-3282	120-3282	120-3282	120-3282	120-3282	#120-3282	120-3282	120-3282
		120-3282	120-3282	#120-3282	120-3282	120-3282	120-3282	120-3282	#120-3282	120-3282
		120-3282	120-3282	120-3282	#120-3282	120-3282	120-3282	120-3282	120-3282	#120-3282
		120-3282	120-3282	120-3282	120-3282	#120-3282				
$TRPAD	017302	120-3282	#120-3282							
$TSTM	000504	#74-897								
$TSTNM	001002	#76-900	*86-1832	*111-3065	*111-3075	113-3120	116-3206	*116-3206	116-3206	116-3206
		116-3206	116-3206							
$TTYIN	017202	119-3277	119-3277	119-3277	#119-3277					
$TYPBN	= ******	120-3282								
$TYPDS	- ******	120-3282								
$TYPE	015712	117-3242	#118-3272	120-3282	120-3282					
$TYPEC	016124	118-3272	118-3272	118-3272	#118-3272	118-3272	119-3277			
$TYPEX	016242	118-3272	118-3272	#118-3272						
$TYPOC	016270	#118-3273	120-3282	120-3282						
$TYPON	016304	118-3273	#118-3273	120-3282						
$TYPOS	016244	#118-3273	120-3282							

SYMBOL		VALUE	REFERENCES				
$UNIT		001100	#76-900	*77-1386	*77-1503	*77-1506	*112-3085
$UNITM		000510	#74-897				
$USWR		001112	#76-900	77-1388	*77-1390	107-2690	107-2731
$VECT1		001136	#76-900	77-1456			
$VECT2		001140	#76-900				
$XTSTR		015304	#116-3206				
$$GET4	=	000000	#111-3075	111-3075			
$OFILL		016467	*118-3273	*118-3273	118-3273	#118-3273	
$40CAT	=	******	116-3206				
.$ERRT		001146	#77-902				
.$X		000500	#74-897	74-897			

MACRO NAME	REFERENCES									
CLKTST	#73-792	86-1834	86-1846	88-1924	89-1951	90-2002	91-2039	92-2066	93-2096	
COMMEN	#18-1530	#73-850								
CTESTS	#73-800	86-1832								
DISMNT	#73-813	#79-1615	#79-1628	#79-1638	#96-2258	#97-2278	#97-2297	#97-2307	#97-2315	#97-2323
	#97-2328	#98-2339	#98-2364	#99-2385	#99-2389	#99-2400	#99-2405	#100-2431	#100-2442	#100-2446
	#101-2467	#102-2509	#104-2578	#105-2619	#105-2625	#105-2630	#106-2655	#107-2698	#107-2702	
ENDCOM	#18-1542	#73-850								
ENDPAS	#73-796	111-3075								
ESCAPE	#20-1658	#73-850								
GETPRI	#13-1282	#73-850								
GETSWR	#22-1729	#73-850								
MULT	#43-4409	#73-850								
NEWTST	#19-1589	#73-850	#78-1528	#78-1545	#79-1562	#79-1602	#80-1657	#80-1673	#81-1685	#82-1701
	#84-1751	#85-1791	#86-1833	#86-1845	#87-1885	#88-1923	#89-1950	#90-2001	#91-2038	#92-2065
	#93-2095	#94-2138	#95-2166	#96-2201	#96-2236	#97-2266	#98-2331	#98-2346	#99-2373	#100-2411
	#101-2454	#102-2497	#103-2528	#104-2558	#105-2593	#106-2634	#107-2670	#107-2706	#108-2744	#110-2871
POP	#26-2107	#73-846	#73-850							
PUSH	#26-2099	#73-846	#73-850							
RECDLY	#73-829	#97-2271	#98-2334	#98-2352	#99-2377	#100-2418	#101-2463	#102-2505	#103-2536	#104-2571
	#105-2606	#106-2649	#107-2677	#108-2766						
REPORT	#56-5368	#73-850	78-1539	78-1556	79-1572	79-1589	79-1618	79-1631	82-1720	82-1736
SETPRI	#12-1250	#73-850								
SETTRA	#120-3282	#120-3282	#120-3282	#120-3282	#120-3282	#120-3282	#120-3282	#120-3282	#120-3282	
SETUP	#14-1306	#73-846	#73-850	#77-1394						
SKIP	#21-1692	#73-850								
SLASH	#17-1482	#73-850								
SPACE	#73-808	#73-850								
STARS	#16-1451	#73-846	#73-850	73-861	74-896	74-897	74-897	74-897	76-900	76-900
	76-900	78-1528	78-1528	78-1545	78-1545	79-1562	79-1562	79-1602	79-1602	80-1657
	80-1657	80-1673	80-1673	81-1685	81-1685	82-1701	82-1701	84-1751	84-1751	85-1791
	85-1791	86-1833	86-1833	86-1845	86-1845	87-1885	87-1885	88-1923	88-1923	89-1950
	89-1950	90-2001	90-2001	91-2038	91-2038	92-2065	92-2065	93-2095	93-2095	94-2138
	94-2138	95-2166	95-2166	96-2201	96-2201	96-2236	96-2236	97-2266	97-2266	98-2331
	98-2331	98-2346	98-2346	99-2373	99-2373	100-2411	100-2411	101-2454	101-2454	102-2497
	102-2497	103-2528	103-2528	104-2558	104-2558	105-2593	105-2593	106-2634	106-2634	107-2670
	107-2670	107-2706	107-2706	108-2744	108-2744	110-2871	110-2871	111-3075	113-3105	113-3115
	114-3156	115-3161	115-3163	115-3179	115-3181	116-3206	117-3210	117-3212	118-3272	118-3273
	119-3277	119-3277	119-3277	119-3277	120-3282	121-3286	121-3291	122-3344	122-3350	
SWRSU	#15-1420	#73-850	#77-1394	#77-1394						
TRMTRP	#120-3282									
TYPBIN	#25-2043	#73-850								
TYPDEC	#25-2013	#73-850								
TYPNAM	#23-1783	#73-850								
TYPNUM	#25-1980	#73-850								
TYPOCS	#25-1933	#73-850								
TYPOCT	#25-1896	#73-850	#114-3156	#114-3156	#119-3277					
TYPTXT	#24-1850	#73-850								
XMTDLY	#73-819	79-1653	96-2263	97-2282	104-2589					
$CLKTS	#73-785	#86-1834	#86-1846	#88-1924	#89-1951	#90-2002	#91-2039	#92-2066	#93-2096	
$$CMRE	#75-900									
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$$ESCA	#20-1671	#73-850								

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MACRO NAME      REFERENCES
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                #84-1751  #85-1791  #86-1833  #86-1845  #87-1885  #88-1923  #89-1950  #90-2001  #91-2038  #92-2065
                #93-2095  #94-2138  #95-2166  #96-2201  #96-2236  #97-2266  #98-2331  #98-2346  #99-2373  #100-2411
                #101-2454 #102-2497 #103-2528 #104-2558 #105-2593 #106-2634 #107-2670 #107-2706 #108-2744 #110-2871
$$SET           #120-3282 #120-3282 #120-3282 #120-3282 #120-3282 #120-3282 #120-3282 #120-3282 #120-3282
$$SETM          #77-1394   77-1394
$$SKIP          #21-1705  #73-850
.EQUAT          #4-180    #73-849    73-850
.EQUIV          #73-805   #73-846   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850
                #73-850   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850   #73-850
                #73-850   #73-850   #73-850   #73-850   #73-850
.HEADE          #2-54
.KT11           #5-323
.SETUP          #10-1184  #73-846   #73-882
.SWRHI          #3-96
.$ACT1          #52-4977  #73-847   #74-896
.$APTB          #53-5021  #73-847   #76-900    76-900
.$APTH          #54-5277  #73-847    74-897
.$APTY          #57-5452
.$ASTA          #55-5323
.$CATC          #7-909
.$CMTA          #9-1020   #73-848    75-900
.$DB2D          #46-4607
.$DB2O          #48-4730
.$DIV           #45-4510
.$EOP           #27-2166  #73-848   #111-3075
.$ERRO          #29-2647
.$ERRT          #30-2842  #73-846   #114-3156
.$MULT          #44-4447
.$POWE          #40-4159
.$RAND          #41-4234
.$RDDE          #37-3830
.$RDOC          #36-3739
.$READ          #35-3344  #73-848    119-3277
.$R2AZ          #51-4874
.$SAVE          #38-3905
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.$SB2O          #49-4792
.$SCOP          #28-2401  #73-847   #116-3206
.$SIZE          #42-4287
.$SUPR          #50-4830
.$TRAP          #39-4007  #73-845   #120-3282
.$TYPB          #34-3237
.$TYPD          #33-3160
.$TYPE          #31-2929  #73-845    118-3272
.$TYPO          #32-3064  #73-845   #118-3273
.$40CA          #8-948
.1170           #6-502
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