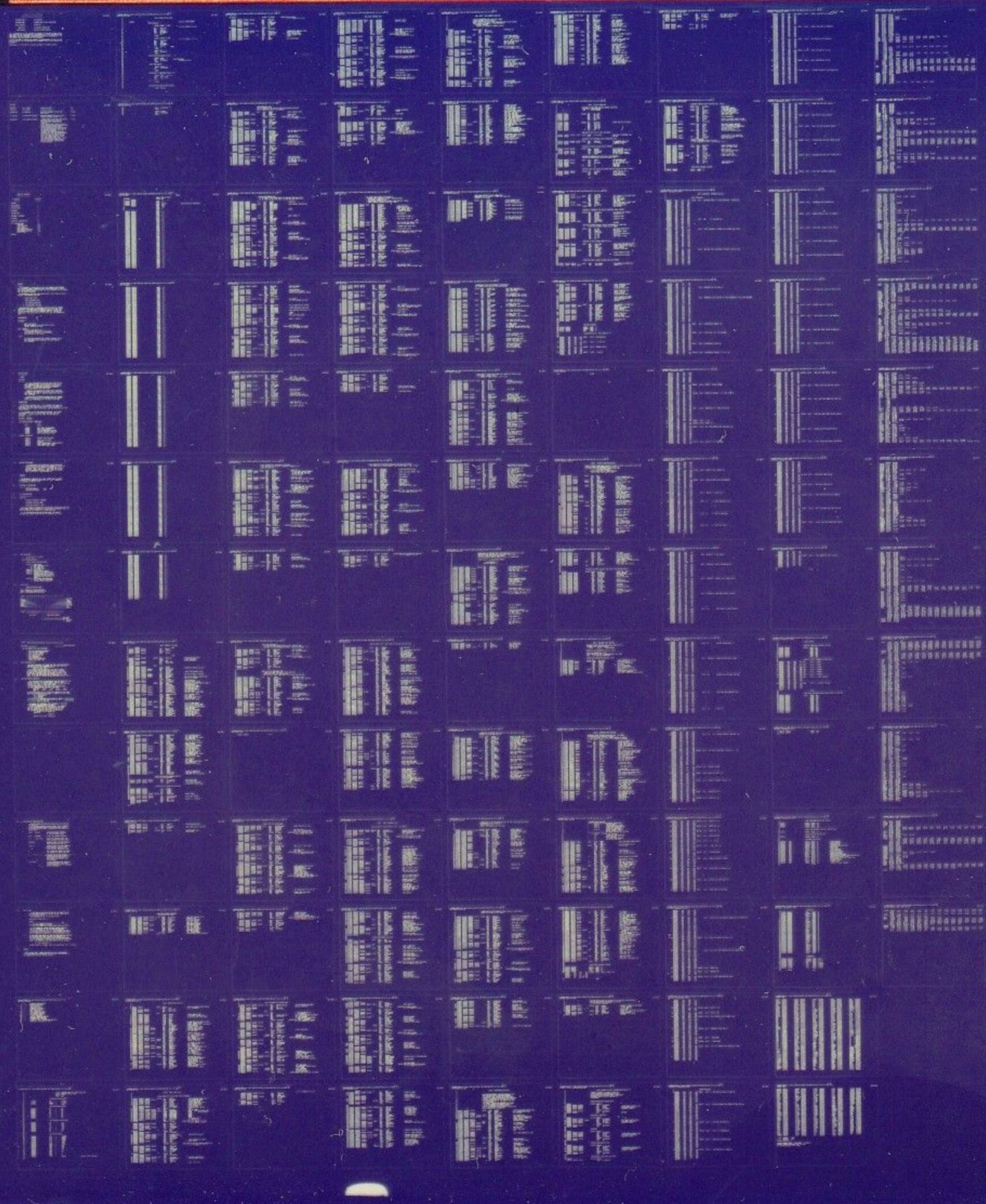
CMR11 CMR11 HOST EXERCISER AH-F914B-MC
CMV11-AA CZCMJB0 FICHE 1 OF 1



I D E N T I F I C A T I O N

PROGRAM CODE: AC-F912B-MC

PROGRAM NAME: CZCMJB0 CMR-11 HOST EXERCISER

DATE CREATED: 30-MAY-79

MODIFIED: 14-JAN-80, 28-NOV-80

MAINTAINER: SPECIAL SYSTEMS KANATA

HISTORY

SEQ 0002

MOD DATE	NEW NUMBER	REASON FOR MOD.	BY:
30-MAY-80	YC-Z018E-OZ	ORIGINAL PROGRAM TO TEST CMR HOST LOGIC.	D.G.W.
14-JAN-80	AC-F912A-MC(CZCMJA0)	ORIGINAL RELEASE TO S.D.C. (U.S.) PRODUCT BECOMES CATEGORY ''A''	D.G.W.
28-NOV-80	AC-F912B-MC(CZCMJB0)	.CHANGE CNTRL CHAR FOR SFTWR SWITCH REG FROM CNTRL-S TO CNTRL-G .PRINT DEFAULT PARAMETERS AT START-UP. .ADD A CNTRL CHAR. AND A FLAG TO ALLOW PRINTING A PORT CONFIGURATION STATUS TABLE WHEN AVAILABLE. .PRINT ELAPSED TIME AT END-OF-PASS IN THE PORT LOOP BACK TEST AND IN THE EXERCISE PORTION. .CORRECT THE ORDER OF BAUD-RATE PRINTOUTS AT THE COMPLETION OF THE FIRST PASS OF THE LOGIC TEST SO THAT THE CORRECT BAUD IS SHOWN WITH THE CORRECT PORT NO. .ADD CODE WHICH PRINTS THE ''STATE'' OF EACH ''REGULAR'' REMOTE ON A PORT IN THE PORT CONFIGURATION STATUS PRINTOUT.	D.G.W.

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1. GENERAL

THIS PROGRAM IS TO BE USED TO TEST THE COMPACT MICRO REMOTE HOST HARDWARE (CMR-11 M8990 OR CMV11 M7181-M7182)AND TO BASIC-ALLY CHECK COMMUNICATIONS BETWEEN THE HOST HARDWARE ON THE UNIBUS AND THE REMOTE HARDWARE.

THE PROGRAM IS DIVIDED INTO THREE PARTS, PLUS A FOURTH MULTI-PURPOSE 'MAINTENANCE'' ROUTINE:

- HOST LOGIC TEST
- PORT LOOP-BACK TEST
- CMR EXERCISE ROUTINE
- 'MAINTENANCE'' ROUTINE

THE HOST LOGIC TEST IS INTENDED TO BE RUN WITH ALL REMOTE COMMUNICATION DISABLED OR DISCONNECTED AS IS THE PORT LOOP-BACK TEST. THE CMR EXERCISE ROUTINE, HOWEVER, CAN BE RUN WITHOUT CHANGING ANY OF THE HARDWARE FROM ITS ''INSTALLED'' CONDITION. FOR THE DETAILS OF EACH TEST, SEE THE ACOMPANYING TEXT.

2. REQUIREMENTS

HARDWARE:

PDP-11 OR LSI-11
CMR HOST MODULE(S) ON THE UNIBUS (Q-BUS)
CONSOLE TERMINAL ON LINE.

PORT JUMPERS:
FOR PORT LOOP BACK TEST A
10 PIN FEMALE BERG PLUG IS REQUIRED
WITH PINS 9 TO 2 AND 7 TO 10 JUMPERED
FOR EACH PORT TO BE TESTED.

OTHER:

THE PROCESSOR MAINDECS AND CONSOLE TERMINAL TESTS
MUST HAVE BEEN RUN SUCCESSFULLY BEFORE RUNNING
THIS PROGRAM.

3. RESTRICTIONS

(NONE)

4. CAUTIONS

IT IS NOT ADVISABLE TO RUN THE LOGIC TEST OR THE PORT LOOP-BACK TEST ON AN "ON-LINE" SYSTEM WITH THE REMOTES ATTACHED AS "ON-LINE" DEVICES MAY BE AFFECTED. THE CMR EXERCISE ROUTINE, HOWEVER, MAY BE RUN UNDER THESE CONDITIONS.

COMMUNICATION PORTIONS OF THESE TESTS FROM HOST TO REMOTE AND REMOTE TO HOST MAY TAKE A CONSIDERABLE LENGTH OF TIME IF THE PORT BAUD RATES ARE SET LOW (300 BAUD).

CAUTION MUST BE EXERCISED WHEN USING THE "MAINTENANCE" ROUTINE SO THAT FUNCTIONS ARE NOT STARTED WHICH WILL COMPROMISE ANY "ON-LINE" SITUATIONS.

5. ASSUMPTIONS

5.1 IN THE PORT LOOP-BACK TEST, IT IS ASSUMED THAT WHEN THE OPERATOR TYPES <CR> INDICATING "READY", HE HAS LOOPED A PORT FROM OUTPUT TO INPUT PHYSICALLY, AND HAS SELECTED THAT PORT TO BE TESTED.

5.2 IT IS ASSUMED, IN THE CMR EXERCISE ROUTINE, THAT THERE ARE REMOTES ATTACHED (AT LEAST ONE) AND THAT THEY ARE "REGULAR". IF THIS IS NOT THE CASE, THE ROUTINE WILL BE IDLE.

6. OPTIONS / CONTROLS

6.1 SWITCHABLE OPTIONS (COMBINABLE)

SWR =	MEANS
100000	DON'T HALT AFTER ERRORS
040000	DON'T PRINT ERRORS
020000	LOOP ON ERRONEOUS ROUTINE
004000	INHIBIT PROGRAM ITERATIONS
002000	DON'T PRINT END OF PASS

6.2 CONTROL CHARACTERS

CNTRL-C	RESTART TEST SELECTOR
CNTRL-T	" " "
CNTRL-G	SHOW "SWR" OPTIONS
CNTRL-P	PROCEED
CNTRL-O	ENTER "MAINTENANCE" DEBUG ROUTINE
CNTRL-F	SHOW CONSOLE FILL COUNT
CNTRL-A	PRINT PORT CONFIG TABLE

6.3 NON-SWR PROCESSORS

ON PROCESSORS WITH NO PHYSICAL SWITCH REGISTER THE OPTIONS CAN BE EXAMINED OR CHANGED BY THE USE OF ''CNTRL-G'' AND AT THE TIME OF AN ERROR HALT. THE PRINTOUT: SWR = XXXXXX : WILL SHOW THE OPTIONS AND THE OPERATOR CAN LEAVE THEM (<CR>) OR CHANGE THEM (YYYYYY<CR>), THEN PROCEED (P)

7. LOADING

THE PROGRAM IS SUPPLIED IN .ABS FORMAT AND IS LOADED BY MEANS OF THE ABSOLUTE LOADER OR THE ''LOAD'' COMMAND OF THE DIAGNOSTIC MONITOR XXDP.

8. STARTING / RESTARTING

STARTING ADDRESS : 200
RESTARTING ADDRESS : 204

9. TEST DESCRIPTION

9.1 START UP:

INTERFACE ADDRESS: (NNNNNN)

INTERFACE VECTOR: (NNN)

INTERFACE PRIORITY: (NN)

THE VALUE SHOWN IN PARENTHASIS ARE DEFAULT VALUES WHICH WILL BE USED IF ONLY <CR> IS ENTERED. IF A NEW VALUE IS ENTERED (XXX), IT WILL BE USED AS THE DEFAULT AT FUTURE START-UPS.

IF THE PROCESSOR HAS NO SWITCH REGISTER, THE SWITCH OPTIONS WILL NOW BE SHOWN AND MAY BE CHANGED (AS IN #6).

9.2 TEST SELECTOR:

SELECT TEST (4 = HELP):

(HELP MESSAGE READS:)

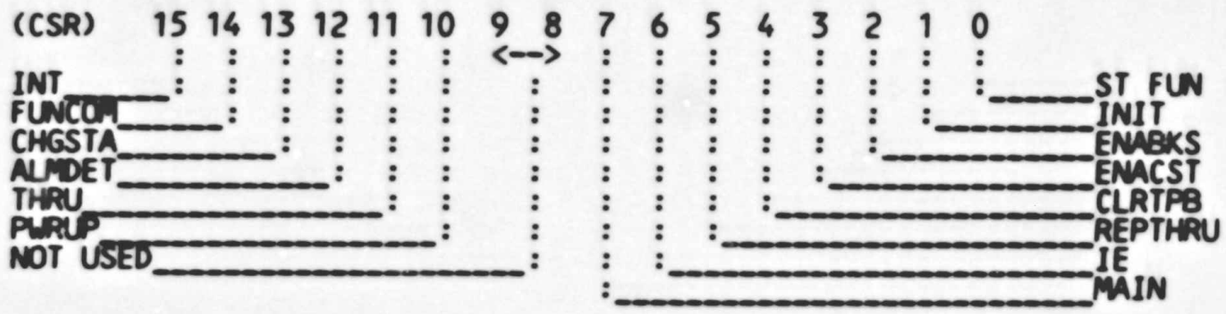
SELECT ONE OF THE FOLLOWING:

```
CR OR 1 = LOGIC TEST
      2 = PORT LOOP-BACK TEST
      3 = CMR EXERCISE
      4 = THIS HELP INFO
CNTRL-C = TEST SELECT
CNTRL-G = SWITCH OPTION SELECT
CNTRL-F = CONSOLE FILL COUNT SELECT
CNTRL-O = DEBUG ROUTINE WHICH ALLOWS
          LOADING SCPD AND STARTING
          FUNCTIONS AND EXAMINING THE
          RESULT.
CNTRL-A = PRINT PORT CONFIGURATION
          STATUS TABLE IF AVAILABLE.
      P = PROCEED FROM SW MONITOR
```

9.3 LOGIC TEST:

REGISTER DEFINITIONS

CSR = CONTROL & STATUS REGISTER
SPAR = SCRATCHPAD ADDRESS REGISTER
SPDR = SCRATCHPAD DATA REGISTER



```
(SPDR)  15 14 13 12 11 10  9  8  7  6  5  4  3  2  1  0
        <--------------------->  <--------------------->
                     :                        :
NOT USED_____________:                        :___________SCRATCHPAD DATA
```

THE FOLLOWING TESTS ARE PERFORMED:

- TEST OF THE PWR-UP SEQUENCE
- TEST THE SCPD ADDRESS REG.
- TEST THE SCPD MEMORY
- TEST ALL OF THE CSR
- TEST INTERRUPT
- TEST PROGRAM INIT.
- CHECK SCPD ACCESS KEYS
- SIMPLE FUNCTIONS TEST

9.4 PORT LOOP-BACK TEST

THE PORT LOOP-BACK TEST USES THE PORT LOOP MAINTENANCE FUNCTION OF THE HOST FIRMWARE.THE TEST WILL RUN WITH ONE PORT OR WITH ALL PORTS SELECTED:

```
      PORT # (<CR> = ALL):
```

THE OPERATOR MUST ENSURE THAT THE PORT(S) BEING TESTED IS(ARE) LOOPED FROM XMTR TO RCVR. THIS MAY BE DONE BY PLUGGING JUMPER PLUGS INTO THE HOST PORT PLUGS OR BY SWITCHING THE LDM (M8996) EITHER AT THE HOST, OR AT ANY ONE REMOTE ON A GIVEN PORT, TO 'LOOP-BACK'. (SEE CMR-11 SYSTEMS OPTION DESCRIPTION SEC. 2.5.1).

9.5 CMR HOST-REMOTE EXERCISE

THIS ROUTINE STARTS A BACKGROUND SCAN AND WAITS FOR THE END OF A SCAN OF ALL REMOTES ON ALL PORTS ('THRU').
DURING THIS WAIT, IF ANY ALARMS OCCUR, THE BELL ON THE CONSOLE WILL RING (4 TIMES PER ALARM).
AT THE COMPLETION OF THE SCAN, THE PROGRAM SHOWS THE PORT CONFIGURATION STATUS AS FOLLOWS:

```
      PORT #0      0(1)     1(1)     2(1)     3(1)     ...
      PORT #1    100(1)   101(1)   102(0)   103(0)     ...
      ETC.
```

SHOWING EACH PORT ONLY IF THERE ARE REMOTES ON THE PORT WHICH ARE 'REGULAR' AND SHOWING THE REMOTE 'STATE' WHERE:

```
      (0) = INITIALIZED
      (1) = PASSIVE
      (2) = ACTIVE
************ THIS PRINTOUT ALSO OCCURS IF CNTRL-A *************
************ IS TYPED ANY TIME AFTER THE FIRST     *************
************ TABLE IS PRINTED.                     *************
```

FOLLOWING THIS PRINTOUT, THE 'DIAGNOSTIC' FUNCTION IS ATTEMPTED ON EACH REMOTE PRESENT.
DURING THE REMAINDER OF THE EXERCISE, ALL REMOTES WILL BE EXERCISED WITH THE 'DIAGNOSTIC' FUNCTION AND ALL ALARMS WILL BE INDICATED (BY BELLS) AND ANY CHANGES OF REMOTE STATUS WILL BE REPORTED:

```
      *** REMOTE STATUS CHANGE ***
      REMOTE #X
                        REGULAR
                       /
      REMOTE STATUS NOW- IRREGULAR
```

9.6 'MAINTENANCE'' DEBUG ROUTINE

CAUTION SHOULD BE EXERCISED WHEN USING THIS ROUTINE SEE SECT. 4.

THIS ROUTINE OPERATES LIKE A SIMPLE 'ODT''. HOWEVER, IT ALLOWS EXAMINING AND/OR DEPOSITING ONLY IN THE CMR-11 SCRATCHPAD MEMORY. FOLLOWING ARE THE OPERATING CHARACTERS:

XXXX/	(SLASH)	OPEN AND DISPLAY CONTENTS OF THE SCPD ADDR 'XXXX''
<CR>	(RETURN)	CLOSE THE CURRENT ADDRESS.
<LF>	(LINE FEED)	CLOSE THE CURRENT ADDR. AND OPEN THE NEXT SEQUENTIAL ONE.
XXXX<CR>		DEPOSIT 'XXXX'' IN THE CURRENTLY OPEN ADDRESS AND CLOSE IT.
XXXX<LF>		DEPOSIT 'XXXX'' IN THE CURRENTLY OPEN ADDRESS, CLOSE IT AND OPEN THE NEXT SEQUENTIAL ONE.
G		SET 'STFUN'' OR 'MAIN'' TO START THE CURRENTLY LOADED FUNCTION
P		PROCEED OUT OF THE 'DE-BUG' ROUTINE AND RETURN TO THE SPOT WHICH WAS LEFT WHEN CNTRL-O WAS TYPED. (ANY PROMPTS WILL BE RE-ASKED).
(CSR ADDR)/		ALLOWS EXAMINATION OF THE HOST CSR REGISTER ONLY. NO OTHER UNIBUS ADDRESSES MAY BE EXAMINED IN THIS FASHION.

9.7 END OF PASS

AT THE END OF EACH PASS OF ANY OF THE THREE TESTS, AN "END PASS" MESSAGE IS PRINTED UNLESS INHIBITED BY SWITCH OPTION BIT 10.
THE PRINTOUT IS IN THE FOLLOWING FORM:

END PASS # X ERR. CNT. = Y

WHERE:

X = THE PASS NUMBER IN DECIMAL
Y = THE TOTAL NUMBER OF ERRORS SINCE START (DECIMAL).

IF THE NUMBER OF ERRORS BECOMES LARGER THAN 64K, THEN "** OVERFLOW **" WILL BE PRINTED INSTEAD.
IF SWITCH OPTION BIT 11 = 0, THIS MESSAGE WILL BE PRINTED ONLY AFTER 10 (OCTAL) PASSES THROUGH WHICHEVER TEST IS RUNNING. OTHERWISE, IT IS PRINTED EVERY PASS.

*** IN THE PORT LOOP BACK TEST AND THE CMR EXERCISE ROUTINE, THE ELAPSED TIME SINCE START-UP (OR CNTRL-C) IS PRINTED ALONG WITH THE END OF PASS MESSAGE PROVIDING THAT THE PROCESSOR IS EQUIPPED WITH A REGULAR LINE-TIME CLOCK. THE FORMAT OF THE TIME PRINTOUT IS AS FOLLOWS:

EL.TIM. HH:MM:SS:TT

(HOURS, MINUTES, SECONDS, AND TICKS WHERE ONE TICK = 1/60 SEC.)

10. ERRORS

FOR THE MOST PART, ERROR PRINTOUTS ARE SELF-EXPLANATORY. THE ERROR NUMBERS AND ADDRESSES CAN BE USED FOR REFERENCE TO THE PROGRAM LISTING FOR FURTHER DETAILS.

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```
                                .TITLE  CZCMJB0 CMR(V)-11 HOST EXERCISER
                                .SBTTL SYMBOLIC DEFINITIONS
                                .NLIST  TTM
                                .LIST   ME

                            ;INTERNAL DEFINITIONS:

177776                      PS      =       177776
177570                      HWSWR   =       177570
027636                      SSWR    =       SWREG

                            ;REGISTER DEFINITIONS:

000000                      R0      =       %0
000001                      R1      =       %1
000002                      R2      =       %2
000003                      R3      =       %3
000004                      R4      =       %4
000005                      R5      =       %5
000006                      SP      =       %6
000007                      PC      =       %7

                            ;BUS REQUEST DEFINITIONS:

000340                      P7      =       340
000300                      P6      =       300
000240                      P5      =       240
000200                      P4      =       200
000140                      P3      =       140
000100                      P2      =       100
000040                      P1      =       40
000000                      P0      =       0

                            ;BIT DEFINITIONS:

100000                      B15     =       100000
040000                      B14     =       40000
020000                      B13     =       20000
010000                      B12     =       10000
004000                      B11     =       4000
002000                      B10     =       2000
001000                      B09     =       1000
000400                      B08     =       400
000200                      B07     =       200
000100                      B06     =       100
000040                      B05     =       40
000020                      B04     =       20
000010                      B03     =       10
000004                      B02     =       4
000002                      B01     =       2
000001                      B00     =       1
002000                      ISP     =       BEGIN           ;INITIAL STACK POINTER
```

```
                                .SBTTL MACRO DEFINITIONS

000001                  N       =       1               ;INITIAL ERROR NUMBER
                        ;ERROR MACROS

                                .MACRO  ERROR   P,MSG
                                                        ;******* ERROR P *******
                                BIT     #B14,@SR
                                BNE     .+20
                                MOV     #MSG,R0
                                MOV     #P,ERRNUM
                                JSR     PC,ERR
                        N       =       N+1
                                .ENDM

                                .MACRO  DATERR  P,MSG
                                                        ;******* ERROR P *******
                                BIT     #B14,@SR
                                BNE     .+20
                                MOV     #MSG,R0
                                MOV     #P,ERRNUM
                                JSR     PC,DERR
                        N       =       N+1
                                .ENDM

                                .MACRO  HLT
                                JSR     PC,SWHLT
                                .ENDM

                        ;PRINT MACRO (MSG ADDR IN R0)

                                .MACRO  PNTM    A
                                MOV     #A,R0           ;PRINT MESSAGE
                                JSR     PC,TYPOUT               ;POINTED TO BY A
                                .ENDM

                        ;SCOPE LOOP MACRO

                                .MACRO  SCOPE   X
                                JSR     R5,SCPRTN
                                X
                                .ENDM

                        ;INTER-PDP-11 COMPATABLE MOVE TO PS

                                .MACRO  MTPS    SRC,?LLL
                                MOV     SRC,-(SP)
                                MOV     #LLL,-(SP)
                                RTI
                        LLL:
                                .ENDM

                        ;REGISTER SAVE AND RESTORE MACROS

                                .MACRO  REGSAV
```

```
                                        JSR     R5,REGSAV
                                        .ENDM

                                        .MACRO  REGRES
                                        JSR     R5,REGRES
                                        .ENDM
```

```
                                        .SBTTL  TRAP CATCHERS
                                        .ENABLE ABS
000000                                  .       =       0
000000  000002                          .WORD   .+2
000002  000000                          .WORD   0
000004  016150                          .WORD   DVATST                  ;TRAP BAD DEVICE ADDRESSES
000006  000340                          .WORD   340
        000176                          .REPT   126.
                                        .WORD   .+2
                                        .WORD   0
                                        .ENDR
000010  000012                          .WORD   .+2
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000074  000076                          .WORD   .+2
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                                                .SBTTL SYMBOLIC LISTING

                000200                          .       =       200
000200  000167  001574                          JMP     BEGIN
000204  012706  002000                          MOV     #ISP,SP
000210  000005                                  RESET
000212  000167  002276                          JMP     RESTRT

                002000                          .       =       2000

002000  012706  002000          BEGIN:          MOV     #ISP,SP                 ;INITIALIZE THE STACK
002004  000005                                  RESET                           ;CLEAR THE WORLD
002006                                          MTPS    #P7                     ;STOP INTERRUPTS
002006  012746  000340                          MOV     #P7,-(SP)
002012  012746  002020                          MOV     #64$,-(SP)
002016  000002                                  RTI
002020                          64$:
002020  005067  025544                          CLR     DEVER
002024  105067  025510                          CLRB    LSIFLG                  ;PREPARE TO CHECK FOR LSI-11
002030  012737  016122  000004                  MOV     #LSTST,@#4
002036  012737  000340  000006                  MOV     #P7,@#6
002044  005737  177776                          TST     @#177776                ;CHECK FOR PSW &SET FLAG
002050  005067  025564                          CLR     SWRFLG
002054  012737  016132  000004                  MOV     #SRTST,@#4              ;SET UP TO TRAP IF NO SWR.
002062  012737  000340  000006                  MOV     #P7,@#6
002070  012767  177570  025536                  MOV     #HWSWR,SR               ;SET UP TO CHECK IF ANY HD SWR
002076  005777  025532                          TST     @SR                     ;SEE IF IT'S THERE
002102                                          PNTM    TSTHDR
002102  012700  020712                          MOV     #TSTHDR,R0              ;PRINT MESSAGE
002106  004767  015160                          JSR     PC,TYPOUT               ;POINTED TO BY TSTHDR
002112                          PROMT:          PNTM    FRAD                    ;ASK FOR 1ST UNIBUS ADDR OF CMR-11
002112  012700  021277                          MOV     #FRAD,R0                ;PRINT MESSAGE
002116  004767  015150                          JSR     PC,TYPOUT               ;POINTED TO BY FRAD
002122  016767  025530  016110                  MOV     DEVADR,KBBUF            ;LOAD DEFAULT ADDRESS
002130  004767  014172                          JSR     PC,PRDFLT               ;GO PRINT DEFAULT
002134  012767  002112  025444                  MOV     #PROMT,PCONT            ;LOAD RETURN ADDRESS
002142  004767  015166                          JSR     PC,INPKB                ;GET KBD INPUT
002146  016767  016066  025502                  MOV     KBBUF,DEVADR            ;REPLACE CMR-11 BASE ADDR

002154  026727  016060  164000                  CMP     KBBUF,#164000           ;IS IT WITHIN LIMIT?
002162  103006                                  BHIS    PRMT1                   ;YES, TEST IT
002164                                          PNTM    AGAIN                   ;NO, ERROR & ASK AGAIN
002164  012700  021324                          MOV     #AGAIN,R0               ;PRINT MESSAGE
002170  004767  015076                          JSR     PC,TYPOUT               ;POINTED TO BY AGAIN
002174  000167  177712                          JMP     PROMT
002200  012737  016150  000004  PRMT1:          MOV     #DVATST,@#4
002206  005777  025444                          TST     @DEVADR                 ;IS IT A GOOD ADDR?
002212  012737  016370  000004                  MOV     #HDER,@#4               ;SET UP FOR FURTHER TRAPS
002220  005037  000006                          CLR     @#6                     ;ALLOW CLOCK TO FUNCTION
002224                          PRMT2:          PNTM    DVECT                   ;YES, ASK FOR DEVICE VECTOR
002224  012700  021357                          MOV     #DVECT,R0               ;PRINT MESSAGE
002230  004767  015036                          JSR     PC,TYPOUT               ;POINTED TO BY DVECT
002234  016767  025414  015776                  MOV     VECTOR,KBBUF            ;LOAD DEFAULT VECTOR
002242  004767  014060                          JSR     PC,PRDFLT               ;GO PRINT DEFAULT
002246  012767  002224  025332                  MOV     #PRMT2,PCONT            ;LOAD RETURN ADDRESS
002254  004767  015054                          JSR     PC,INPKB                ;GET KBD INPUT
002260  016767  015754  025366                  MOV     KBBUF,VECTOR            ;REPLACE CMR-11 VECTOR
```

```
                                                        CMP     KBBUF,#776      ;IS IT WITHIN LIMITS?
                                                        BLOS    PRMT3           ;YES, GET PRIORITY
                                                        PNTM    AGAIN           ;NO, ERROR AND ASK AGAIN
002276  012700  021324                                  MOV     #AGAIN,R0       ;PRINT MESSAGE
002302  004767  014764                                  JSR     PC,TYPOUT       ;POINTED TO BY AGAIN
002306  000167  177712                                  JMP     PRMT2
002312                                          PRMT3:  PNTM    DVPRIO          ;ASK FOR CMR-11 PRIORITY
002312  012700  021403                                  MOV     #DVPRIO,R0      ;PRINT MESSAGE
002316  004767  014750                                  JSR     PC,TYPOUT       ;POINTED TO BY DVPRIO
002322  016767  025332  015710                          MOV     FKPRIO,KBBUF    ;LOAD DEFAULT PRIORITY
002330  004767  013772                                  JSR     PC,PRDFLT       ;GO PRINT DEFAULT
002334  012767  002312  025244                          MOV     #PRMT3,PCONT    ;LOAD RETURN ADDRESS
002342  004767  014766                                  JSR     PC,INPKB        ;GET KBD INPUT
002346  026727  015666  000007                          CMP     KBBUF,#7        ;IS IT WITHIN LIMITS?
002354  003406                                          BLE     PRMT4           ;LOW ENOUGH, OKAY
002356                                                  PNTM    AGAIN           ;NO, ERROR AND ASK AGAIN
002356  012700  021324                                  MOV     #AGAIN,R0       ;PRINT MESSAGE
002362  004767  014704                                  JSR     PC,TYPOUT       ;POINTED TO BY AGAIN
002366  000167  177720                                  JMP     PRMT3
002372  026727  015642  000004              PRMT4:      CMP     KBBUF,#4        ;HIGH ENOUGH?
002400  002006                                          BGE     PRMT5           ;YES, OKAY
002402                                                  PNTM    AGAIN           ;NO, ERROR & ASK AGAIN
002402  012700  021324                                  MOV     #AGAIN,R0       ;PRINT MESSAGE
002406  004767  014660                                  JSR     PC,TYPOUT       ;POINTED TO BY AGAIN
002412  000167  177674                                  JMP     PRMT3
002416  006367  015616                      PRMT5:      ASL     KBBUF
002422  006367  015612                                  ASL     KBBUF
002426  006367  015606                                  ASL     KBBUF
002432  006367  015602                                  ASL     KBBUF
002436  006367  015576                                  ASL     KBBUF           ;SHIFT IT INTO PLACE
002442  016767  015572  025144                          MOV     KBBUF,PRIO      ;LOAD NEW PRIORITY
002450  004767  013606                                  JSR     PC,DEVGEN       ;GENERATE CMR-11 ADDRESSES

                                        ;TEST FOR CLOCK CSR ADDRESS AND SET
                                        ;CLOCK FLAG ACCORDINGLY:

002454  112767  177777  025047                  MOVB    #-1,CLKFLG              ;SET CLOCK FLAG
002462  012737  002566  000004                  MOV     #CLKTRP,@#4             ;SET UP TO TRAP
002470  005777  025172                          TST     @LCS                    ;TEST LINE CLOCK STAT.
                                                                                ;A TRAP WILL CLEAR FLAG.

                                        ;CLEAR OUT ALL TABLES FOR START-UP

002474  005067  023764                          CLR     EXTBL1
002500  005067  024160                          CLR     EXTBL2
002504  005067  024354                          CLR     EXTBL3
002510  005067  024550                          CLR     EXTBL4
002514  012737  016370  000004      RESTRT:     MOV     #HDER,@#4               ;RESET TRAPS

002522  012737  002574  000100                  MOV     #CLKINT,@#100           ;SET CLOCK VECTOR
002530  012737  000340  000102                  MOV     #340,@#102
002536                                          MTPS    #P7                     ;RAISE C.P. PRIORITY
002536  012746  000340                          MOV     #P7,-(SP)
002542  012746  002550                          MOV     #64$,-(SP)
002546  000002                                  RTI
002550                                  64$:
```

```
     91 002550  005767  025064                TST     SWRFLG                  ;NON-SWR-PROCESSOR?
     92 002554  001402                        BEQ     1$
     93 002556  004767  014136                JSR     PC,SWDMP                ;YES, DUMP SWITCH LOCATION
     94 002562  000167  000076          1$:   JMP     BCONT
     95
     96 002566  105067  024737          CLKTRP: CLRB    CLKFLG                  ;CLEAR CLOCK FLAG
     97 002572  000002                        RTI                             ;AND RETURN
     98
```

```
                                        ;LINE CLOCK SERVICE ROUTINE.
                                        ;  UPDATE RUN TIME CLOCK.
                                        ;
002574  112767  177777  024726  CLKINT: MOVB    #-1,CLKFL1      ;SET ''CLK TICKING'' FLAG
002602  105267  024743                  INCB    TICKS           ;UPDATE TICKS
002606  126727  024737  000074          CMPB    TICKS,#60.      ;REACHED A SECOND?
002614  103422                          BLO     CLKEXT          ;NO, JUST RETURN
002616  105067  024727                  CLRB    TICKS           ;YES, 0 - TICKS
002622  105267  024720                  INCB    SECS            ;AND UPDATE SECONDS
002626  126727  024714  000074          CMPB    SECS,#60.       ;REACHED A MINUTE?
002634  103412                          BLO     CLKEXT          ;NO, JUST RETURN
002636  105067  024704                  CLRB    SECS            ;YES, 0 - SECONDS
002642  105267  024673                  INCB    MINS            ;AND UPDATE MINUTES
002646  126727  024667  000074          CMPB    MINS,#60.       ;REACHED AN HOUR?
002654  103402                          BLO     CLKEXT          ;NO, JUST RETURN
002656  105267  024654                  INCB    HOURS           ;YES, UPDATE HOURS
002662  000002                  CLKEXT: RTI                     ;RETURN FROM CLOCK INTERRUPT
```

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                                        .SBTTL SUPERVISOR DISPATCH

002664  000005                  BCONT:  RESET                   ;ALWAYS DO RESET UPON ARRIVAL
002666                                  MTPS    #P7             ;KILL INTERRUPTS
002666  012746  000340                  MOV     #P7,-(SP)
002672  012746  002700                  MOV     #64$,-(SP)
002676  000002                          RTI
002700                          64$:
002700  105067  024627                  CLRB    CNFGFL          ;CLEAR CONFIG FLAG
002704  105067  024620                  CLRB    CLKFL1          ;CLR CLOCK TICKING FLAG
002710  105067  024635                  CLRB    TICKS           ;CLEAR RUN TIME CLOCK TIME
002714  105067  024626                  CLRB    SECS
002720  105067  024615                  CLRB    MINS
002724  105067  024606                  CLRB    HOURS
002730  105067  024611                  CLRB    SAFE            ;CLEAR 'FILL CNT SAFETY FLAG'
002734  105067  024574                  CLRB    DBFLG           ;CLEAR 'DEBUG' FLAG
002740                                  PNTM    TSTSEL          ;PRINT 'SELECT TEST (<CR>=HELP)''
002740  012700  021676                  MOV     #TSTSEL,R0      ;PRINT MESSAGE
002744  004767  014322                  JSR     PC,TYPOUT       ;POINTED TO BY TSTSEL
002750  012767  000001  015262          MOV     #1,KBBUF        ;DEFAULT LOGIC TEST
002756  012767  002664  024622          MOV     #BCONT,PCONT    ;LOAD RETURN ADDRESS
002764  004767  014344                  JSR     PC,INPKB        ;GET KBD INPUT
002770  005067  024612                  CLR     PCONT
002774  026727  015240  000001          CMP     KBBUF,#1        ;CHECK IT FOR '1'
003002  001010                          BNE     BCNT1           ;IF = 1, DO LOGIC TESTS
003004  105767  024521                  TSTB    CLKFLG          ;IS THERE A CLOCK CSR?
003010  001403                          BEQ     BCNT0           ;NO, FORGET IT.
003012  042777  000100  024646          BIC     #100,@LCS       ;YES, ENSURE IT'S IDLE
003020  000167  000120          BCNT0:  JMP     LOGTST          ;GO TO LOGIC TEST
003024  026727  015210  000002  BCNT1:  CMP     KBBUF,#2        ;CHECK IT FOR '2'
003032  001010                          BNE     BCNT2
003034  105767  024471                  TSTB    CLKFLG          ;IS THERE A CLOCK CSR?
003040  001403                          BEQ     BCNT3           ;NO, FORGET IT
003042  052777  000100  024616          BIS     #100,@LCS       ;YES, ENABLE IT!!
003050  000167  006056          BCNT3:  JMP     PORTLP          ;IF '2' DO PORT LOOP TEST
003054  026727  015160  000003  BCNT2:  CMP     KBBUF,#3        ;CHECK IT FOR '3'
003062  001010                          BNE     TSTRSK          ;IF NOT, GIVE HELP
003064  105767  024441                  TSTB    CLKFLG          ;IS THERE A CLOCK CSR?
003070  001403                          BEQ     BCNT4           ;NO, FORGET IT
003072  052777  000100  024566          BIS     #100,@LCS       ;YES, ENABLE IT!!
003100  000167  007374          BCNT4:  JMP     CMREXC          ;IF '3' DO EXERCISE.

003104  026727  015130  000004  TSTRSK: CMP     KBBUF,#4        ;DID HE TYPE A 4?
003112  001006                          BNE     HLPASK          ;NO, BUT HE HAD BETTER!!
003114                                  PNTM    HELPM           ;PRINT HELPFUL INFO
003114  012700  021725                  MOV     #HELPM,R0       ;PRINT MESSAGE
003120  004767  014146                  JSR     PC,TYPOUT       ;POINTED TO BY HELPM
003124  000167  177534                  JMP     BCONT           ;AND RE-ASK
003130                          HLPASK: PNTM    HLPDSR          ;PRINT ''IF HELP IS REQ'D...''
003130  012700  022714                  MOV     #HLPDSR,R0      ;PRINT MESSAGE
003134  004767  014132                  JSR     PC,TYPOUT       ;POINTED TO BY HLPDSR
003140  000167  177520                  JMP     BCONT
```

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                                        .SBTTL  HOST LOGIC TEST


                                ;CHECK POWER UP OF THE HOST MICRO FIRMWARE.

003144  005067  024500          LOGTST: CLR     VERFLG                  ;CLEAR VERSION PRINT FLAG
003150  012767  000010  024416          MOV     #10,ITER                ;SET ITERATION COUNT
003156  005067  024420                  CLR     PASCNT                  ;CLEAR PASS COUNT
003162  105067  024354                  CLRB    OFLOF                   ;CLEAR 'OVERFLOW' FLAG
003166  005067  024400                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
003172                                  PNTM    LGKTSM                  ;PRINT 'LOGIC TEST''
003172  012700  022761                  MOV     #LGKTSM,R0              ;PRINT MESSAGE
003176  004767  014070                  JSR     PC,TYPOUT               ;POINTED TO BY LGKTSM
003202  000005          STO:    RESET                                   ;INIT
003204  012767  000000  024352          MOV     #0,CNTR                 ;SET UP TIMER
003212  116767  177774  177772  MOVB:   MOVB    MOVB,MOVB               ;MOVB   GIVE THE MICRO TIME
003220  116767  177766  177764          MOVB    MOVB,MOVB               ;MOVB        TO GET GOING.
003226  116767  177760  177756          MOVB    MOVB,MOVB               ;MOVB
003234  116767  177752  177750          MOVB    MOVB,MOVB               ;MOVB
003242  116767  177744  177742          MOVB    MOVB,MOVB               ;MOVB
003250  116767  177736  177734          MOVB    MOVB,MOVB               ;MOVB
003256  032777  002000  024302          BIT     #B10,@CSR               ;IS 'PWRUP'' SET?
003264  001016                          BNE     ST1                     ;IF YES, OKAY
003266                                  ERROR   \N,NOGO         ;ERROR:HOST U.P. FAILED TO START.
                                                                        ;******* ERROR 1 *******
003266  032777  040000  024340          BIT     #B14,@SR
003274  001007                          BNE     .+20
003276  012700  024031                  MOV     #NOGO,R0
003302  012767  000001  013300          MOV     #1,ERRNUM
003310  004767  013126                  JSR     PC,ERR
000002                          N       =       N+1
003314                                  SCOPE   STO
003314  004567  012670                  JSR     R5,SCPRTN
003320  003202                          STO
003322  012767  102000  013262  ST1:    MOV     #102000,GOOD            ;NOW WATCH FOR INTR
003330  017767  024232  013256          MOV     @CSR,BAD
003336  042767  075777  013250          BIC     #75777,BAD
003344  026767  013242  013242          CMP     GOOD,BAD
003352  001421                          BEQ     ST2                     ;INTR & PWRUP SET; OKAY
003354  005367  024204                  DEC     CNTR                    ;WAIT A BIT
003360  001360                          BNE     ST1
003362                                  DATERR  \N,NOTUP        ;ERROR:PWR UP SEQ NOT COMPLETED(BAD CSR)
                                                                        ;******* ERROR 2 *******
003362  032777  040000  024244          BIT     #B14,@SR
003370  001007                          BNE     .+20
003372  012700  024066                  MOV     #NOTUP,R0
003376  012767  000002  013204          MOV     #2,ERRNUM
003404  004767  013116                  JSR     PC,DERR
000003                          N       =       N+1
003410                                  SCOPE   STO
003410  004567  012574                  JSR     R5,SCPRTN
003414  003202                          STO
003416  017767  024144  013170  ST2:    MOV     @CSR,BAD                ;NOW CHK CSR FOR 0'S
003424  042767  102000  013162          BIC     #102000,BAD             ;EXCEPT PWRUP & INTR
003432  005067  013154                  CLR     GOOD
003436  026767  013150  013150          CMP     GOOD,BAD
003444  001416                          BEQ     ST3                     ;CSR = 0'S, O.K.
```

```
     38 003446                                          DATERR  \N,CSRRST       ;ERROR:CSR NOT RESET
                                                                                ;******* ERROR 3 *******
        003446  032777  040000  024160                  BIT     #B14,@SR
        003454  001007                                  BNE     .+20
        003456  012700  024137                          MOV     #CSRRST,R0
        003462  012767  000003  013120                  MOV     #3,ERRNUM
        003470  004767  013032                          JSR     PC,DERR
                000004                          N       =       N+1
     39 003474                                          SCOPE   ST0
        003474  004567  012510                          JSR     R5,SCPRTN
        003500  003202                                  ST0
     40 003502  012767  000020  024052          ST3:    MOV     #20,CLK                 ;COUNTER FOR VERSION ITEMS
     41 003510  012777  001000  024112                  MOV     #1000,@SPAR             ;ADDR RESULT SCPD
     42 003516  012701  027464                          MOV     #VERSP,R1               ;POINT AT MEM SPACE
     43 003522  117721  024104                  ST4:    MOVB    @SPDR,(R1)+             ;STORE VERSION INFO
     44 003526  005367  024030                          DEC     CLK                     ;DONE?
     45 003532  002403                                  BLT     ST6
     46 003534  005277  024070                          INC     @SPAR                   ;NO, KEEP GOING
     47 003540  000770                                  BR      ST4
     48
```

```
                                        ;SPAR REGISTER TEST:
                                        ;DO A SLIDING BIT (0) TEST ON THE SCPD ADDRESS REGISTER
                                        ;WHILE IGNORING SPAR BIT 08 (UNUSED).

003542  005077  024062          ST6:   CLR     @SPAR                    ;TEST CLEAR OF SPAR
003546  005067  013040                 CLR     GOOD
003552  017767  024052  013034         MOV     @SPAR,BAD                ;SPAR CLEAR?
003560  001416                         BEQ     ST60                     ;YES, OK
003562                                 DATERR  \N,SPRCLR        ;ERROR:CAN'T CLEAR SPAR
                                                                        ;******* ERROR 4 *******
003562  032777  040000  024044         BIT     #B14,@SR
003570  001007                         BNE     .+20
003572  012700  024164                 MOV     #SPRCLR,R0
003576  012767  000004  013004         MOV     #4,ERRNUM
003604  004767  012716                 JSR     PC,DERR
        000005                 N       =       N+1
003610                                 SCOPE   ST6
003610  004567  012374                 JSR     R5,SCPRTN
003614  003542                         ST6
003616  012767  177777  023760  ST60:  MOV     #-1,PAT                  ;SET UP FOR SLIDING 0 TEST
003624  012767  000001  023746         MOV     #B00,MASK                ;SET BIT MASK
003632  016767  023746  012752  ST61:  MOV     PAT,GOOD
003640  042767  176000  012744         BIC     #176000,GOOD
003646  016777  012740  023754         MOV     GOOD,@SPAR               ;LOAD PATTERN
003654  017767  023750  012732         MOV     @SPAR,BAD                ;AND READ IT BACK
003662  042767  000400  012724         BIC     #B08,BAD
003670  042767  000400  012714         BIC     #B08,GOOD                ;IGNORE BIT 08
003676  026767  012710  012710         CMP     GOOD,BAD                 ;SPAR DATA O.K. ?
003704  001416                         BEQ     ST62                     ;IF YES  NEXT PATTERN
003706                                 DATERR  \N,SPRDAT        ;ERROR:BAD BITS IN SPAR
                                                                        ;******* ERROR 5 *******
003706  032777  040000  023720         BIT     #B14,@SR
003714  001007                         BNE     .+20
003716  012700  024211                 MOV     #SPRDAT,R0
003722  012767  000005  012660         MOV     #5,ERRNUM
003730  004767  012572                 JSR     PC,DERR
        000006                 N       =       N+1
003734                                 SCOPE   ST61
003734  004567  012250                 JSR     R5,SCPRTN
003740  003632                         ST61
003742  032767  001000  023634  ST62:  BIT     #B09,PAT                 ;DONE WHOLE REG?
003750  001414                         BEQ     ST7                      ;IF YES, NEXT RTN
003752  012767  177777  023624         MOV     #-1,PAT                  ;RE-LOAD ALL 1'S
003760  046767  023614  023616         BIC     MASK,PAT                 ;NO, PREPARE FOR NEXT BIT
003766  006367  023606                 ASL     MASK                     ;ROTATE MASK
003772  004767  012670                 JSR     PC,MONIT
003776  000167  177630                 JMP     ST61                     ;AND CONTINUE
```

```
                                        ;SCRATCH PAD MEMORY TEST
                                        ; (1) UP COUNT IN REQ SCPD WHILE FILLING RES SCPD WITH 377'S
                                        ; (2) UP COUNT IN RES SCPD WHILE FILLING REQ SCPD WITH 377'S
                                        ;
 004002  005077  023622         ST7:    CLR     @SPAR                   ;ADDRESS 0
 004006  005067  023640                 CLR     WORD
 004012  016777  023634  023612 ST70:    MOV     WORD,@SPDR              ;LOAD REQUEST SCRATCH PAD
 004020  052777  001000  023602         BIS     #B09,@SPAR
 004026  012777  000377  023576         MOV     #377,@SPDR
 004034  042777  001000  023566         BIC     #B09,@SPAR
 004042  027727  023562  000377         CMP     @SPAR,#377              ;DONE.
 004050  103005                        BHIS    ST71
 004052  005277  023552                 INC     @SPAR
 004056  105267  023570                 INCB    WORD
 004062  000753                        BR      ST70
 004064  005077  023540         ST71:   CLR     @SPAR                   ;NOW...CHECK IT
 004070  005067  023556                 CLR     WORD
 004074  016767  023552  012510 ST80:    MOV     WORD,GOOD
 004102  017767  023524  012504         MOV     @SPDR,BAD
 004110  026767  012476  012476         CMP     GOOD,BAD
 004116  001432                        BEQ     ST81                    ;O.K, CONTINUE
 004120                                 DATERR  \M,ISATE        ;ERROR:REQ SCPD ADR TEST ERROR
                                                                        ;******* ERROR 6 *******
 004120  032777  040000  023506         BIT     #B14,@SR
 004126  001007                        BNE     .+20
 004130  012700  024240                 MOV     #ISATE,R0
 004134  012767  000006  012446         MOV     #6,ERRNUM
 004142  004767  012360                 JSR     PC,DERR
         000007                 N       =       N+1
 004146  032777  040000  023460         BIT     #B14,@SR                ;PRINT ALLOWED?
 004154  001010                        BNE     ST80S                   ;NO, SKIP IT
 004156                                 PNTM    SCPAD
 004156  012700  022776                 MOV     #SCPAD,R0               ;PRINT MESSAGE
 004162  004767  013104                 JSR     PC,TYPOUT               ;POINTED TO BY SCPAD
 004166  017700  023436                 MOV     @SPAR,R0                ;PRINT SCPD ADDRESS OF ERROR
 004172  004767  014120                 JSR     PC,OCTPNT
 004176                         ST80S:  SCOPE   ST80
 004176  004567  012006                 JSR     R5,SCPRTN
 004202  004074                        ST80
 004204  027727  023420  000377 ST81:    CMP     @SPAR,#377
 004212  103005                        BHIS    ST82
 004214  005277  023410                 INC     @SPAR
 004220  105267  023426                 INCB    WORD
 004224  000723                        BR      ST80
 004226  012777  001000  023374 ST82:    MOV     #1000,@SPAR
 004234  012767  000377  012350         MOV     #377,GOOD
 004242  017767  023364  012344 ST90:    MOV     @SPDR,BAD
 004250  026767  012336  012336         CMP     GOOD,BAD                ;RES SCPD ALL 1'S?
 004256  001432                        BEQ     ST91                    ;YES, O.K.
 004260                                 DATERR  \M,OSDTE        ;ERROR:RESULT SCPD DATA TEST ERROR
                                                                        ;******* ERROR 7 *******
 004260  032777  040000  023346         BIT     #B14,@SR
 004266  001007                        BNE     .+20
 004270  012700  024271                 MOV     #OSDTE,R0
 004274  012767  000007  012306         MOV     #7,ERRNUM
 004302  004767  012220                 JSR     PC,DERR
         000010                 N       =       N+1
```

```
     40 004306  032777  040000  023320          BIT     #B14,@SR                ;PRINT ALLOWED?
     41 004314  001010                          BNE     ST90S                   ;NO, SKIP IT
     42 004316                                  PNTM    SCPAD
        004316  012700  022776                  MOV     #SCPAD,R0               ;PRINT MESSAGE
        004322  004767  012744                  JSR     PC,TYPOUT               ;POINTED TO BY SCPAD
     43 004326  017700  023276                  MOV     @SPAR,R0                ;PRINT SCPD ADDRESS OF ERROR
     44 004332  004767  013760                  JSR     PC,OCTPNT
     45 004336                          ST90S:  SCOPE   ST90
        004336  004567  011646                  JSR     R5,SCPRTN
        004342  004242                          ST90
     46 004344  027727  023260  001377  ST91:   CMP     @SPAR,#1377             ;ALL DONE?
     47 004352  001403                          BEQ     ST10                    ;IF YES, REVERSE IN & OUT
     48 004354  005277  023250                  INC     @SPAR
     49 004360  000730                          BR      ST90
     50
     51 004362  012777  001000  023240  ST10:   MOV     #B09,@SPAR              ;DO IT AGAIN WITH A SWITCH
     52 004370  005067  023256                  CLR     WORD
     53 004374  016777  023252  023230  ST100:  MOV     WORD,@SPDR              ;COUNT DOWN UNTIL HALF-WAY
     54 004402  042777  001000  023220          BIC     #B09,@SPAR
     55 004410  012777  000377  023214          MOV     #377,@SPDR              ;AND LOAD REQ SCPD WITH 1'S
     56 004416  052777  001000  023204          BIS     #B09,@SPAR
     57 004424  027727  023200  001377          CMP     @SPAR,#1377             ;DONE?
     58 004432  103005                          BHIS    ST101                   ;YES
     59 004434  005277  023170                  INC     @SPAR                   ;NO, KEEP GOING DOWN
     60 004440  105267  023206                  INCB    WORD
     61 004444  000753                          BR      ST100
     62 004446  012777  001000  023154  ST101:  MOV     #B09,@SPAR              ;NOW, ...CHECK IT
     63 004454  005067  023172                  CLR     WORD
     64 004460  016767  023166  012124  ST110:  MOV     WORD,GOOD
     65 004466  017767  023140  012120          MOV     @SPDR,BAD
     66 004474  026767  012112  012112          CMP     GOOD,BAD
     67 004502  001432                          BEQ     ST111                   ;OUT ADDR OK?
     68 004504                                  DATERR  \N,OSATE        ;ERROR:RESULT SCPD ADR TEST ERROR
                                                                                ;******* ERROR 10 *******
        004504  032777  040000  023122          BIT     #B14,@SR
        004512  001007                          BNE     .+20
        004514  012700  024326                  MOV     #OSATE,R0
        004520  012767  000010  012062          MOV     #10,ERRNUM
        004526  004767  011774                  JSR     PC,DERR
                000011                  N       =       N+1
     69 004532  032777  040000  023074          BIT     #B14,@SR                ;PRINT ALLOWED?
     70 004540  001010                          BNE     ST110S                  ;NO, SKIP IT
     71 004542                                  PNTM    SCPAD
        004542  012700  022776                  MOV     #SCPAD,R0               ;PRINT MESSAGE
        004546  004767  012520                  JSR     PC,TYPOUT               ;POINTED TO BY SCPAD
     72 004552  017700  023052                  MOV     @SPAR,R0                ;PRINT SCPD ADR OF ERROR
     73 004556  004767  013534                  JSR     PC,OCTPNT
     74 004562                          ST110S: SCOPE   ST110
        004562  004567  011422                  JSR     R5,SCPRTN
        004566  004460                          ST110
     75 004570  027727  023034  001377  ST111:  CMP     @SPAR,#1377
     76 004576  103005                          BHIS    ST112
     77 004600  005277  023024                  INC     @SPAR
     78 004604  105267  023042                  INCB    WORD
     79 004610  000723                          BR      ST110
     80 004612  012767  000377  011772  ST112:  MOV     #377,GOOD               ;NOW CHECK REQ SCPD
     81 004620  005077  023004                  CLR     @SPAR
```

```
     82 004624  017767  023002  011762  ST120:  MOV     @SPDR,BAD
     83 004632  026767  011754  011754          CMP     GOOD,BAD                ;ALL 1'S?
     84 004640  001432                          BEQ     ST121                   ;YES, CHECK THE REST
     85 004642                                  DATERR  \N,ISDTE        ;ERROR:REQ SCPD DATA TEST ERR
                                                                                ;******* ERROR 11 *******
        004642  032777  040000  022764          BIT     #B14,@SR
        004650  001007                          BNE     .+20
        004652  012700  024362                  MOV     #ISDTE,R0
        004656  012767  000011  011724          MOV     #11,ERRNUM
        004664  004767  011636                  JSR     PC,DERR
                000012                  N       =       N+1
     86 004670  032777  040000  022736          BIT     #B14,@SR                ;PRINT ALLOWED?
     87 004676  001010                          BNE     ST120S                  ;NO, SKIP IT
     88 004700                                  PNTM    SCPAD
        004700  012700  022776                  MOV     #SCPAD,R0               ;PRINT MESSAGE
        004704  004767  012362                  JSR     PC,TYPOUT               ;POINTED TO BY SCPAD
     89 004710  017700  022714                  MOV     @SPAR,R0                ;PRINT SCPD ADR OF ERROR
     90 004714  004767  013376                  JSR     PC,OCTPNT
     91 004720                          ST120S: SCOPE   ST120
        004720  004567  011264                  JSR     R5,SCPRTN
        004724  004624                          ST120
     92 004726  027727  022676  000377  ST121:  CMP     @SPAR,#377              ;DONE REQ SCPD?
     93 004734  001403                          BEQ     ST13                    ;YES, CHECK CLR SC. PAD
     94 004736  005277  022666                  INC     @SPAR
     95 004742  000730                          BR      ST120                   ;NO, KEEP CHECKING
```

```
                                        ;CHECK CLEARING ALL SCRATCHPAD LOCATIONS
                                        ; FILL THE ENTIRE SCPD WITH A CONSTANT (NORMALLY '0')
                                        ; AND THE CHECK IT.
                                        
 005744  005077  022660         ST13:   CLR     @SPAR                   ;START AT 0
 005750  012777  000000  022654 ST130:  MOV     #0,@SPDR                ;THIS LOC (#0) CAN BE CHANGED
 005756  027727  022646  000377         CMP     @SPAR,#377              ; TO ANYTHING AND THIS RTN
 005764  001403                        BEQ     ST131A                  ; CAN BE USED FOR ANY DATA
 005766  005277  022636                INC     @SPAR                   ; FILL-UP & TEST
 005772  000766                        BR      ST130
 005774  012777  001000  022626 ST131A: MOV     #B09,@SPAR              ;ADDR RES. SCPD
 006002  012777  000000  022622 ST131B: MOV     #0,@SPDR                ;THIS ''#0'' MUST ALSO BE CHANGED
 006010  027727  022614  001377         CMP     @SPAR,#1377
 006016  001403                        BEQ     ST131                   ;FILL UP WHOLE RES. SCPD
 006020  005277  022604                INC     @SPAR
 006024  000766                        BR      ST131B
 006026  005077  022576         ST131:  CLR     @SPAR                   ;NOW CHECK IT
 006032  012767  000000  011552        MOV     #0,GOOD                 ;THIS LOC (#0) MUST BE CHANGED
 006040  017767  022566  011546 ST132:  MOV     @SPDR,BAD               ; TO CORRESPOND TO ST130
 006046  026767  011540  011540        CMP     GOOD,BAD                ; IN ORDER TO CHECK THE
 006054  001432                        BEQ     ST133                   ; CORRECT DATA FILL-UP
 006056                                DATERR  \N,RQSPCL       ;ERROR:REQ. SCPD NOT ALL 0'S
                                                                        ;******* ERROR 12 *******
 005056  032777  040000  022550        BIT     #B14,@SR
 005064  001007                        BNE     .+20
 005066  012700  024414                MOV     #RQSPCL,R0
 005072  012767  000012  011510        MOV     #12,ERRNUM
 005100  004767  011422                JSR     PC,DERR
         000013                 N      =       N+1
 005104  032777  040000  022522        BIT     #B14,@SR                ;PRINT ALLOWED?
 005112  001010                        BNE     ST132S                  ;NO, SKIP IT
 005114                                PNTM    SCPAD
 005114  012700  022776                MOV     #SCPAD,R0               ;PRINT MESSAGE
 005120  004767  012146                JSR     PC,TYPOUT               ;POINTED TO BY SCPAD
 005124  017700  022500                MOV     @SPAR,R0                ;PRINT SCPD ADR OF ERROR
 005130  004767  013162                JSR     PC,OCTPNT
 005134                         ST132S: SCOPE   ST13
 005134  004567  011050                JSR     R5,SCPRTN
 005140  004744                        ST13
 005142  027727  022462  000377 ST133:  CMP     @SPAR,#377              ;DONE CHECKING REQ. SCPD?
 005150  001404                        BEQ     ST134                   ;YES, CHECK RES. SCPD
 005152  005277  022452                INC     @SPAR                   ;NO, FINISH UP
 005156  000167  177656                JMP     ST132
 005162  012777  001000  022440 ST134:  MOV     #1000,@SPAR             ;NOW CHECK RES. SCPD
 005170  012767  000000  011414        MOV     #0,GOOD                 ;THIS ''#0'' ALSO MUST BE CHANGED
 005176  017767  022430  011410 ST135:  MOV     @SPDR,BAD
 005204  026767  011402  011402        CMP     GOOD,BAD                ;RES SCPD ALL 0'S?
 005212  001432                        BEQ     ST136
 005214                                DATERR  \N,RSSPCL       ;ERROR:RES. SCPD NOT ALL 0'S
                                                                        ;******* ERROR 13 *******
 005214  032777  040000  022412        BIT     #B14,@SR
 005222  001007                        BNE     .+20
 005224  012700  024444                MOV     #RSSPCL,R0
 005230  012767  000013  011352        MOV     #13,ERRNUM
 005236  004767  011264                JSR     PC,DERR
         000014                 N      =       N+1
 005242  032777  040000  022364        BIT     #B14,@SR                ;PRINT ALLOWED?
```

```
      40 005250  001010                          BNE     ST135S                  ;NO, SKIP IT
      41 005252                                  PNTM    SCPAD
         005252  012700  022776                  MOV     #SCPAD,R0               ;PRINT MESSAGE
         005256  004767  012010                  JSR     PC,TYPOUT               ;POINTED TO BY SCPAD
      42 005262  017700  022342                  MOV     @SPAR,R0                ;PRINT SCPD ADDR OF ERROR
      43 005266  004767  013024                  JSR     PC,OCTPNT
      44 005272                          ST135S: SCOPE   ST13
         005272  004567  010712                  JSR     R5,SCPRTN
         005276  004744                          ST13
      45 005300  027727  022324  001377  ST136:  CMP     @SPAR,#1377             ;DONE RES. SCPD?
      46 005306  001403                          BEQ     ST14                    ;YES, NEXT ROUTINE
      47 005310  005277  022314                  INC     @SPAR
      48 005314  000730                          BR      ST135
```

```
                                        ;TEST ''CLR TOP BYTE''
                                        ;  SETTING ''CLRTPB'' SHOULD RESULT IN ALL BITS OF THE
                                        ;  HIGH BYTE OF THE CSR BEING CLEARED. (LOW BYTE ALREADY = 0)

005316  012777  000020  022242  ST14:   MOV     #B04,@CSR                       ;SET ''CLRTPB''
005324  005067  011262                  CLR     GOOD                            ;ALL CSR SHOULD BE 0
005330  017767  022232  011256          MOV     @CSR,BAD
005336  026767  011250  011250          CMP     GOOD,BAD                        ;ALL CLEAR?
005344  001416                          BEQ     ST15
005346                                  DATERR  \N,CLTBER               ;ERROR:CLR TPB FAILED
                                                                                ;******* ERROR 14 *******
005346  032777  040000  022260          BIT     #B14,@SR
005354  001007                          BNE     .+20
005356  012700  024474                  MOV     #CLTBER,R0
005362  012767  000014  011220          MOV     #14,ERRNUM
005370  004767  011132                  JSR     PC,DERR
        000015                  N       =       N+1
005374                                  SCOPE   ST14
005374  004567  010610                  JSR     R5,SCPRTN
005400  005316                          ST14

                                        ;NOW  H A N G  AND CHECK CSR
                                        ;  ''HANG'' BY USING THE CMR-11 'DIE' FUNCTION
                                        ;  THEN CHECK THAT THE CSR WAS RIGHT
                                        ; FOR THE 'DIE' FUNC. THEN CHECK ALL R/W BITS OF THE CSR

005402  005077  022222          ST15:   CLR     @SPAR                           ;ADDR REQ. SCPD
005406  012777  000213  022216          MOV     #213,@SPDR                      ;LOAD MAINT FUNC SUBF #3
005414  005277  022210                  INC     @SPAR
005420  012777  000001  022204          MOV     #1,@SPDR                        ;DATA LEN. = 1
005426  005277  022176                  INC     @SPAR
005432  012777  000001  022172          MOV     #1,@SPDR                        ;ONE REQUEST
005440  012777  000200  022120          MOV     #200,@CSR                       ;SET 'MAIN'SHD CAUSE U.P. HANG
005446  012767  007777  022110          MOV     #7777,CNTR                      ;WAIT FOR THE MICRO
005454  005777  022106          1$:     TST     @CSR                            ;MICRO DONE?
005460  100403                          BMI     2$                              ;NO, WAIT A BIT
005462  005367  022076                  DEC     CNTR
005466  001372                          BNE     1$
005470  012767  137600  011114  2$:     MOV     #137600,GOOD
005476  017767  022064  011110          MOV     @CSR,BAD                        ;READ CSR REGISTER
005504  026767  011102  011102          CMP     GOOD,BAD                        ;DID IT HANG CORRECTLY?
005512  001432                          BEQ     ST16                            ;YES, GOOD
005514  012767  000000  022042          MOV     #0,CNTR
005522                                  DATERR  \N,DIERR                ;ERROR:CSR NOT RIGHT FOR ''DIE''
                                                                                ;******* ERROR 15 *******
005522  032777  040000  022104          BIT     #B14,@SR
005530  001007                          BNE     .+20
005532  012700  024536                  MOV     #DIERR,R0
005536  012767  000015  011044          MOV     #15,ERRNUM
005544  004767  010756                  JSR     PC,DERR
        000016                  N       =       N+1
005550  012777  000002  022010          MOV     #2,@CSR                         ;PROGRAM INIT
005556  005367  022002          ST150:  DEC     CNTR                            ;WAIT FOR INIT
005562  001375                          BNE     ST150
005564  012777  000020  021774          MOV     #B04,@CSR                       ;CLR TOP BYTE
005572                                  SCOPE   ST15
005572  004567  010412                  JSR     R5,SCPRTN
```

```
        005576  005402                          ST15
```

```
                                        ;CHECK CSR WITH MICRO HUNG
                                
005600  012767  137755  011004  ST16:   MOV     #137755,GOOD            ;CHECK R/W BITS OF CSR
005606  012777  000355  021752          MOV     #355,@CSR
005614  017767  021746  010772          MOV     @CSR,BAD
005622  026767  010764  010764          CMP     GOOD,BAD                ;DO THEY SET?
005630  001416                          BEQ     ST160                   ;YES, TRY CLEARING THEM
005632                                  DATERR  \W,CSRWE        ;ERROR:BAD BITS IN CSR WHILE HUNG
                                                                        ;******* ERROR 16 *******
005632  032777  040000  021774          BIT     #B14,@SR
005640  001007                          BNE     .+20
005642  012700  024571                  MOV     #CSRWE,R0
005646  012767  000016  010734          MOV     #14,ERRNUM
005654  004767  010646                  JSR     PC,DERR
        000017                  N       =       N+1
005660                                  SCOPE   ST16
005660  004567  010324                  JSR     R5,SCPRTN
005664  005600                          ST16
005666  012767  137400  010716  ST160:  MOV     #137400,GOOD            ;NOW, SEE IF THEY CLEAR
005674  012777  000000  021664          MOV     #0,@CSR
005702  017767  021660  010704          MOV     @CSR,BAD
005710  026767  010676  010676          CMP     GOOD,BAD                ;DID THEY CLR?
005716  001416                          BEQ     ST161                   ;YES, NEXT
005720                                  DATERR  \W,CSRCE        ;ERROR:CAN'T CLR LOW CSR WHILE HUNG
                                                                        ;******* ERROR 17 *******
005720  032777  040000  021706          BIT     #B14,@SR
005726  001007                          BNE     .+20
005730  012700  024623                  MOV     #CSRCE,R0
005734  012767  000017  010646          MOV     #17,ERRNUM
005742  004767  010560                  JSR     PC,DERR
        000020                  N       =       N+1
005746                                  SCOPE   ST160
005746  004567  010236                  JSR     R5,SCPRTN
005752  005666                          ST160
005754  012777  000200  021604  ST161:  MOV     #200,@CSR               ;CHECK ACCESS KEYS TO SCPD
005762  012777  000200  021640          MOV     #200,@SPAR              ;WITH MAIN SET
005770  017767  021636  021654          MOV     @SPDR,WORD              ;READ AN REQ SCPD WORD
005776  005167  021650                  COM     WORD                    ;COMPLEMENT IT
006002  042767  177400  021642          BIC     #177400,WORD            ;FORGET TOP BYTE
006010  016777  021636  021614          MOV     WORD,@SPDR              ;WRITE COMPL. BACK
006016  027767  021610  021626          CMP     @SPDR,WORD              ;READ IT BACK AGAIN
006024  001016                          BNE     ST162                   ;IT SHOULDN'T BE THE SAME
006026                                  ERROR   \W,SPAVME       ;ERROR:ACCESSED REQ SCPD WITH 'MAIN' SET
                                                                        ;******* ERROR 20 *******
006026  032777  040000  021600          BIT     #B14,@SR
006034  001007                          BNE     .+20
006036  012700  024662                  MOV     #SPAVME,R0
006042  012767  000020  010540          MOV     #20,ERRNUM
006050  004767  010366                  JSR     PC,ERR
        000021                  N       =       N+1
006054                                  SCOPE   ST161
006054  004567  010130                  JSR     R5,SCPRTN
006060  005754                          ST161
006062  012777  000001  021476  ST162:  MOV     #1,@CSR                 ;TRY AGAIN WITH 'ST FUN' SET
006070  012777  000200  021532          MOV     #200,@SPAR
006076  017767  021530  021546          MOV     @SPDR,WORD              ;READ A REQ SCPD WORD
006104  005167  021542                  COM     WORD                    ;COMPLEMENT IT
```

```
     31 006110  042767  177400  021534          BIC     #177400,WORD            ;FORGET TOP BYTE
     32 006116  016777  021530  021506          MOV     WORD,@SPDR              ;WRITE IT BACK
     33 006124  026777  021522  021500          CMP     WORD,@SPDR              ;READ IT BACK AGAIN
     34 006132  001016                          BNE     ST17                    ;IT SHOULDN'T BE THE SAME
     35 006134                                  ERROR   \N,SPAVFE       ;ERROR:ACCESSED REQ SCPD WITH 'STFUN' SET
                                                                        ;******* ERROR 21 *******
        006134  032777  040000  021472          BIT     #B14,@SR
        006142  001007                          BNE     .+20
        006144  012700  024726                  MOV     #SPAVFE,R0
        006150  012767  000021  010432          MOV     #21,ERRNUM
        006156  004767  010260                  JSR     PC,ERR
                000022                  N       =       N+1
     36 006162                                  SCOPE   ST162
        006162  004567  010022                  JSR     R5,SCPRTN
        006166  006062                          ST162
```

```
                                        ;TEST INTERRUPT WITH MICRO HUNG
                                        
006170  012777  006302  021456  ST17:   MOV     #ERINT,@VECTOR          ;SET UP VECTOR FOR ERROR
006176                                  MTPS    #0                      ;ALLOW INTERRUPTS
006176  012746  000000                  MOV     #0,-(SP)
006202  012746  006210                  MOV     #64$,-(SP)
006206  000002                          RTI
006210                          64$:
006210  000240                          NOP                             ;IF ONE OCCURS NOW, IT
006212  000240                          NOP                             ;  IS ERRONEOUS.
006214  012777  006344  021432  ST170:  MOV     #GDINT,@VECTOR          ;SET VECTOR FOR GOOD INTERRUPT
006222  012777  000100  021336          MOV     #100,@CSR               ;SET INTR ENABLE
006230  000240                          NOP                             ;IF ONE DOES NOT OCCUR NOW,
006232  000240                          NOP                             ;  THERE IS AN ERROR
006234                                  ERROR   \N,NOINTR       ;ERROR:HOST CAN'T INTERRUPT UNIBUS
                                                                        ;******* ERROR 22 *******
006234  032777  040000  021372          BIT     #B14,@SR
006242  001007                          BNE     .+20
006244  012700  024773                  MOV     #NOINTR,R0
006250  012767  000022  010332          MOV     #22,ERRNUM
006256  004767  010160                  JSR     PC,ERR
        000023                  N       =       N+1
006262  042777  000100  021276          BIC     #100,@CSR               ;CLEAR INTR ENAB
006270                                  SCOPE   ST170
006270  004567  007714                  JSR     R5,SCPRTN
006274  006214                          ST170
006276  000167  000054          ST170R: JMP     INTCNT                  ;CONTINUE
006302  022626                  ERINT:  CMP     (SP)+,(SP)+             ;POP-POP STACK
006304                                  ERROR   \N,ERINTR       ;ERROR:ERRONEOUS HOST INTERRUPT
                                                                        ;******* ERROR 23 *******
006304  032777  040000  021322          BIT     #B14,@SR
006312  001007                          BNE     .+20
006314  012700  025031                  MOV     #ERINTR,R0
006320  012767  000023  010262          MOV     #23,ERRNUM
006326  004767  010110                  JSR     PC,ERR
        000024                  N       =       N+1
006332                                  SCOPE   ST17
006332  004567  007652                  JSR     R5,SCPRTN
006336  006170                          ST17
006340  000167  177650                  JMP     ST170                   ;CONTINUE
006344  012716  006276          GDINT:  MOV     #ST170R,(SP)            ;CHANGE RETURN ADDRESS
006350  005077  021212                  CLR     @CSR                    ;CLEAR INTR ENAB
006354  000002                          RTI                             ;CONTINUE
006356  012777  006422  021270  INTCNT: MOV     #ERINT1,@VECTOR         ;SET UP FOR 2ND ERR INTR
006364  042777  000100  021174          BIC     #100,@CSR               ;CLEAR INTER ENAB
006372                                  MTPS    PRIO                    ;SET C.P AT DEVICE PRIORITY
006372  016746  021216                  MOV     PRIO,-(SP)
006376  012746  006404                  MOV     #64$,-(SP)
006402  000002                          RTI
006404                          64$:
006404  012777  000100  021154          MOV     #100,@CSR               ;SET INTR ENAB
006412  000240                          NOP                             ;NO INTERRUPT SHOULD OCCUR
006414  000240                          NOP                             ; THIS TIME.
006416  000167  000046          INTCNR: JMP     ST18                    ;O.K. CONTINUE
006422  022626                  ERINT1: CMP     (SP)+,(SP)+             ;POP-POP STACK
006424  005077  021136                  CLR     @CSR                    ;CLEAR INTR ENAB
006430                                  ERROR   \N,WPODI        ;ERROR:WRONG PRIORITY;DEVICE IS HIGHER
```

```
                                                                    ;******* ERROR 24 *******
        006430  032777  040000  021176          BIT     #B14,@SR
        006436  001007                          BNE     .+20
        006440  012700  025064                  MOV     #WPODI,R0
        006444  012767  000024  010136          MOV     #24,ERRNUM
        006452  004767  007764                  JSR     PC,ERR
                000025                  N       =       N+1
     32 006456                                  SCOPE   INTCNT
        006456  004567  007526                  JSR     R5,SCPRTN
        006462  006356                          INTCNT
     33 006464  000167  000000                  JMP     ST18
```

```
                                        ;NOW CHECK PROGRAM INIT.


006470  012777  000002  021070  ST18:   MOV     #2,@CSR                 ;DO HOST ''INIT''
006476  016767  177774  177772  MOV:    MOV     MOV,MOV                 ;WAIT A LITTLE
006504  016767  177766  177764          MOV     MOV,MOV
006512  016767  177760  177756          MOV     MOV,MOV
006520  016767  177752  177750          MOV     MOV,MOV
006526  016767  177744  177742          MOV     MOV,MOV
006534  016767  177736  177734          MOV     MOV,MOV
006542  012767  002000  010042          MOV     #2000,GOOD              ;ONLY PWR-UP SHOULD BE SET
006550  017767  021012  010036          MOV     @CSR,BAD                ;READ CSR
006556  026767  010030  010030          CMP     GOOD,BAD                ;CSR CORRECT AFTER INIT?
006564  001416                          BEQ     ST180                   ;YES, CONTINUE
006566                                  DATERR  \N,HITER        ;ERROR:PROGRAM INIT FAILED
                                                                        ;******* ERROR 25 *******

006566  032777  040000  021040          BIT     #B14,@SR
006574  001007                          BNE     .+20
006576  012700  025125                  MOV     #HITER,R0
006602  012767  000025  010000          MOV     #25,ERRNUM
006610  004767  007712                  JSR     PC,DERR
        000026                  N       =       N+1
006614                                  SCOPE   ST18
006614  004567  007370                  JSR     R5,SCPRTN
006620  006470                          ST18
006622  032777  100000  020736  ST180:  BIT     #B15,@CSR               ;WAIT FOR PWR-UP COMPL
006630  001774                          BEQ     ST180
006632  012777  001000  020770          MOV     #1000,@SPAR             ;NOW READY TO READ VERSION
006640  012701  027464                  MOV     #VERSP,R1               ;POINT AT ORIGINAL VERSION
006644  012702  027506                  MOV     #VERSUN,R2              ;AND SAVE THIS VERSION
006650  117712  020756          ST181:  MOVB    @SPDR,(R2)
006654  001016                          BNE     ST182
006656                                  ERROR   \N,VISF         ;ERROR:MICRO DIDN'T STORE VERSION STUFF
                                                                        ;******* ERROR 26 *******

006656  032777  040000  020750          BIT     #B14,@SR
006664  001007                          BNE     .+20
006666  012700  025165                  MOV     #VISF,R0
006672  012767  000026  007710          MOV     #26,ERRNUM
006700  004767  007536                  JSR     PC,ERR
        000027                  N       =       N+1
006704                                  SCOPE   ST180
006704  004567  007300                  JSR     R5,SCPRTN
006710  006622                          ST180
006712  111167  007674          ST182:  MOVB    (R1),GOOD               ;NOW COMPARE VERSION WITH ORIG.
006716  111267  007672                  MOVB    (R2),BAD
006722  042767  177400  007662          BIC     #177400,GOOD            ;CLR TOP BYTE
006730  042767  177400  007656          BIC     #177400,BAD
006736  026767  007650  007650          CMP     GOOD,BAD                ;SAME AS FIRST TIME?
006744  001416                          BEQ     ST183
006746                                  DATERR  \N,VIDER        ;ERROR:2ND VERSION NOT SAME AS 1ST
                                                                        ;******* ERROR 27 *******

006746  032777  040000  020660          BIT     #B14,@SR
006754  001007                          BNE     .+20
006756  012700  025225                  MOV     #VIDER,R0
006762  012767  000027  007620          MOV     #27,ERRNUM
006770  004767  007532                  JSR     PC,DERR
        000030                  N       =       N+1
```

```
 33 006774                                      SCOPE   ST182
    006774  004567  007210                      JSR     R5,SCPRTN
    007000  006712                              ST182
 34 007002  122123                      ST183:  CMPB    (R1)+,(R2)+             ;UPDATE POINTERS
 35 007004  027727  020620  001020              CMP     @SPAR,#1020             ;DONE?
 36 007012  001403                              BEQ     ST19
 37 007014  005277  020610                      INC     @SPAR                   ;NEXT WORD
 38 007020  000713                              BR      ST181
 39
 40
 41                                     ;CHECK ACCESS TO RESULT SCPD WITH INTERRUPT CLEAR
 42
 43
 44 007022  012777  000020  020536      ST19:   MOV     #20,@CSR                ;CLEAR TOP BYTE OF CSR
 45 007030  012777  001200  020572              MOV     #1200,@SPAR             ;ADDRESS RESULT SCPD
 46 007036  017767  020570  020606              MOV     @SPDR,WORD              ;READ A WORD FROM IT
 47 007044  005167  020602                      COM     WORD                    ;COMPLEMENT IT
 48 007050  042767  177400  020574              BIC     #177400,WORD            ;IGNORE TOP 8 BITS
 49 007056  016777  020570  020546              MOV     WORD,@SPDR              ;AND WRITE IT BACK
 50 007064  026777  020562  020540              CMP     WORD,@SPDR              ;NOW READ IT BACK
 51 007072  001016                              BNE     ST20                    ;IT SHOULDN'T BE THE SAME
 52 007074                                      ERROR   \N,SPAVIC       ;ERROR:RES. SCR. PAD ACCESSED WITH INTR CLR
                                                                                ;******* ERROR 30 *******
    007074  032777  040000  020532              BIT     #B14,@SR
    007102  001007                              BNE     .+20
    007104  012700  025274                      MOV     #SPAVIC,R0
    007110  012767  000030  007472              MOV     #30,ERRNUM
    007116  004767  007320                      JSR     PC,ERR
            000031                      N       =       N+1
 53 007122                                      SCOPE   ST19
    007122  004567  007062                      JSR     R5,SCPRTN
    007126  007022                              ST19
 54
```

```
                                ;NOW CHECK SOME SIMPLE FUNCTIONALITY
                                ;  ENSURE THAT STARTING A 'MAINT' FUNCTION GIVES
                                ;  THE CORRECT ERROR STATUS.
                                ;  ENSURE THAT STARTING THE 'MAINT' FUNCTION WITH 'MAIN'
                                ;  WORKS PROPERLY AND GET PORT BAUD RATES.

007130  012767  000000  020426  ST20:   MOV     #0,CNTR
007136  012777  000020  020422          MOV     #20,@CSR                ;CLEAR TOP BYTE
007144  005077  020460                  CLR     @SPAR                   ;ADDRESS REQ SCPD
007150  012777  000210  020454          MOV     #210,@SPDR              ;LOAD 'MAIN' FUNCTION
007156  005277  020446                  INC     @SPAR                   ;  TO EXAMINE HOST
007162  012777  000004  020442          MOV     #4,@SPDR                ;  MEMORY LOCATIONS
007170  005277  020434                  INC     @SPAR
007174  012777  000001  020430          MOV     #1,@SPDR                ;ONE REQUEST
007202  005277  020422                  INC     @SPAR
007206  012777  000002  020416          MOV     #2,@SPDR                ;# OF BYTES TO READ = 2
007214  005277  020410                  INC     @SPAR
007220  012777  000377  020404          MOV     #377,@SPDR              ;START ADDR = DFFF (H)
007226  005277  020376                  INC     @SPAR
007232  012777  000337  020372          MOV     #337,@SPDR
007240  012777  000001  020320  ST200:  MOV     #1,@CSR                 ;SET 'ST FUN' ON 'MAINT' FUNC
007246  012767  140000  007336          MOV     #B14+B15,GOOD           ;CHECK FOR FUNCOM & INTR
007254  017767  020306  007332  ST201:  MOV     @CSR,BAD
007262  026767  007324  007324          CMP     GOOD,BAD                ;'FUNCOM' AND 'INTR' SET?
007270  001421                          BEQ     ST202
007272  005367  020266                  DEC     CNTR                    ;IF NOT, WAIT A BIT
007276  001366                          BNE     ST201
007300                                  DATERR  \N,STESTF       ;ERROR:STATUS WRONG WITH 'STFUN' ON 'MAIN'
                                                                ;******* ERROR 31 *******
007300  032777  040000  020326          BIT     #B14,@SR
007306  001007                          BNE     .+20
007310  012700  025337                  MOV     #STESTF,R0
007314  012767  000031  007266          MOV     #31,ERRNUM
007322  004767  007200                  JSR     PC,DERR
        000032                  N       =       N+1
007326                                  SCOPE   ST20
007326  004567  006656                  JSR     R5,SCPRTN
007332  007130                          ST20
007334  012777  001000  020266  ST202:  MOV     #1000,@SPAR             ;ADDRESS RESULT SCPD
007342  012767  000210  007242          MOV     #210,GOOD               ;CHECK ON FUNCTION
007350  017767  020256  007236          MOV     @SPDR,BAD
007356  026767  007230  007230          CMP     GOOD,BAD                ;FUNCTION CORRECT?
007364  001416                          BEQ     ST203
007366                                  DATERR  \N,RSPESF       ;ERROR:RESULT FUNC. CODE WRONG ON MAIN
                                                                ;******* ERROR 32 *******
007366  032777  040000  020240          BIT     #B14,@SR
007374  001007                          BNE     .+20
007376  012700  025370                  MOV     #RSPESF,R0
007402  012767  000032  007200          MOV     #32,ERRNUM
007410  004767  007112                  JSR     PC,DERR
        000033                  N       =       N+1
007414                                  SCOPE   ST20
007414  004567  006570                  JSR     R5,SCPRTN
007420  007130                          ST20
007422  012777  001002  020200  ST203:  MOV     #1002,@SPAR             ;NOW ADDRESS 'USOF'
007430  012767  000377  007154          MOV     #377,GOOD               ;SHOULD SHOW 'TOTAL FAILURE' CODE
```

```
     40 007436  017767  020170  007150          MOV     @SPDR,BAD
     41 007444  026767  007142  007142          CMP     GOOD,BAD                ;USOF O.K.?
     42 007452  001416                          BEQ     ST204
     43 007454                                   DATERR  \N,USOFE1       ;ERROR:'STFUN' ON 'MAIN' GAVE BAD USOF
                                                                                 ;******* ERROR 33 *******
        007454  032777  040000  020152          BIT     #B14,@SR
        007462  001007                          BNE     .+20
        007464  012700  025431                  MOV     #USOFE1,R0
        007470  012767  000033  007112          MOV     #33,ERRNUM
        007476  004767  007024                  JSR     PC,DERR
                000034                  N       =       N+1
     44 007502                                   SCOPE   ST20
        007502  004567  006502                  JSR     R5,SCPRTN
        007506  007130                          ST20
     45 007510  012767  000000  020046  ST204:  MOV     #0,CNTR
     46 007516  012777  000020  020042          MOV     #20,@CSR                ;SET 'CLRTPB'
     47 007524  012777  000200  020034          MOV     #200,@CSR               ;SET 'MAIN' WITH SAME FUN LOADED
     48 007532  012767  140000  007052          MOV     #B14+B15,GOOD           ;CHECK FOR 'FUNCOM' & ''INTR''
     49 007540  017767  020022  007046  ST205:  MOV     @CSR,BAD
     50 007546  026767  007040  007040          CMP     GOOD,BAD                ;FUN COMPLETE?
     51 007554  001421                          BEQ     ST206
     52 007556  005367  020002                  DEC     CNTR                    ;WAIT A BIT
     53 007562  001366                          BNE     ST205
     54 007564                                   DATERR  \N,STEMF        ;ERROR:STATUS WRONG ON 'MAIN' FUNC
                                                                                 ;******* ERROR 34 *******
        007564  032777  040000  020042          BIT     #B14,@SR
        007572  001007                          BNE     .+20
        007574  012700  025472                  MOV     #STEMF,R0
        007600  012767  000034  007002          MOV     #34,ERRNUM
        007606  004767  006714                  JSR     PC,DERR
                000035                  N       =       N+1
     55 007612                                   SCOPE   ST204
        007612  004567  006372                  JSR     R5,SCPRTN
        007616  007510                          ST204
     56 007620  012777  001002  020002  ST206:  MOV     #1002,@SPAR             ;POINT AT 'USOF'
     57 007626  012767  000001  006756          MOV     #1,GOOD                 ;SHOULD SHOW SUCCESS
     58 007634  017767  017772  006752          MOV     @SPDR,BAD
     59 007642  026767  006744  006744          CMP     GOOD,BAD                ;USOF O.K.?
     60 007650  001416                          BEQ     ST207
     61 007652                                   DATERR  \N,USOFE2       ;ERROR:BAD 'USOF' ON 'MAIN' FUNCTION
                                                                                 ;******* ERROR 35 *******
        007652  032777  040000  017754          BIT     #B14,@SR
        007660  001007                          BNE     .+20
        007662  012700  025523                  MOV     #USOFE2,R0
        007666  012767  000035  006714          MOV     #35,ERRNUM
        007674  004767  006626                  JSR     PC,DERR
                000036                  N       =       N+1
     62 007700                                   SCOPE   ST204
        007700  004567  006304                  JSR     R5,SCPRTN
        007704  007510                          ST204
     63 007706  012777  001001  017714  ST207:  MOV     #1001,@SPAR             ;POINT AT DATA LENGTH
     64 007714  012767  000003  006670          MOV     #3,GOOD                 ;SHOULD BE 3
     65 007722  017767  017704  006664          MOV     @SPDR,BAD
     66 007730  026767  006656  006656          CMP     GOOD,BAD                ;WAS IT 3?
     67 007736  001416                          BEQ     ST21
     68 007740                                   DATERR  \N,DATLER       ;ERROR:'MAIN' FUNC GAVE BAD DATA LEN.
                                                                                 ;******* ERROR 36 *******
```

```
        007740  032777  040000  017666          BIT     #B14,@SR
        007746  001007                          BNE     .+20
        007750  012700  025560                  MOV     #DATLER,R0
        007754  012767  000036  006626          MOV     #36,ERRNUM
        007762  004767  006540                  JSR     PC,DERR
                000037                  N       =       N+1
     69 007766                                  SCOPE   ST204
        007766  004567  006216                  JSR     R5,SCPRTN
        007772  007510                          ST204
     70 007774  012700  027556          ST21:   MOV     #BAUD,R0                ;POINT AT BAUD TABLE
     71 010000  012777  001003  017622          MOV     #1003,@SPAR             ;GET RESULTS OF EXAMINE
     72 010006  117720  017620                  MOVB    @SPDR,(R0)+
     73 010012  005277  017612                  INC     @SPAR
     74 010016  117710  017610                  MOVB    @SPDR,(R0)              ;STORE BAUD RATES
```

```
                                        ;CHECK RESULTS OF STARTING A REGULAR FUNCTION WITH 'MAIN'
                                        ;  TRY DOING AN "ACTIVATE REMOTE" FIRST USING 'MAIN', THEN 'STFUN'
                                        
 5 010022  012777  000020  017536 ST22:  MOV   #20,@CSR              ;CLEAR TOP BYTE OF CSR
 6 010030  012777  000000  017572       MOV   #0,@SPAR
 7 010036  012777  000060  017566       MOV   #60,@SPDR             ;LOAD "ACTIVATE REMOTE" FUNC
 8 010044  005277  017560               INC   @SPAR
 9 010050  012777  000002  017554       MOV   #2,@SPDR              ;DATA LEN. = 2
10 010056  005277  017546               INC   @SPAR
11 010062  012777  000001  017542       MOV   #1,@SPDR              ;ONE REQUEST
12 010070  005277  017534               INC   @SPAR
13 010074  012777  000001  017530       MOV   #1,@SPDR              ;REMOTE #1
14 010102  012777  000200  017456 ST220: MOV   #200,@CSR             ;SET 'MAIN'
15 010110  032777  040000  017450 ST221: BIT   #B14,@CSR             ;FUNC. COMPL?
16 010116  001774               BEQ   ST221                 ;NO, WAIT
17 010120  012777  001000  017502       MOV   #1000,@SPAR           ;ADDRESS RESULT
18 010126  017767  017500  006460       MOV   @SPDR,BAD             ;READ RESULT FUNC. CODE
19 010134  012767  000060  006450       MOV   #60,GOOD
20 010142  026767  006444  006444       CMP   GOOD,BAD              ;O.K.?
21 010150  001416               BEQ   ST222
22 010152                       DATERR  \N,RSPEMF       ;ERROR:RES. FUNC. CODE WRONG FOR 'MAIN'
                                                        ;******* ERROR 37 *******
   010152  032777  040000  017454       BIT   #B14,@SR
   010160  001007               BNE   .+20
   010162  012700  025620               MOV   #RSPEMF,R0
   010166  012767  000037  006414       MOV   #37,ERRNUM
   010174  004767  006326               JSR   PC,DERR
           000040               N       =     N+1
23 010200                       SCOPE   ST22
   010200  004567  006004               JSR   R5,SCPRTN
   010204  010022                       ST22
24 010206  012777  001002  017414 ST222: MOV   #1002,@SPAR           ;ADDR 'USOF'
25 010214  012767  000377  006370       MOV   #377,GOOD             ;SHOULD  SHOW TOTAL FAILURE
26 010222  017767  017404  006364       MOV   @SPDR,BAD
27 010230  026767  006356  006356       CMP   GOOD,BAD              ;USOF O.K.?
28 010236  001416               BEQ   ST223
29 010240                       DATERR  \N,USOFE3       ;ERROR:'MAIN' ON REG FUNC GAVE WRONG USOF
                                                        ;******* ERROR 40 *******
   010240  032777  040000  017366       BIT   #B14,@SR
   010246  001007               BNE   .+20
   010250  012700  025662               MOV   #USOFE3,R0
   010254  012767  000040  006326       MOV   #40,ERRNUM
   010262  004767  006240               JSR   PC,DERR
           000041               N       =     N+1
30 010266                       SCOPE   ST22
   010266  004567  005716               JSR   R5,SCPRTN
   010272  010022                       ST22
31 010274  012777  000020  017264 ST223: MOV   #20,@CSR              ;CLR TOP BYTE
32 010302  012777  000001  017256       MOV   #1,@CSR               ;SET 'STFUN'
33 010310  032777  040000  017250 ST224: BIT   #B14,@CSR             ;FUNCOM SET?
34 010316  001774               BEQ   ST224                 ;WAIT
35 010320  012777  001002  017302       MOV   #1002,@SPAR           ;ADDRESS USOF
36 010326  012767  000364  006256       MOV   #364,GOOD             ;SHOULD SHOW REM. ERROR
37 010334  017767  017272  006252       MOV   @SPDR,BAD
38 010342  026767  006244  006244       CMP   GOOD,BAD              ;USOF O.K.?
39 010350  001416               BEQ   ST23
```

```
     40 010352                                          DATERR  \N,USOFE4       ;ERROR:WRONG USOF ON REGULAR FUNCTION
                                                                                ;******* ERROR 41 *******
        010352  032777  040000  017254                  BIT     #B14,@SR
        010360  001007                                  BNE     .+20
        010362  012700  025725                          MOV     #USOFE4,R0
        010366  012767  000041  006214                  MOV     #41,ERRNUM
        010374  004767  006126                          JSR     PC,DERR
                000042                          N       =       N+1
     41 010400                                          SCOPE   ST223
        010400  004567  005604                          JSR     R5,SCPRTN
        010404  010274                                  ST223
```

```
                                        ;END OF LOGIC TEST. PRINT END OF PASS AND VERSION STUFF

010406  005767  017236        ST23:   TST     VERFLG          ;IS FLAG SET?
010412  001402                        BEQ     ST23A           ;NO
010414  000167  000350                JMP     ST24            ;YES, JUST PRINT 'END PASS'
010420  012767  177777  017222 ST23A: MOV     #-1,VERFLG      ;NO, SET FLAG
010426  012701  027506                MOV     #VERSUN,R1      ;GET VERSION DATA
010432  012702  027556                MOV     #BAUD,R2        ;AND BAUD RATES
010436                                PNTM    VERSM           ;PRINT 'VERSION ''
010436  012700  023017                MOV     #VERSM,R0       ;PRINT MESSAGE
010442  004767  006624                JSR     PC,TYPOUT       ;POINTED TO BY VERSM
010446  012767  000021  017110        MOV     #21,CNTR
010454  112100        ST230:  MOVB    (R1)+,R0        ;DUMP ALL VERSION INFO
010456  004767  010140                JSR     PC,TTO
010462  005367  017076                DEC     CNTR
010466  001372                        BNE     ST230
010470                                PNTM    BAUDM           ;PRINT 'BAUD RATES:''
010470  012700  023052                MOV     #BAUDM,R0       ;PRINT MESSAGE
010474  004767  006572                JSR     PC,TYPOUT       ;POINTED TO BY BAUDM
010500                                PNTM    PORTOM          ;PRINT 'PORT 0 = ''
010500  012700  023070                MOV     #PORTOM,R0      ;PRINT MESSAGE
010504  004767  006562                JSR     PC,TYPOUT       ;POINTED TO BY PORTOM
010510  111267  017136                MOVB    (R2),WORD
010514  042767  177617  017130        BIC     #177617,WORD    ;SORT OUT CORRECT PART
010522  006267  017124                ASR     WORD
010526  006267  017120                ASR     WORD
010532  006267  017114                ASR     WORD            ;PUT IT IN L.S. BIT PLACES
010536  006267  017110                ASR     WORD
010542  012703  026302                MOV     #BDRTBL,R3      ;R3 POINTS AT TABLE OF RATES
010546  006367  017100                ASL     WORD            ;DOUBLE OFFSET
010552  066703  017074                ADD     WORD,R3         ;USE CORRECT OFFSET
010556  011300                        MOV     (R3),R0         ;GET BAUD
010560  004767  006506                JSR     PC,TYPOUT
010564                                PNTM    PORT1M          ;NOW PRINT 'PORT 1 = ''
010564  012700  023104                MOV     #PORT1M,R0      ;PRINT MESSAGE
010570  004767  006476                JSR     PC,TYPOUT       ;POINTED TO BY PORT1M
010574  112267  017052                MOVB    (R2)+,WORD      ;GET NEXT BAUD RATE CODE
010600  042767  177770  017044        BIC     #177770,WORD    ;SORT OUT CORRECT BAUD RATE
010606  012703  026302                MOV     #BDRTBL,R3
010612  006367  017034                ASL     WORD            ;DOUBLE OFFSET
010616  066703  017030                ADD     WORD,R3         ;USE IT AS TABLE OFFSET
010622  011300                        MOV     (R3),R0
010624  004767  006442                JSR     PC,TYPOUT       ;PRINT RATE FOR PORT 1
010630                                PNTM    PORT2M          ;PRINT 'PORT 2 = ''
010630  012700  023120                MOV     #PORT2M,R0      ;PRINT MESSAGE
010634  004767  006432                JSR     PC,TYPOUT       ;POINTED TO BY PORT2M
010640  111267  017006                MOVB    (R2),WORD       ;GET BAUD RATE CODE
010644  042767  177617  017000        BIC     #177617,WORD    ;GET CORRECT PART.
010652  006267  016774                ASR     WORD
010656  006267  016770                ASR     WORD
010662  006267  016764                ASR     WORD
010666  006267  016760                ASR     WORD
010672  012703  026302                MOV     #BDRTBL,R3
010676  006367  016750                ASL     WORD            ;DOUBLE OFFSET
010702  066703  016744                ADD     WORD,R3         ;USE IT AS TABLE OFFSET
010706  011300                        MOV     (R3),R0
```

```
                                                        JSR     PC,TYPOUT       ;PRINT BAUD RATE FOR PORT 2
                                                        PNTM    PORT3M          ;PRINT 'PORT 3 = ''
 010714  012700  023134                                 MOV     #PORT3M,R0      ;PRINT MESSAGE
 010720  004767  006346                                 JSR     PC,TYPOUT       ;POINTED TO BY PORT3M
 010724  111267  016722                                 MOVB    (R2),WORD
 010730  042767  177770  016714                         BIC     #177770,WORD    ;SORT OUT CORRECT PART
 010736  012703  026302                                 MOV     #BDRTBL,R3
 010742  006367  016704                                 ASL     WORD            ;DOUBLE OFFSET
 010746  066703  016700                                 ADD     WORD,R3         ;USE IT AS TABLE OFFSET
 010752  011300                                         MOV     (R3),R0
 010754  004767  006312                                 JSR     PC,TYPOUT       ;PRINT RATE FOR PORT 3
 010760  004767  007514                                 JSR     PC,NULLS        ;NULLS AFTER PRINTOUT
 010764  000167  000016                                 JMP     ST25

 010770  005367  016600                 ST24:           DEC     ITER            ;UPDATE ITERATION
 010774  001404                                         BEQ     ST25            ;DONE 10?
 010776  032777  004000  016630                         BIT     #B11,@SR        ;SINGLE ITERATION?
 011004  001415                                         BEQ     ST26
 011006  012767  000010  016560         ST25:           MOV     #10,ITER
 011014  005267  016562                                 INC     PASCNT          ;UPDATE PASS COUNT
 011020  032777  002000  016606                         BIT     #B10,@SR        ;END PASS INHIBIT?
 011026  001004                                         BNE     ST26
 011030  004767  000014                                 JSR     PC,ENPRTN       ;PRINT END PASS INFO
 011034  004767  007440                                 JSR     PC,NULLS        ;NULLS AFTER PRINTOUT
 011040  004767  005622                 ST26:           JSR     PC,MONIT        ;CHECK FOR CONTROL CHARACTERS
 011044  000167  172132                                 JMP     ST0             ;START OVER

 011050                                 ENPRTN: PNTM    ENDPS           ;PRINT 'END PASS # ''
 011050  012700  023150                         MOV     #ENDPS,R0       ;PRINT MESSAGE
 011054  004767  006212                         JSR     PC,TYPOUT       ;POINTED TO BY ENDPS
 011060  016700  016516                         MOV     PASCNT,R0       ;GET PASS COUNT
 011064  004767  007332                         JSR     PC,DECPNT       ;PRINT IT IN DECIMAL
 011070                                         PNTM    ERCTM           ;PRINT 'ERROR COUNT = ''
 011070  012700  023177                         MOV     #ERCTM,R0       ;PRINT MESSAGE
 011074  004767  006172                         JSR     PC,TYPOUT       ;POINTED TO BY ERCTM
 011100  105767  016436                         TSTB    OFLOF           ;CHECK FOR ERROR CNT OVERFLOW
 011104  001405                                 BEQ     EN01            ;IT DID'T, PRINT COUNT
 011106                                         PNTM    OVFLM           ;IT DID, PRINT '**OVERFLOW**''
 011106  012700  023215                         MOV     #OVFLM,R0       ;PRINT MESSAGE
 011112  004767  006154                         JSR     PC,TYPOUT       ;POINTED TO BY OVFLM
 011116  000404                                 BR      ENRET
 011120  016700  016446                 EN01:   MOV     ERRCNT,R0       ;GET ERROR COUNT
 011124  004767  007272                         JSR     PC,DECPNT       ;PRINT IT IN DECIMAL
 011130  000207                         ENRET:  RTS     PC
```

```
                                        .SBTTL  PORT LOOP-BACK TEST


                                ;ASK FOR PORT # TO BE TESTED (<CR> = ALL PORTS)


011132  012767  000000  016424  PORTLP: MOV     #0,CNTR                 ;BETTER CHECK FOR PWR-UP COMPL
011140  027727  016422  102000  PRLC:   CMP     @CSR,#102000            ;POWER UP COMPLETE?
011146  001420                          BEQ     POK                     ;YES, CARRY ON
011150  005367  016410                  DEC     CNTR                    ;NO, WAIT A BIT
011154  001371                          BNE     PRLC
011156                                  ERROR   \N,NOGO         ;ERROR:HOST MICRO FAILED TO START
                                                                ;******* ERROR 42 *******
011156  032777  040000  016450          BIT     #B14,@SR
011164  001007                          BNE     .+20
011166  012700  024031                  MOV     #NOGO,R0
011172  012767  000042  005410          MOV     #42,ERRNUM
011200  004767  005236                  JSR     PC,ERR
        000043                  N       =       N+1
011204                                  HLT                             ;RUN LOGIC TEST.
011204  004767  004760                  JSR     PC,SWHLT
011210  012767  000010  016356  POK:    MOV     #10,ITER                ;LOAD ITERATION COUNT
011216  005067  016332                  CLR     ALLFLG                  ;CLEAR "ALL" FLAG
011222  005067  016354                  CLR     PASCNT                  ;CLEAR PASS COUNT
011226  005067  016340                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
011232  105067  016304                  CLRB    OFLOF                   ;CLR OVERFLOW FLAG
011236                                  PNTM    PLTM                    ;PRINT "PORT LOOP-BACK TEST"
011236  012700  023232                  MOV     #PLTM,R0                ;PRINT MESSAGE
011242  004767  006024                  JSR     PC,TYPOUT               ;POINTED TO BY PLTM
011246                          PST0:   PNTM    PORTN                   ;PRINT "PORT # (<CR>=ALL) "
011246  012700  023260                  MOV     #PORTN,R0               ;PRINT MESSAGE
011252  004767  006014                  JSR     PC,TYPOUT               ;POINTED TO BY PORTN
011256  012767  000004  006754          MOV     #4,KBBUF                ;DEFAULT IS "ALL"
011264  012767  011246  016314          MOV     #PST0,PCONT             ;LOAD RETURN ADDRESS
011272  004767  006036                  JSR     PC,INPKB                ;GET KBD INPUT
011276  005067  016304                  CLR     PCONT
011302  026727  006732  000004          CMP     KBBUF,#4                ;WAS IT DEFAULT (OR 4)?
011310  001007                          BNE     PST1                    ;NO
011312  012767  177777  016234          MOV     #-1,ALLFLG              ;YES, SET "ALL" FLAG
011320  005067  016266                  CLR     PORT                    ; START WITH PORT 0
011324  000167  000034                  JMP     PST2A

011330  101004                  PST1:   BHI     PSTE                    ;WAS IT HIGHER THAN 4?
011332  005067  016216                  CLR     ALLFLG                  ;NO, MUST BE A PORT #
011336  000167  000014                  JMP     PST2
011342                          PSTE:   PNTM    AGAIN                   ;WRONG!, TRY AGAIN
011342  012700  021324                  MOV     #AGAIN,R0               ;PRINT MESSAGE
011346  004767  005720                  JSR     PC,TYPOUT               ;POINTED TO BY AGAIN
011352  000167  177670                  JMP     PST0
011356  016767  006656  016226  PST2:   MOV     KBBUF,PORT              ;SAVE PORT #
011364  012777  000020  016174  PST2A:  MOV     #20,@CSR                ;CLR TOP BYTE
011372  005077  016232                  CLR     @SPAR                   ;ADDRESS REG. SCR. PAD
011376  012777  000212  016226          MOV     #212,@SPDR              ;LOAD MAINT FUNC.
011404  005277  016220                  INC     @SPAR                   ;TO DO PORT LOOP-BACK
011410  012777  000023  016214          MOV     #23,@SPDR               ;DATA LEN. = 23
011416  005277  016206                  INC     @SPAR
011422  012777  000001  016202          MOV     #1,@SPDR                ;ONE REQUEST
```

```
     44 011430  005277  016174                    INC     @SPAR
     45 011434  016777  016152  016170            MOV     PORT,@SPDR          ;LOAD PORT # (XMTR)
     46 011442  005277  016162                    INC     @SPAR
     47 011446  016777  016140  016156            MOV     PORT,@SPDR          ;LOAD PORT # (RCVR)
     48 011454  012767  000020  016102            MOV     #20,CNTR            ;CHARACTER COUNTER
     49 011462  012701  026424                    MOV     #DATBL,R1           ;LOOP DATA FROM 'DATBL''
     50 011466  005277  016136          PST3:     INC     @SPAR
     51 011472  012177  016134                    MOV     (R1)+,@SPDR         ;LOAD DATA BYTE
     52 011476  005367  016062                    DEC     CNTR                ;LOADED ALL?
     53 011502  001371                            BNE     PST3                ;NO, KEEP LOADING
     54 011504                          PST5:     PNTM    TYPCR               ;PRINT 'TYPE <CR> WHEN READY''
        011504  012700  023312                    MOV     #TYPCR,R0           ;PRINT MESSAGE
        011510  004767  005556                    JSR     PC,TYPOUT           ;POINTED TO BY TYPCR
     55 011514  012767  011504  016064  PST4:     MOV     #PSTS,PCONT         ;INDICATE PROMPT PENDING
     56 011522  012767  001236  006510            MOV     #1236,KBBUF         ;LOAD ANY DEFAULT VALUE
     57 011530  004767  005600                    JSR     PC,INPKB            ;GET KEYBOARD INPUT
     58 011534  005067  016046                    CLR     PCONT
     59 011540  026727  006474  001236            CMP     KBBUF,#1236         ;<CR> ONLY TYPED?
     60 011546  001356                            BNE     PST5                ;IF NOT, KEEP LOOKING FOR IT
     61
     62                                 ;START MAINTENANCE FUNCTION
     63
     64 011550                          PST5:     MTPS    #P0                 ;ALLOW LINE CLOCK INTERRUPTS
        011550  012746  000000                    MOV     #P0,-(SP)
        011554  012746  011562                    MOV     #64$,-(SP)
        011560  000002                            RTI
        011562                             64$:
     65 011562  012777  000020  015776            MOV     #20,@CSR            ;CLR    TOP BYTE
     66 011570  012777  000200  015770            MOV     #200,@CSR           ;SET 'MAIN'
     67 011576  005777  015764          PST6:     TST     @CSR                ;LOOK FOR INTERRUPT BIT
     68 011602  100403                            BMI     PST60
     69 011604  004767  005056                    JSR     PC,MONIT            ;AND WATCH FOR CNTRL CHARS.
     70 011610  000772                            BR      PST6
     71 011612  012777  001002  016010  PST60:    MOV     #1002,@SPAR         ;NOW CHECK USOF
     72 011620  027727  016006  000001            CMP     @SPDR,#1            ;DONE SUCCESSFULLY?
     73 011626  001004                            BNE     PST7                ;NO, CHECK ERROR TYPE
     74 011630  004767  005032                    JSR     PC,MONIT
     75 011634  000167  000430                    JMP     ENDCHK              ;YES, DONE A PASS
     76 011640  027727  015766  000375  PST7:     CMP     @SPDR,#375          ;FUNCTION FAIL?
     77 011646  103434                            BLO     PST8
     78 011650                                    ERROR   \N,PLFFE    ;ERROR:TOTAL FAILURE OF 'MAIN' FUNCTION
                                                                      ;******* ERROR 43 *******
        011650  032777  040000  015756            BIT     #B14,@SR
        011656  001007                            BNE     .+20
        011660  012700  025762                    MOV     #PLFFE,R0
        011664  012767  000043  004716            MOV     #43,ERRNUM
        011672  004767  004544                    JSR     PC,ERR
                000044                     N      =       N+1
     79 011676  032777  040000  015730            BIT     #B14,@SR            ;PRINT ALLOWED?
     80 011704  001010                            BNE     PST7S               ;NO, SKIP IT
     81 011706                                    PNTM    PORTMS              ;PRINT 'PORT # ''
        011706  012700  023556                    MOV     #PORTMS,R0          ;PRINT MESSAGE
        011712  004767  005354                    JSR     PC,TYPOUT           ;POINTED TO BY PORTMS
     82 011716  016700  015670                    MOV     PORT,R0
     83 011722  004767  006370                    JSR     PC,OCTPNT
     84 011726                          PST7S:    SCOPE   PST5
        011726  004567  004256                    JSR     R5,SCPRTN
```

```
                011732  011550                          PST5
                011734  000167  000330                  JMP     ENDCHK
                011740  027727  015666  000374  PST8:   CMP     @SPDR,#374              ;XMTR HUNG UP?
                011746  103434                          BLO     PST80
                011750                                  ERROR   \N,PLTXTO       ;ERROR:XMTR TIMEOUT ERROR
                                                                                ;******* ERROR 44 *******
                011750  032777  040000  015656          BIT     #B14,@SR
                011756  001007                          BNE     .+20
                011760  012700  026025                  MOV     #PLTXTO,R0
                011764  012767  000044  004616          MOV     #44,ERRNUM
                011772  004767  004444                  JSR     PC,ERR
                        000045          N               =       N+1
                012000  032777  040000  015630          BIT     #B14,@SR                ;PRINT ALLOWED?
                012004  001010                          BNE     PST8S                   ;NO, SKIP IT
                012006                                  PNTM    PORTMS                  ;PRINT 'PORT # ''
                012006  012700  023556                  MOV     #PORTMS,R0              ;PRINT MESSAGE
                012012  004767  005254                  JSR     PC,TYPOUT               ;POINTED TO BY PORTMS
                012016  016700  015570                  MOV     PORT,R0
                012022  004767  006270                  JSR     PC,OCTPNT
                012026                          PST8S:  SCOPE   PST5
                012026  004567  004156                  JSR     R5,SCPRTN
                012032  011550                          PST5
                012034  000167  000230                  JMP     ENDCHK
                012040  027727  015566  000373  PST80:  CMP     @SPDR,#373              ;RCVR HUNG UP?
                012046  103434                          BLO     PST9
                012050                                  ERROR   \N,PLRCTO       ;ERROR;RCVR TIMEOUT ERROR
                                                                                ;******* ERROR 45 *******
                012050  032777  040000  015556          BIT     #B14,@SR
                012056  001007                          BNE     .+20
                012060  012700  026053                  MOV     #PLRCTO,R0
                012064  012767  000045  004516          MOV     #45,ERRNUM
                012072  004767  004344                  JSR     PC,ERR
                        000046          N               =       N+1
                012076  032777  040000  015530          BIT     #B14,@SR                ;PRINT ALLOWED?
                012104  001010                          BNE     PST80S                  ;NO, SKIP IT
                012106                                  PNTM    PORTMS                  ;PRINT 'PORT # ''
                012106  012700  023556                  MOV     #PORTMS,R0              ;PRINT MESSAGE
                012112  004767  005154                  JSR     PC,TYPOUT               ;POINTED TO BY PORTMS
                012116  016700  015470                  MOV     PORT,R0
                012122  004767  006170                  JSR     PC,OCTPNT
                012126                          PST80S: SCOPE   PST5
                012126  004567  004056                  JSR     R5,SCPRTN
                012132  011550                          PST5
                012134  000167  000130                  JMP     ENDCHK
                012140  012777  001001  015462  PST9:   MOV     #1001,@SPAR             ;ADDRESS DATA TO FIND BAD WORD
                012146  067777  015460  015454          ADD     @SPDR,@SPAR
                012154  017767  015452  004432          MOV     @SPDR,BAD               ;GET BAD WORD
                012162  042777  001000  015440          BIC     #B09,@SPAR
                012170  062777  000002  015432          ADD     #2,@SPAR
                012176  017767  015430  004406          MOV     @SPDR,GOOD              ;GET GOOD WORD
                012204                                  DATERR  \N,PLDERR       ;ERROR:LOOP TEST DETECTED DATA ERROR
                                                                                ;******* ERROR 46 *******
                012204  032777  040000  015422          BIT     #B14,@SR
                012212  001007                          BNE     .+20
                012214  012700  026101                  MOV     #PLDERR,R0
                012220  012767  000046  004362          MOV     #46,ERRNUM
                012226  004767  004274                  JSR     PC,DERR
```

```
                000047                          N       =       N+1
113 012232      032777  040000  015374                  BIT     #B14,@SR                ;PRINT ALLOWED?
114 012240      001010                          PST9S   BNE     PST5
115 012242                                      PNTM    PORTMS                          ;PRINT 'PORT # ''
    012242      012700  023556                  MOV     #PORTMS,R0                      ;PRINT MESSAGE
    012246      004767  005020                  JSR     PC,TYPOUT               ;POINTED TO BY PORTMS
116 012252      016700  015334                  MOV     PORT,R0
117 012256      004767  006034                  JSR     PC,OCTPNT               ;PRINT #
118 012262                              PST9S:  SCOPE   PST5
    012262      004567  003722                  JSR     R5,SCPRTN
    012266      011550                          PST5
119
120
121 012270      052777  000020  015270  ENDCHK: BIS     #B04,@CSR               ;CLR TOP BYTE
122 012276      005767  015252                  TST     ALLFLG                  ;DOING ALL PORTS?
123 012302      001441                          BEQ     PNTEND                  ;NO, DONE A PASS
124 012304      026727  015302  000003          CMP     PORT,#3                 ;YES, DONE ALL?
125 012312      103416                          BLO     END0                    ;NO, KEEP GOING
126 012314      005067  015272                  CLR     PORT                    ;CLEAR PORT #
127 012320      012777  000003  015302          MOV     #3,@SPAR                ;   IN REQ. SCPD
128 012326      016777  015260  015276          MOV     PORT,@SPDR
129 012334      005277  015270                  INC     @SPAR
130 012340      016777  015246  015264          MOV     PORT,@SPDR
131 012346      000417                          BR      PNTEND
132 012350      005267  015236          END0:   INC     PORT                    ;NEXT PORT
133 012354      012777  000003  015246          MOV     #3,@SPAR                ;PREPARE TO LOAD NEXT PORT #
134 012362      016777  015224  015242          MOV     PORT,@SPDR
135 012370      005277  015234                  INC     @SPAR
136 012374      016777  015212  015230          MOV     PORT,@SPDR
137 012402      000167  177142                  JMP     PST5
138
139 012406      005367  015162          PNTEND: DEC     ITER                    ;UPDATE ITERATION COUNT
140 012412      001404                          BEQ     PNT0
141 012414      032777  004000  015212          BIT     #B11,@SR                ;SW 11 =, INH ITERATION
142 012422      001422                          BEQ     PNTRTN
143 012424      012767  000010  015142  PNT0:   MOV     #10,ITER                ;RELOAD ITERATION COUNT
144 012432      005267  015144  PNT1:   INC     PASCNT                  ;UPDATE PASS COUNT
145 012436      032777  002000  015170          BIT     #B10,@SR                ;SW 10 = INH END PASS PRINT
146 012444      001011                          BNE     PNTRTN
147 012446      004767  176376                  JSR     PC,ENPRTN               ;PRINT END PASS
148 012452      105767  015052                  TSTB    CLKFL1                  ;IS CLOCK TICKING?
149 012456      001402                          BEQ     1$                      ;NO, SKIP PRINTOUT
150 012460      004767  004504                  JSR     PC,PRNTIM               ;PRINT ELAPSED TIME
151 012464      004767  006010          1$:     JSR     PC,NULLS                ;PRINT NULLS
152 012470      004767  004172          PNTRTN: JSR     PC,MONIT
153 012474      000167  177050                  JMP     PST5
```

```
                        .SBTTL  HOST-REMOTE EXERCISE


                        ;START BACKGROUND SCAN, WAIT FOR 'THRU'
                        ;REPORT ALARMS  WHILE WAITING.
                        ;WHEN 'THRU' SETS, DO A 'PORT CONFIGURATION STATUS'' REPORT
                        ;AND THEN RUN 'DIAGNOSTIC'' FUNCTION ON ALL
                        ;  AVAILABLE REMOTES
                        ;    REPORT ALL CHANGES OF REMOTE STATUS


012500                  CMREXC: MTPS    #0                      ;INTERRUPT ON
012500  012746  000000          MOV     #0,-(SP)
012504  012746  012512          MOV     #64$,-(SP)
012510  000002                  RTI
012512                  64$:
012512  005067  015064          CLR     PASCNT                  ;CLEAR PASS COUNTER
012516  012767  000010  015050  MOV     #10,ITER                ;LOAD ITERATION COUNT
012524  105067  015012          CLRB    OFLOF                   ;CLR FLAGS & COUNTERS
012530  005067  015036          CLR     ERRCNT
012534  012767  000000  015022  MOV     #0,CNTR                 ;SET UP TO TIME POWER UP
012542  027727  015020  102000  CELP:   CMP     @CSR,#102000    ;PWR-UP & INTR SET?
012550  001420                  BEQ     EXS1                    ;YES, CONTINUE
012552  005367  015006          DEC     CNTR                    ;NO, WAIT A BIT
012556  001371                  BNE     CELP
012560                          ERROR   \N,NOGO         ;ERROR:HOST MICRO WON'T START
                                                        ;******* ERROR 47 *******
012560  032777  040000  015046  BIT     #B14,@SR
012566  001007                  BNE     .+20
012570  012700  024031          MOV     #NOGO,R0
012574  012767  000047  004006  MOV     #47,ERRNUM
012602  004767  003634          JSR     PC,ERR
        000050          N       =       N+1
012606                          HLT                             ;RUN LOGIC TEST
012606  004767  003356          JSR     PC,SWHLT
012612  005067  014742  EXS1:   CLR     CHNGFL                  ;CLEAR STATUS CHANGE FLAG
012616  005077  014744          CLR     @CSR                    ;START OFF CLEAR
012622  012777  000020  014736  MOV     #20,@CSR                ;CLEAR TOP BYTE
012630  012777  000044  014730  MOV     #44,@CSR                ;ENABLE BKG SCAN & THRU INTR
012636                          PNTM    EXCM                    ;PRINT 'CMR EXERCISE ROUTINE''
012636  012700  023342          MOV     #EXCM,R0                ;PRINT MESSAGE
012642  004767  004424          JSR     PC,TYPOUT               ;POINTED TO BY EXCM
012646  105067  014671          CLRB    ONCE
012652  105067  014672          CLRB    THRUF
012656  005067  014760          CLR     TALLY
012662  005067  013576          CLR     EXTBL1                  ;CLEAR TABLES
012666  005067  013772          CLR     EXTBL2
012672  005067  014166          CLR     EXTBL3
012676  005067  014362          CLR     EXTBL4


                        ;EXERCISER MAIN LOOP

012702  004767  000574  EXS2:   JSR     PC,SCALM                ;GO SCAN ALARMS
012706  004767  003754          JSR     PC,MONIT                ;CHECK FOR CNTRL CHARS.
012712  032777  040000  014646  BIT     #B14,@CSR               ;IS FUN COMPL SET?
012720  001410                  BEQ     EXS2B                   ;NO.
012722  052777  000020  014636  BIS     #20,@CSR                ;CLR TOP BYTE
```

```
012730  005767  014624                     TST     CHNGFL          ;CHANGE FLAG SET?
012734  001022                             BNE     EXS3            ;IF YES, DO PCS
012736  004767  003724                     JSR     PC,MONIT        ;CHECK FOR CNTRL CHARS
012742  105767  014602            EXS2B:   TSTB    THRUF           ;IS 'THRU' SET?
012746  001015                             BNE     EXS3            ;IF YES, DO PORT CONFIG
012750  105767  014567                     TSTB    ONCE            ;DONE PORT CONFIG ONCE?
012754  001752                             BEQ     EXS2            ;NO. WAIT FOR THRU
012756  005767  014660                     TST     TALLY           ;YES, ANY REMOTES?
012762  001747                             BEQ     EXS2            ;NO, WAIT FOR CHANGE OR THRU
012764  005767  014570                     TST     CHNGFL          ;YES, ANY CHANGES PENDING?
012770  001004                             BNE     EXS3            ;YES, NEW PORT CONFIG
012772  004767  000230                     JSR     PC,DIAGFU       ;NO, GO DO DIAG FUNC ON AVAIL REMOTES
012776  000167  000406                     JMP     SKPD2           ;THEN PRINT END PASS STUFF
013002  004767  000100            EXS3:    JSR     PC,PRTCNF       ;DO A PORT CONFIG FUNC.
013006  005067  014546                     CLR     CHNGFL          ;CLR CHANGE FLAG
013012  112777  000074  014546             MOVB    #74,@CSR        ;ENAB BKG SCN,CHGST,THRU INTR
013020  005767  014616                     TST     TALLY           ;ANY REMOTES?
013024  001411                             BEQ     EXS3A           ;NO. IDLE
013026  105767  014511                     TSTB    ONCE            ;ALREADY DONE REPORT?
013032  001017                             BNE     EXS3B           ;YES, SKIP IT THIS TIME
013034  004767  001334                     JSR     PC,REPORT       ;REPORT ALL REGULAR REMOTES
013040  112767  177777  014465             MOVB    #-1,CNFGFL      ;SET PORT CONFIG FLAG
013046  000411                             BR      EXS3B
013050  105067  014467            EXS3A:   CLRB    ONCE            ;NO REMOTES. WAIT FOR THRU
013054                                     PNTM    NOREM           ;PRINT 'NO REMOTES..WAITING''
013054  012700  023450                     MOV     #NOREM,R0       ;PRINT MESSAGE
013060  004767  004206                     JSR     PC,TYPOUT       ;POINTED TO BY NOREM
013064  105067  014460                     CLRB    THRUF           ;CLEAR THRU FLAG
013070  000704                             BR      EXS2
013072  105067  014452            EXS3B:   CLRB    THRUF           ;CLEAR THRU FLAG
013076  112767  177777  014437             MOVB    #-1,ONCE        ;SET 'ONCE'' FLAG
013104  000676                             BR      EXS2
```

```
                                        ;PORT CONFIGURATION STATUS SUBROUTINE
                                        ;PERFORMS A P.C.S. ON ALL 4 PORTS AND SAVES THE
                                        ;REMOTE #'S IN TABLES
                                        
013106  005067  014446        PRTCNF: CLR     CHNGFL          ;CLEAR 'CHANGE FLAG'
013112  005067  014524                CLR     TALLY           ;CLEAR REMOTE TALLY
013116  012767  026464  014520        MOV     #EXTBL1,TBLAD   ;SET UP TO CONFIG PORT 0
013124  012767  000000  014456        MOV     #0,PORN
013132  004767  000734                JSR     PC,PORCNF       ;DO PORT CONFIG ON PORT 0
013136  012767  026664  014500        MOV     #EXTBL2,TBLAD
013144  012767  000001  014436        MOV     #1,PORN
013152  004767  000714                JSR     PC,PORCNF       ;DO PORT CONFIG ON PORT 1
013156  012767  027064  014460        MOV     #EXTBL3,TBLAD
013164  012767  000002  014416        MOV     #2,PORN
013172  004767  000674                JSR     PC,PORCNF       ;DO PORT CONFIG ON PORT 2
013176  012767  027264  014440        MOV     #EXTBL4,TBLAD
013204  012767  000003  014376        MOV     #3,PORN
013212  004767  000654                JSR     PC,PORCNF       ;DO PORT CONFIG ON PORT 3
013216  005767  014336                TST     CHNGFL          ;ANY CHANGES PENDING?
013222  001331                      BNE     PRTCNF          ;IF SO, DO IT ALL OVER
013224  000207                      RTS     PC
```

```
                                        ;SUBROUTINE TO DO THE DIAGNOSTIC FUNCTION ON
                                        ;ALL REMOTES WHICH ARE ON LINE AND REGULAR
                                        
013226  012701  026464        DIAGFU: MOV     #EXTBL1,R1              ;GET TABLE FOR PORT 0
013232  012167  014326                MOV     (R1)+,CNTR              ;GET # OF REMOTES ON PORT
013236  001002                        BNE     SKP1                    ;NONE, NEXT PORT
013240  000167  000016                JMP     SKP2
013244  012167  014350        SKP1:   MOV     (R1)+,REMNO             ;GET 1ST REMOTE #
013250  004767  001510                JSR     PC,DIAGNF               ;DO DIAGNOSTIC FUNC. ON REM.
013254  005367  014304                DEC     CNTR                    ;DO ALL REMOTES ON THIS PORT
013260  001371                        BNE     SKP1
                                        
013262  012701  026664        SKP2:   MOV     #EXTBL2,R1              ;GET TABLE FOR PORT 1
013266  012167  014272                MOV     (R1)+,CNTR              ;1ST ENTRY IS # OF REMOTES
013272  001002                        BNE     SKP3
013274  000167  000016                JMP     SKP4                    ;IF NONE, NEXT PORT
013300  012167  014314        SKP3:   MOV     (R1)+,REMNO             ;GET REMOTE NO.
013304  004767  001454                JSR     PC,DIAGNF               ;DO DIAGNOSTIC FUNCTION ON REM.
013310  005367  014250                DEC     CNTR
013314  001371                        BNE     SKP3
013316  012701  027064        SKP4:   MOV     #EXTBL3,R1              ;GET TABLE FOR PORT 2
013322  012167  014236                MOV     (R1)+,CNTR              ;1ST ENTRY IS # OF REMOTES
013326  001002                        BNE     SKP5
013330  000167  000016                JMP     SKP6                    ;IF NONE, NEXT PORT
013334  012167  014260        SKP5:   MOV     (R1)+,REMNO             ;GET REMOTE #
013340  004767  001420                JSR     PC,DIAGNF               ;DO DIAGNOSTIC FUNC. ON REMOTE
013344  005367  014214                DEC     CNTR
013350  001371                        BNE     SKP5
013352  012701  027264        SKP6:   MOV     #EXTBL4,R1              ;GET TABLE FOR PORT 3
013356  012167  014202                MOV     (R1)+,CNTR              ;1ST ENTRY IS # OF REMOTES
013362  001002                        BNE     SKP7
013364  000167  000016                JMP     SKP8                    ;IF NONE, DONE!
013370  012167  014224        SKP7:   MOV     (R1)+,REMNO             ;GET REMOTE #
013374  004767  001364                JSR     PC,DIAGNF               ;DO DIAGNOSTIC FUNCTION ON REM.
013400  005367  014160                DEC     CNTR                    ;FINISH ALL REMOTES ON THIS PORT
013404  001371                        BNE     SKP7
013406  000207        SKP8:   RTS     PC                              ;RETURN
                                        
013410  005367  014160        SKPD2:  DEC     ITER                    ;UPDATE ITERATION COUNT
013414  001404                        BEQ     SKPX0                   ;IF 0, END PASS.
013416  032777  004000  014210        BIT     #B11,@SR                ;SW 11 = 1  == INH ITER.
013424  001422                        BEQ     SKPX1
013426  012767  000010  014140 SKPX0: MOV     #10,ITER                ;RELOAD ITERATION COUNT
013434  005267  014142                INC     PASCNT                  ;UPDATE PASS COUNT
013440  032777  002000  014166        BIT     #B10,@SR                ;SW 10 = INH END PASS PRINT
013446  001011                        BNE     SKPX1
013450  004767  175374                JSR     PC,ENPRTN               ;PRINT END PASS STUFF
013454  105767  014050                TSTB    CLKFL1                  ;IS CLOCK TICKING?
013460  001402                        BEQ     1$                      ;NO, SKIP PRINTOUT
013462  004767  003502                JSR     PC,PRNTIM               ;PRINT ELAPSED TIME
013466  004767  005006        1$:     JSR     PC,NULLS
013472  004767  003170        SKPX1:  JSR     PC,MONIT
013476  000167  177200                JMP     EXS2                    ;KEEP GOING
```

```
                                        ;SUBROUTINE TO CHECK FOR ALARMS AND CHANGES OF REMOTE STATE.
                                        ;  IF ALARM... RING 4 BELLS
                                        ;  IF CHANGE OF REMOTE STATE...SET A FLAG

013502  032777  010000  014056  SCALM:  BIT     #B12,@CSR               ;ALARMS?
013510  001415                        BEQ     SCA1                    ;NO, CHECK FOR CHG ST.
013512  012700  000007                MOV     #7,R0                   ;ALARM! RING TTY BELLS
013516  004767  005100                JSR     PC,TTO
013522  004767  005074                JSR     PC,TTO
013526  004767  005070                JSR     PC,TTO
013532  004767  005064                JSR     PC,TTO
013536  052777  000020  014022        BIS     #B04,@CSR               ;CLR ALARM
013544  000240                SCA1:   NOP
013546  000240                        NOP
013550  000240                        NOP
013552  032777  020000  014006        BIT     #B13,@CSR               ;CHANGE OF STATE?
013560  001531                        BEQ     SCA3                    ;NO, CHECK THRU
013562  012777  001000  014040        MOV     #1000,@SPAR             ;SEE IF THIS IS A SYS ERR
013570  027727  014036  000310        CMP     @SPDR,#310              ; OR REMOTE CHANGE
013576  001415                        BEQ     SCA2                    ;REMOTE CHANGE IS O.K.
013600                                ERROR   \N,SYSER        ;ERROR:HOST SYS ERROR. RUN LOGIC TEST.
                                                                ;******* ERROR 50 *******
013600  032777  040000  014026        BIT     #B14,@SR
013606  001007                        BNE     .+20
013610  012700  026141                MOV     #SYSER,R0
013614  012767  000050  002766        MOV     #50,ERRNUM
013622  004767  002614                JSR     PC,ERR
000051                          N       =       N+1
013626                                HLT
013626  004767  002336                JSR     PC,SWHLT
013632                          SCA2:   PNTM    REMCHG                  ;PRINT 'REMOTE STATUS CHANGE''
013632  012700  023657                MOV     #REMCHG,R0              ;PRINT MESSAGE
013636  004767  003430                JSR     PC,TYPOUT               ;POINTED TO BY REMCHG
013642                                PNTM    REMSG                   ;PRINT 'REMOTE # ''
013642  012700  023566                MOV     #REMSG,R0               ;PRINT MESSAGE
013646  004767  003420                JSR     PC,TYPOUT               ;POINTED TO BY REMSG
013652  012777  001003  013750        MOV     #1003,@SPAR
013660  017700  013746                MOV     @SPDR,R0                ;GET THE REMOTE NUMBER
013664  004767  004426                JSR     PC,OCTPNT               ;PRINT IT
013670                                PNTM    REMSTM                  ;PRINT 'REMOTE STATUS NOW ''
013670  012700  023715                MOV     #REMSTM,R0              ;PRINT MESSAGE
013674  004767  003372                JSR     PC,TYPOUT               ;POINTED TO BY REMSTM
013700  005277  013724                INC     @SPAR
013704  032777  000040  013720        BIT     #B05,@SPDR              ;NOW REGULAR?
013712  001405                        BEQ     SCA2A                   ;NO
013714                                PNTM    REGMG                   ;YES, PRINT 'REGULAR''
013714  012700  023741                MOV     #REGMG,R0               ;PRINT MESSAGE
013720  004767  003346                JSR     PC,TYPOUT               ;POINTED TO BY REGMG
013724  000416                        BR      SCA2C
013726  032777  000100  013676  SCA2A: BIT     #B06,@SPDR              ;IRREGULAR?
013734  001405                        BEQ     SCA2B
013736                                PNTM    IRRGMG                  ;YES, PRINT ''IRREGULAR''
013736  012700  023752                MOV     #IRRGMG,R0              ;PRINT MESSAGE
013742  004767  003324                JSR     PC,TYPOUT               ;POINTED TO BY IRRGMG
013746  000410                        BR      SCA2D
013750  017700  013656          SCA2B: MOV     @SPDR,R0                ;OTHERWISE, JUST PRINT THE STATUS
```

```
 40 013754  004767  004336                JSR     PC,OCTPNT
 41 013760  000410                        BR      SCA2E           ;AND LEAVE THE TALLY ALONE
 42 013762  005267  013654        SCA2C:  INC     TALLY           ;UPDATE TALLY FOR ADDED REMOTE
 43 013766  000405                        BR      SCA2E
 44 013770  005767  013646        SCA2D:  TST     TALLY           ;IS TALLY ALREADY =0?
 45 013774  001402                        BEQ     SCA2E           ;YES, FORGET IT
 46 013776  005367  013640                DEC     TALLY           ;NO, MAKE IT ONE LESS
 47 014002  005767  013634        SCA2E:  TST     TALLY           ;IS TALLY NOW 0?
 48 014006  001006                        BNE     SCA2F           ;NO, O.K.
 49 014010  105067  013527                CLRB    ONCE            ;YES, HAVE TO START OVER
 50 014014                                PNTM    ALROFF          ;PRINT ''ALL REMOTES ARE IRREGULAR''
    014014  012700  023765                MOV     #ALROFF,R0      ;PRINT MESSAGE
    014020  004767  003246                JSR     PC,TYPOUT       ;POINTED TO BY ALROFF
 51 014024  012767  177777  013526  SCA2F:  MOV     #-1,CHNGFL      ;SET CHANGE FLAG
 52 014032  052777  000020  013526        BIS     #20,@CSR        ;CLEAR TOP BYTE
 53 014040  000167  177500                JMP     SCA1            ;GO SEE IF ANY MORE CHANGES.
 54 014044  032777  004000  013514  SCA3:   BIT     #B11,@CSR       ;IS THRU SET?
 55 014052  001406                        BEQ     SCART           ;NO, LEAVE
 56 014054  112767  177777  013466        MOVB    #-1,THRUF       ;YES, SET THE ''THRUF'' FLAG
 57 014062  052777  000020  013476        BIS     #20,@CSR        ;CLEAR TOP BYTE
 58 014070  000207                SCART:  RTS     PC
```

```
                                        ;SUBROUTINE TO PERFORM 'PORT CONFIGURATION STATUS'' ON A GIVEN
                                        ;PORT AND STORE THE RESULTS IN A GIVEN TABLE. ALSO
                                        ;STORED IS THE STATUS OF EACH REMOTE
                                        ;FOR EACH REGULAR REMOTE FOUND, A TALLY IS INCREMENTED

                                        ;TABLES ARE IN THE FOLLOWING FORMAT:

                                        ;       [  # OF ENTRIES  ]
                                        ;       [REM STAT][REM #  ]
                                        ;       [    ''   ][   ''   ]

014072  016701  013546          PORCNF: MOV     TBLAD,R1                ;TABLE ADDR GIVEN BY CALLER
014076  052777  000020  013462          BIS     #B04,@CSR               ;CLR TOP BYTE OF CSR
014104  005077  013520                  CLR     @SPAR                   ;ADDR REQ. SCPD
014110  012777  000140  013514          MOV     #140,@SPDR              ;LOAD PORT CONF. ST. FUNC.
014116  005277  013506                  INC     @SPAR
014122  012777  000002  013502          MOV     #2,@SPDR                ;DATA LEN. = 2
014130  005277  013474                  INC     @SPAR
014134  012777  000001  013470          MOV     #1,@SPDR                ; ONE REQUEST
014142  005277  013462                  INC     @SPAR
014146  016777  013436  013456          MOV     PORN,@SPDR              ;PORT # GIVEN BY CALLER
014154  004767  177322                  JSR     PC,$CALM                ;CLEAR ALARMS & CHANGES
014160  052777  000001  013400          BIS     #B00,@CSR               ;START FUNCTION
014166  032777  040000  013372  POR0:   BIT     #B14,@CSR               ;FUNCTION COMPLETE?
014174  001003                          BNE     POR00                   ;NO, WAIT
014176  004767  177300                  JSR     PC,$CALM                ;SCAN ALARMS AGAIN
014202  000771                          BR      POR0
014204  004767  002456          POR00:  JSR     PC,MONIT
014210  012777  001000  013412          MOV     #1000,@SPAR             ;ADDR RESULT SCPD
014216  027727  013410  000140          CMP     @SPDR,#140              ;THIS RESULT FROM PORT CONFIG?
014224  001415                          BEQ     POR1
014226                                  ERROR   \N,SYSER        ;ERROR:HOST SYS ERROR. RUN LOGIC TEST
                                                                ;******* ERROR 51 *******
014226  032777  040000  013400          BIT     #B14,@SR
014234  001007                          BNE     .+20
014236  012700  026141                  MOV     #SYSER,R0
014242  012767  000051  002340          MOV     #51,ERRNUM
014250  004767  002166                  JSR     PC,ERR
        000052                  N       =       N+1
014254                                  HLT
014254  004767  001710                  JSR     PC,SWHLT
014260  005277  013344          POR1:   INC     @SPAR                   ;GET # OF REMOTES
014264  017700  013342                  MOV     @SPDR,R0
014270  006200                          ASR     R0                      ;DIVIDE BY 4
014272  006200                          ASR     R0
014274  010021                          MOV     R0,(R1)+                ;SAVE AS # OF ENTRIES
014276  001002                          BNE     PORLD                   ;IF MORE THAN 0, LOAD THEM
014300  000167  000042                  JMP     PORXT                   ;IF NONE, EXIT
014304  010067  013254          PORLD:  MOV     R0,CNTR                 ;GET # OF ENTRIES
014310  012777  001003  013312          MOV     #1003,@SPAR
014316  117721  013310          PORCN:  MOVB    @SPDR,(R1)+             ;LOAD REMOTE #
014322  005277  013302                  INC     @SPAR
014326  117721  013300                  MOVB    @SPDR,(R1)+             ;LOAD REM. STATUS
014332  062777  000003  013270          ADD     #3,@SPAR
014340  005367  013220                  DEC     CNTR                    ;GOT THEM ALL?
014344  001364                          BNE     PORCN                   ;NO, GET THE REST
014346  005767  013236          PORXT:  TST     PORN                    ;PORT 0?
```

```
     50 014352  001002                      BNE     1$                      ;NO, NEVER MIND
     51 014354  005067  013262              CLR     TALLY                   ;YES, CLEAR TALLY
     52 014360  060067  013256      1$:     ADD     R0,TALLY                ;UPDATE TALLY
     53 014364  052777  000020  013174      BIS     #B04,@CSR               ;CLR TOP BYTE
     54 014372  000207                      RTS     PC                      ;AND RETURN
```

```
                                        ;SUBROUTINE TO REPORT THE STATUS OF EACH PORT WHICH HAS ANY
                                        ;REMOTES ATTACHED AND REGULAR.

014374                          REPORT: PNTM    CONFMS          ;PRINT '** PORT CONFIGURATION **''
014374 012700 023600                    MOV     #CONFMS,R0      ;PRINT MESSAGE
014400 004767 002666                    JSR     PC,TYPOUT       ;POINTED TO BY CONFMS
014404 105067 013134                    CLRB    PNCFLG          ;CLR 'PRINTED SOMETHING' FLAG
014410 012767 000006 013160             MOV     #6,LINLEN       ;ALLOW 6 REM'S PER LINE.
014416 012701 026464                    MOV     #EXTBL1,R1      ;GET PORT TABLE
014422 012167 013136                    MOV     (R1)+,CNTR      ;GET # OF REMOTES
014426 001407                           BEQ     REP0            ;NONE HERE, NEXT PORT
014430 105267 013110                    INCB    PNCFLG          ;SET FLAG
014434 012767 000000 013146             MOV     #0,PORN         ;LOAD PORT NO.
014442 004767 000130                    JSR     PC,PRNREM       ;GO PRINT REMOTES ON THIS PORT
014446 012701 026664            REP0:   MOV     #EXTBL2,R1
014452 012167 013106                    MOV     (R1)+,CNTR      ;GET # OF REMOTES
014456 001407                           BEQ     REP1            ;NONE HERE, NEXT PORT
014460 105267 013060                    INCB    PNCFLG          ;SET FLAG
014464 012767 000001 013116             MOV     #1,PORN
014472 004767 000100                    JSR     PC,PRNREM       ;GO PRINT REMOTES ON THIS PORT
014476 012701 027064            REP1:   MOV     #EXTBL3,R1
014502 012167 013056                    MOV     (R1)+,CNTR      ;GET # OF REMOTES
014506 001407                           BEQ     REP2            ;NONE HERE, NEXT PORT
014510 105267 013030                    INCB    PNCFLG          ;SET FLAG
014514 012767 000002 013066             MOV     #2,PORN
014522 004767 000050                    JSR     PC,PRNREM       ;GO PRINT REMOTES ON THIS PORT
014526 012701 027264            REP2:   MOV     #EXTBL4,R1
014532 012167 013026                    MOV     (R1)+,CNTR      ;GET # OF REMOTES
014536 001407                           BEQ     REP20           ;NONE WE'RE DONE
014540 105267 013000                    INCB    PNCFLG          ;SET FLAG
014544 012767 000003 013036             MOV     #3,PORN
014552 004767 000020                    JSR     PC,PRNREM       ;GO PRINT REMOTES ON THIS PORT
014556 105767 012762            REP20:  TSTB    PNCFLG          ;PRINTED ANYTHING?
014562 001004                           BNE     REP3            ;YES, FINE.
014564                                  PNTM    ALROFF          ;NO, SAY ALL ARE IRREGULAR.
014564 012700 023765                    MOV     #ALROFF,R0      ;PRINT MESSAGE
014570 004767 002476                    JSR     PC,TYPOUT       ;POINTED TO BY ALROFF
014574 000207                   REP3:   RTS     PC              ;RETURN WHEN DONE
```

```
                                        ;SUBROUTINE TO DO THE PRINTING PART OF PORT CONFIGURATION REPORT.
                                        ;R1 POINTS AT FIRST REMOTE #
                                        ;PORN = PORT #
                                        ;CNTR = # OF REMOTES ON THIS PORT

014576                          PRNREM: PNTM    PORTMS                  ;PRINT 'PORT # ''
014576  012700  023556                  MOV     #PORTMS,R0              ;PRINT MESSAGE
014602  004767  002464                  JSR     PC,TYPOUT               ;POINTED TO BY PORTMS
014606  016700  012776                  MOV     PORN,R0                 ;GET PORT #
014612  004767  003500                  JSR     PC,OCTPNT               ;PRINT IT
014616  112100                  PREMO:  MOVB    (R1)+,R0                ;GET REMOTE #
014620  042700  177400                  BIC     #177400,R0              ;CLR HIGH BYTE
014624  004767  003514                  JSR     PC,OCTJSP               ;PRINT IT
014630  012700  000050                  MOV     #'(,R0                  ;BRACKET THE STATE
014634  004767  003762                  JSR     PC,TTO
014640  112100                          MOVB    (R1)+,R0                ;GET REM. STATE
014642  042700  177400                  BIC     #177400,R0              ;CLEAR THE JUNK OFF
014646  004767  003444                  JSR     PC,OCTPNT               ;PRINT THE STATE
014652  012700  000051                  MOV     #'),R0                  ;CLOSE BRACKETS
014656  004767  003740                  JSR     PC,TTO
014662  005367  012676                  DEC     CNTR
014666  001426                          BEQ     PREML                   ;EXIT IF ALL DONE
014670  005367  012702                  DEC     LINLEN                  ;FILLED A LINE?
014674  001350                          BNE     PREMO
014676  012767  000006  012672          MOV     #6,LINLEN               ;YES, RESTORE LINLEN
014704  012700  000015                  MOV     #15,R0
014710  004767  003706                  JSR     PC,TTO                  ;CARRIAGE RETURN
014714  012767  000007  012640          MOV     #7,CLK                  ;SPACE PAST PORT #
014722  012700  000040                  MOV     #40,R0
014726  004767  003670          PREM1:  JSR     PC,TTO
014732  005367  012624                  DEC     CLK
014736  001373                          BNE     PREM1
014740  000167  177652                  JMP     PREMO
014744  012700  000015          PREML:  MOV     #15,R0                  ;ANOTHER <CR>
014750  004767  003646                  JSR     PC,TTO
014754  012767  000006  012614          MOV     #6,LINLEN
014762  000207                          RTS     PC                      ;AND RETURN
```

```
                                        ;SUBROUTINE TO DO DIAGNOSTIC FUNCTION ON A GIVEN REMOTE
                                        ;ENTER WITH REMOTE # IN 'REMNO'


 014764  012767  000020  012570 DIAGNF: MOV     #20,CLK                 ;SET UP TO LOAD REQUEST
 014772  012702  026424                 MOV     #DATBL,R2
 014776  005077  012626                 CLR     @SPAR                   ;ADDRESS REQ SCR PAD
 015002  012777  000100  012622         MOV     #100,@SPDR              ;LOAD 'DIAG' FUNC
 015010  005277  012614                 INC     @SPAR
 015014  012777  000022  012610         MOV     #22,@SPDR               ;DATA LEN. = 22
 015022  005277  012602                 INC     @SPAR
 015026  012777  000001  012576         MOV     #1,@SPDR                ;ONE REQUEST
 015034  005277  012570                 INC     @SPAR
 015040  016777  012554  012564         MOV     REMNO,@SPDR             ;LOAD REMOTE #
 015046  005277  012556         DIAG0:  INC     @SPAR
 015052  012277  012554                 MOV     (R2)+,@SPDR             ;LOAD DATA PATTERN
 015056  005367  012500                 DEC     CLK
 015062  001371                         BNE     DIAG0
 015064  004767  176412         DIAG00: JSR     PC,SCALM                ;CLEAR ALARMS ETC.
 015070  052777  000020  012470         BIS     #B04,@CSR               ;CLR TOP BYTE
 015076  052777  000001  012462         BIS     #B00,@CSR               ;SET START FUNC.
 015104  032777  040000  012454 DIAG1:  BIT     #B14,@CSR               ;FUN COMPL?
 015112  001003                         BNE     DIAG10
 015114  004767  176362                 JSR     PC,SCALM                ;NO, WAIT FOR IT
 015120  000771                         BR      DIAG1
 015122  012777  001000  012500 DIAG10: MOV     #1000,@SPAR             ;ADDRESS RESULT SCR. PAD
 015130  012767  000100  001454         MOV     #100,GOOD               ;RIGHT FUNCTION?
 015136  017767  012470  001450         MOV     @SPDR,BAD
 015144  026767  001442  001442         CMP     GOOD,BAD
 015152  001416                         BEQ     DIAG2
 015154                                 DATERR  \N,DIAGF        ;ERROR:DIAG FUNC GAVE WRONG FUNC CODE
                                                                ;******* ERROR 52 *******
 015154  032777  040000  012452         BIT     #B14,@SR
 015162  001007                         BNE     .+20
 015164  012700  026202                 MOV     #DIAGF,R0
 015170  012767  000052  001412         MOV     #52,ERRNUM
 015176  004767  001324                 JSR     PC,DERR
         000053                 N       =       N+1
 015202                                 SCOPE   DIAG00
 015202  004567  001002                 JSR     R5,SCPRTN
 015206  015064                         DIAG00
 015210  062777  000002  012412 DIAG2:  ADD     #2,@SPAR                ;CHECK FUNCTION STATUS
 015216  012767  000001  001366         MOV     #1,GOOD                 ;SHD SHOW SUCCESS
 015224  017767  012402  001362         MOV     @SPDR,BAD
 015232  026767  001354  001354         CMP     GOOD,BAD
 015240  001460                         BEQ     DIAG4                   ;O.K.
 015242                                 DATERR  \N,DIAGUF       ;ERROR:USOF WRONG ON 'DIAG' FUNC
                                                                ;******* ERROR 53 *******
 015242  032777  040000  012364         BIT     #B14,@SR
 015250  001007                         BNE     .+20
 015252  012700  026245                 MOV     #DIAGUF,R0
 015256  012767  000053  001324         MOV     #53,ERRNUM
 015264  004767  001236                 JSR     PC,DERR
         000054                 N       =       N+1
 015270  032777  040000  012336         BIT     #B14,@SR                ;PRINT ALLOWED?
 015276  001036                         BNE     DIAG3S                  ;NO, SKIP IT
 015300                                 PNTM    REMSG                   ;PRINT 'REMOTE # ''
```

```
                015300  012700  023566                  MOV     #REMSG,R0       ;PRINT MESSAGE
                015304  004767  001762                  JSR     PC,TYPOUT       ;POINTED TO BY REMSG
     42         015310  005277  012314                  INC     @SPAR
     43         015314  017700  012312                  MOV     @SPDR,R0        ;GET REM. NO.
     44         015320  004767  002772                  JSR     PC,OCTPNT       ;PRINT IT
     45         015324                                  PNTM    STATEM          ;PRINT 'STATE ''
                015324  012700  023634                  MOV     #STATEM,R0      ;PRINT MESSAGE
                015330  004767  001736                  JSR     PC,TYPOUT       ;POINTED TO BY STATEM
     46         015334  005277  012270                  INC     @SPAR
     47         015340  017700  012266                  MOV     @SPDR,R0        ;GET STAE OF REMOTE
     48         015344  004767  002746                  JSR     PC,OCTPNT
     49         015350                                  PNTM    USORM           ;PRINT 'USOR = ''
                015350  012700  023646                  MOV     #USORM,R0       ;PRINT MESSAGE
                015354  004767  001712                  JSR     PC,TYPOUT       ;POINTED TO BY USORM
     50         015360  005277  012244                  INC     @SPAR
     51         015364  017700  012242                  MOV     @SPDR,R0
     52         015370  004767  002722                  JSR     PC,OCTPNT
     53         015374                          DIAG3S: SCOPE   DIAG00
                015374  004567  000610                  JSR     R5,SCPRTN
                015400  015064                          DIAG00
     54         015402  052777  000020  012156  DIAG4:  BIS     #B04,@CSR       ;CLEAR TOP BYTE WHEN DONE
     55         015410  000207                          RTS     PC
```

```
                                .SBTTL  MAINTENANCE ROUTINE


                                ;THIS ROUTINE WORKS LIKE ODT BASICALLY BUT
                                ;ONLY ON THE CMR-11 SCRATCHPAD MEMORY.
                                ;THE REQUEST SCR. PAD MAY BE LOADED/READ
                                ;TYPING "G" CAUSES EXECUTION OF THE FUNCTION
                                ;LOADED. COMPLETION OF THE FUNCTION CAUSES
                                ;THE FIRST LOCATION OF THE RESULT SCR. PAD
                                ; TO BE PRINTED.
                                ;THE CMR-11 CSR MAY BE EXAMINED BY TYPING
                                ; IT'S BUS ADDRESS FOLLOWED BY SLASH (/)
                                ; EXIT IS ACHIEVED BY TYPING CNTRL-C
                                ;OR "P" TO PROCEED TO THE POINT AT WHICH THE
                                ;MAIN PROGRAM WAS INTERRUPTED.

015412  105767  012113         ODTPR:  TSTB    CLKFLG          ;STOP CLOCK WHILE WE'RE HERE
015416  001404                          BEQ     $00$            ;BY CLEARING INTR ENAB
015420  017746  012242                  MOV     @LCS,-(SP)      ;IF IT'S SET
015424  005077  012236                  CLR     @LCS
015430  112767  177777  012076  $00$:   MOVB    #-1,DBFLG       ;SET DEBUG FLAG
015436  017767  012124  012162          MOV     @CSR,SAVEC      ;SAVE CSR FOR LOOKING AT
015444                                  PNTM    DBAID           ;PRINT "CMR-11 DEBUG AID"
015444  012700  021442                  MOV     #DBAID,R0       ;PRINT MESSAGE
015450  004767  001616                  JSR     PC,TYPOUT       ;POINTED TO BY DBAID
015454  005067  012072          $0$:    CLR     ADDR
015460  016767  012066  002552  $1$:    MOV     ADDR,KBBUF      ;GET ADDRESS
015466  004767  001642                  JSR     PC,INPKB        ; FROM KEYBOARD
015472  016767  002542  012052          MOV     KBBUF,ADDR
015500  026727  012046  001777          CMP     ADDR,#1777      ;WITHIN LIMIT?
015506  101423                          BLOS    $2$             ;YES, O.K.
015510  026767  012036  012050          CMP     ADDR,CSR        ;IS IT THE CSR?
015516  001012                          BNE     $10$            ;NO
015520  017700  012042                  MOV     @CSR,R0
015524  004767  002614                  JSR     PC,OCTJSP       ;YES, SHOW CONTENTS OF CSR
015530  012700  000015                  MOV     #15,R0
015534  004767  003062                  JSR     PC,TTO
015540  000167  177710                  JMP     $0$
015544                          $10$:   PNTM    AGAIN
015544  012700  021324                  MOV     #AGAIN,R0       ;PRINT MESSAGE
015550  004767  001516                  JSR     PC,TYPOUT       ;POINTED TO BY AGAIN
015554  000741                          BR      $1$
015556  105767  011765          $2$:    TSTB    SLFL            ;SLASH HIT?
015562  001042                          BNE     $11$            ;YES DUMP DATA
015564  105767  011745                  TSTB    GOFLG           ;"G" TYPED?
015570  001462                          BEQ     $20$            ;NO
015572  052777  000020  011766  $2A$:   BIS     #B04,@CSR       ;INSURE TOP BYTE CLEAR
015600  005077  012024                  CLR     @SPAR           ;ADDRESS FUNC. CODE
015604  027727  012022  000151          CMP     @SPDR,#151      ;IS FUNC NOT MAINT?
015612  101404                          BLOS    $3$             ;IT'S NOT MAINT. DO IT
015614  052777  000200  011744          BIS     #B07,@CSR       ;IT IS MAINT, SET "MAIN"
015622  000403                          BR      $4$
015624  052777  000001  011734  $3$:    BIS     #B00,@CSR       ;SET "STFUN"
015632  032777  100000  011726  $4$:    BIT     #B15,@CSR       ;IS THERE AN INTR?
015640  001003                          BNE     $5$             ;YES, SEE WHAT IT IS
015642  004767  001020                  JSR     PC,MONIT
015646  000771                          BR      $4$
```

```
 54 015650  012767  001000  011674  $5$:    MOV     #1000,ADDR              ;ADDRESS RESULT
 55 015656  012700  000015                  MOV     #15,R0
 56 015662  004767  002734                  JSR     PC,TTO                  ;DO <CR>
 57 015666  000430                          BR      $21$
 58 015670  016777  011656  011732  $11$:   MOV     ADDR,@SPAR              ;LOAD ''ADDRESS''
 59 015676  017700  011730                  MOV     @SPDR,R0                ;GET ''CONTENTS''
 60 015702  004767  002436                  JSR     PC,OCTJSP               ;AND PRINT IT
 61 015706                                  PNTM    TWOSP                   ;SPACE AND PROMPT (:)
    015706  012700  021571                  MOV     #TWOSP,R0               ;PRINT MESSAGE
    015712  004767  001354                  JSR     PC,TYPOUT               ;POINTED TO BY TWOSP
 62 015716  017767  011710  002314          MOV     @SPDR,KBBUF
 63 015724  004767  001404                  JSR     PC,INPKB                ;GET KBD INPUT
 64 015730  016777  002304  011674          MOV     KBBUF,@SPDR             ;LOAD ANY NEW INPUT
 65 015736  105767  011575          $20$:   TSTB    INCF                    ;LINE FEED?
 66 015742  001421                          BEQ     $13$
 67 015744  005267  011602                  INC     ADDR                    ;IF YES, INCREMENT ADDRESS
 68 015750  016700  011576          $21$:   MOV     ADDR,R0
 69 015754  020027  001777                  CMP     R0,#1777                ;VALID ADDRESS?
 70 015760  101402                          BLOS    $22$                    ;YES, O.K.
 71 015762  000167  177556                  JMP     $10$                    ;NO GOOD. GET A NEW ONE!
 72 015766  004767  002324          $22$:   JSR     PC,OCTPNT               ;PRINT NEW ADDRESS
 73 015772  012700  000057                  MOV     #'/,R0                  ;PRINT A SLASH
 74 015776  004767  002620                  JSR     PC,TTO
 75 016002  000167  177662                  JMP     $11$                    ;GO PRINT CONTENTS
 76 016006  105767  011535          $13$:   TSTB    SLFL                    ;SLASH TYPED?
 77 016012  001402                          BEQ     $23$                    ;NO, CHECK IF IT'S 'P''
 78 016014  000167  177650                  JMP     $11$                    ;YES, SHOW CONTENTS
 79 016020  105767  011506          $23$:   TSTB    CONFLG                  ;''P'' TYPED?
 80 016024  001004                          BNE     $25$                    ;NO, MUST BE <CR>
 81 016026  105767  011503                  TSTB    GOFLG                   ;''G'' TYPED?
 82 016032  001257                          BNE     $2A$                    ;YES, START FUNCTION
 83 016034  000611                          BR      $1$
 84 016036  105767  011467          $25$:   TSTB    CLKFLG                  ;CHECK ON CLOCK FLAG
 85 016042  001402                          BEQ     $26$                    ;NO CLOCK, SKIP
 86 016044  012677  011616                  MOV     (SP)+,@LCS              ;RESTORE CLOCK IF GOING
 87 016050  105067  011460          $26$:   CLRB    DBFLG                   ;CLEAR DEBUG FLAG
 88 016054  005767  011526                  TST     PCONT                   ;ANY PROMPTS PENDING?
 89 016060  001402                          BEQ     $24$                    ;NO, JUST RETURN TO CALLER
 90 016062  016716  011520                  MOV     PCONT,(SP)              ;YES, RETYPE PROMPT.
 91 016066  000207          $24$:   RTS     PC                              ;UNOFFICIAL RETURN
```

```
                                .SBTTL  UTILITY ROUTINES

                        ;ROUTINES TO SAVE AND RESTORE GENERAL REGISTERS
                        ; CALLED BY JSR R5,REGSAV
                        ; AND       JSR R5,REGRES

016070  010446          REGSAV: MOV     R4,-(SP)
016072  010346                  MOV     R3,-(SP)
016074  010246                  MOV     R2,-(SP)
016076  010146                  MOV     R1,-(SP)
016100  010046                  MOV     R0,-(SP)
016102  000115                  JMP     @R5

016104  030026          REGRES: BIT     R0,(SP)+                ;THROW AWAY OLD R5 VALUE
016106  012600                  MOV     (SP)+,R0
016110  012601                  MOV     (SP)+,R1
016112  012602                  MOV     (SP)+,R2
016114  012603                  MOV     (SP)+,R3
016116  012604                  MOV     (SP)+,R4
016120  000205                  RTS     R5

                        ;ROUTINE TO SET LSI-11 FLAG (SOFTWARE)

016122  112767  177777  011410  LSTST:  MOVB    #-1,LSIFLG              ;SET LSI-11 SOFTWARE FLAG
016130  000002                  RTI                             ;RETURN

                        ;ROUTINE TO SET SOFTWARE SWITCH REGISTER FLAG

016132  012767  027636  011474  SRTST:  MOV     #SSWR,SR                ;NO HARDWARE SWR, USE
016140  012767  177777  011472          MOV     #-1,SWRFLG              ;  MEMORY LOCATION
016146  000002                  RTI                             ;  AND SET FLAG

                        ;ROUTINE TO PRINT ILLEGAL DEVICE ADDRESS

016150  012706  002000  DVATST: MOV     #ISP,SP                 ;FIX THE STACK
016154                  .       PNTM    INVLAD                  ;PRINT NON-EXST ADDR MSG
016154  012700  021467          MOV     #INVLAD,R0              ;PRINT MESSAGE
016160  004767  001106          JSR     PC,TYPOUT               ;POINTED TO BY INVLAD
016164  000167  163722          JMP     PROMT                   ;GO GET CORRECT ADDRESS

                        ;ROUTINE TO REPLACE HALT WITH CALL TO SW MONITOR
                        ;ON NON SWR PROCESSORS (CALLED BY MACRO 'HLT')

016170  005767  011444  SWHLT:  TST     SWRFLG                  ;ANY HARDWARE SWR?
016174  001403                  BEQ     1$                      ;IF YES, GO HALT
016176  004767  000516          JSR     PC,SWDMP                ;IF NO, DUMP SWITCHES
016202  000207                  RTS     PC                      ;CONTINUE
016204  000000          1$:     HALT                            ;REAL HALT
016206  000207                  RTS     PC                      ;CONTINUE

                        ;ROUTINE USED FOR LOOPING ON ERROR ROUTINE (CALLED BY MACRO 'SCOPE')

016210  004767  000452  SCPRTN: JSR     PC,MONIT                ;CHECK FOR ^G, OR ^C
016214  005777  011414          TST     @SR                     ;IS SW 15 SET?
016220  100402                  BMI     SBAK                    ;YES, DON'T HALT
016222                          HLT                             ;COMMON ERROR HALT
```

```
                016222  004767  177742                  JSR     PC,SWHLT
 56             016226  012500                  SBAK:   MOV     (R5)+,R0        ;GET DIRECTION FOR SCOPE LOOP
 57             016230  032777  020000  011376          BIT     #B13,@SR        ;SW 13 SET?
 58             016236  001402                          BEQ     SCONT           ;NO, DON'T LOOP
 59             016240  012605                          MOV     (SP)+,R5        ;YES, RESTORE R5
 60             016242  000110                          JMP     (R0)            ;AND LOOP
 61             016244  005267  011322          SCONT:  INC     ERRCNT          ;UPDATE ERR CNT IF 'FALL THRU'
 62             016250  001003                          BNE     SCORTN          ;WATCH FOR ERRCNT OFLO
 63             016252  112767  177777  011262          MOVB    #-1,OFLOF       ;SET OVERFLO FLAG.
 64             016260  000205                  SCORTN: RTS     R5              ;AND RETURN
 65
 66
 67                                              ;ROUTINE TO GENERATE CSC DEVICE ADDRESSES FROM 'DEVADR'
 68
 69             016262  016700  011370          DEVGEN: MOV     DEVADR,R0       ;GET DEVICE CSR ADDRESS
 70             016266  010067  011274                  MOV     R0,CSR          ;GENERATE CSR
 71             016272  062700  000002                  ADD     #2,R0
 72             016276  010067  011326                  MOV     R0,SPAR         ;GENERATE SPAR
 73             016302  062700  000002                  ADD     #2,R0
 74             016306  010067  011320                  MOV     R0,SPDR         ;GENERATE SPDR
 75             016312  016700  011336                  MOV     VECTOR,R0
 76             016316  012760  000340  000002          MOV     #340,2(R0)
 77             016324  000207                          RTS     PC              ;RETURN
 78
 79                                              ;ROUTINE TO PRINT DEFAULT VALUES FOR PROMPTS AT FRONT END.
 80                                              ;       ENTER WITH DEFAULT VALUE IN LOC. KBBUF
 81
 82             016326  012700  000050          PRDFLT: MOV     #'(,R0          ;GET OPEN PARENTHASIS
 83             016332  004767  002264                  JSR     PC,TTO          ;PRINT IT
 84             016336  016700  001676                  MOV     KBBUF,R0        ;GET DEFAULT VALUE
 85             016342  004767  001750                  JSR     PC,OCTPNT       ;PRINT IT
 86             016346  012700  000051                  MOV     #'),R0          ;GET CLOSE PARENTHASIS
 87             016352  004767  002244                  JSR     PC,TTO          ;PRINT IT
 88             016356  012700  000040                  MOV     #' ,R0          ;AND PRINT A SPACE
 89             016362  004767  002234                  JSR     PC,TTO
 90             016366  000207                          RTS     PC
 91
 92                                              ;ROUTINE TO CATCH ERROR TRAPS TO LOC 4
 93
 94             016370  011667  011252          HDER:   MOV     (SP),TEMP       ;SAVE STACK FOR ADDR OF TRAP
 95             016374  012706  002000                  MOV     #ISP,SP         ;RENEW STACK BEFORE USING
 96             016400                                  PNTM    TRP4            ;PRINT "TRAPPED TO 4 FROM LOC "
                016400  012700  021533                  MOV     #TRP4,R0        ;PRINT MESSAGE
                016404  004767  000662                  JSR     PC,TYPOUT       ;POINTED TO BY TRP4
 97             016410  162767  000002  011230          SUB     #2,TEMP
 98             016416  016700  011224                  MOV     TEMP,R0
 99             016422  004767  001670                  JSR     PC,OCTPNT       ;PRINT SOURCE OF TRAP
100             016426  004767  002046                  JSR     PC,NULLS
101             016432  012706  002000                  MOV     #ISP,SP         ;REFRESH STACK POINTER
102             016436  000167  164052                  JMP     RESTRT
103
104
105                                             ;ERROR ROUTINES: REGULAR ERRORS AND DATA ERRORS.
106
107
108             016442  011667  000140          ERR:    MOV     (SP),ERRAD      ;GET ADDRESS OF ERROR CALL
109             016446  162767  000026  000132          SUB     #26,ERRAD       ;CORRECT IT
```

```
                                ERR1:   MOV     R0,-(SP)        ;STACK ERROR MSG ADDR
                                        PNTM    ERRM            ;PRINT "**ERROR "
016456  012700  016616                  MOV     #ERRM,R0        ;PRINT MESSAGE
016462  004767  000604                  JSR     PC,TYPOUT       ;POINTED TO BY ERRM
016466  016700  000116                  MOV     ERRNUM,R0
016472  004767  001620                  JSR     PC,OCTPNT       ;PRINT ERROR NO. (P)
016476                                  PNTM    WDAT            ;PRINT " AT LOC. "
016476  012700  016631                  MOV     #WDAT,R0        ;PRINT MESSAGE
016502  004767  000564                  JSR     PC,TYPOUT       ;POINTED TO BY WDAT
016506  016700  000074                  MOV     ERRAD,R0
016512  004767  001600                  JSR     PC,OCTPNT       ;PRINT ADDRESS OF ERROR
016516  012600                          MOV     (SP)+,R0        ;GET ADDR OF ERROR MSG
016520  004767  000546                  JSR     PC,TYPOUT       ;PRINT ERR MSG
016524  000207                          RTS     PC              ;RETURN

016526  011667  000054          DERR:   MOV     (SP),ERRAD      ;GET ADDRESS OF ERROR CALL
016532  162767  000026  000046          SUB     #26,ERRAD       ;CORRECT IT
016540  004767  177710                  JSR     PC,ERR1         ;PRINT REG. ERROR MSG
016544                                  PNTM    WDSDB           ;PRINT "SHOULD BE "
016544  012700  016643                  MOV     #WDSDB,R0       ;PRINT MESSAGE
016550  004767  000516                  JSR     PC,TYPOUT       ;POINTED TO BY WDSDB
016554  016700  000032                  MOV     GOOD,R0
016560  004767  001532                  JSR     PC,OCTPNT       ;PRINT GOOD DATA
016564                                  PNTM    WDWAS           ;PRINT ", WAS "
016564  012700  016657                  MOV     #WDWAS,R0       ;PRINT MESSAGE
016570  004767  000476                  JSR     PC,TYPOUT       ;POINTED TO BY WDWAS
016574  016700  000014                  MOV     BAD,R0
016600  004767  001512                  JSR     PC,OCTPNT       ;PRINT BAD DATA
016604  000207                          RTS     PC              ;RETURN


                                ;RELATED STORAGE:

016606  000000                  ERRAD:  .WORD   0
016610  000000                  ERRNUM: .WORD   0
016612  000000                  GOOD:   .WORD   0
016614  000000                  BAD:    .WORD   0

                                ;ASSOCIATED ASCII  (ONLY SOME OF IT)

016616    046     046     052   ERRM:   .ASCII  /&&**ERROR @/
016621    052     105     122
016624    122     117     122
016627    040     100
016631    040     101     124   WDAT:   .ASCII  / AT LOC. @/
016634    040     114     117
016637    103     056     040
016642    100
016643    046     123     110   WDSDB:  .ASCII  /&SHOULD BE @/
016646    117     125     114
016651    104     040     102
016654    105     040     100
016657    054     040     127   WDWAS:  .ASCII  /, WAS @/
016662    101     123     040
016665    100
```

```
148                                     .EVEN
```

```
                        .SBTTL  'SWITCH' MONITOR ROUTINE

                ;ENTER AT MONIT FROM EVERY SUB-TEST TO SEE IF CNTRL-G OR CNTRL-C WAS TYPED
                ;ENTER AT SWDMP FROM ERROR HALTS IF SW 15 = 0
                ;ALSO MONITORS THE FOLLOWING CONTROL FUNCTIONS:
                ;           P CONTINUE (PROCEED)
                ;       CNTRL-O GO TO CMR-11 DEBUG ROUTINE
                ;       CNTRL-A DUMP PORT CONFIG TABLES

016666  005000          MONIT:  CLR     R0
016670  105777  010770          TSTB    @KBS                    ;CHECK KEYBOARD FLAG
016674  100402                  BMI     MONIC                   ;IF SET, CHECK WHAT CHAR.
016676  000167  000264          JMP     EX6                     ;OTHERWISE, EXIT
016702  017700  010754  MONIC:  MOV     @KBD,R0
016706  042700  177600  MONCH:  BIC     #177600,R0              ;TRIM OFF PARITY BIT
016712  020027  000007          CMP     R0,#07                  ;WAS IT ^G?
016716  001056                  BNE     EX1                     ;NO, EXIT
016720                  SWDMP:  PNTM    SWRMSG                  ;PRINT 'SWR = ''
016720  012700  021575          MOV     #SWRMSG,R0              ;PRINT MESSAGE
016724  004767  000342          JSR     PC,TYPOUT               ;POINTED TO BY SWRMSG
016730  017700  010700          MOV     @SR,R0                  ;GET CONTENTS OF SR
016734  004767  001356          JSR     PC,OCTPNT               ;PRINT IT
016740                          PNTM    TWOSP                   ;SPACE AND PROMPT (:)
016740  012700  021571          MOV     #TWOSP,R0               ;PRINT MESSAGE
016744  004767  000322          JSR     PC,TYPOUT               ;POINTED TO BY TWOSP
016750  017767  010660  001262  MOV     @SR,KBBUF               ;LOAD OLD SWITCHES
016756  012767  016720  010622  MOV     #SWDMP,PCONT            ;LOAD RETURN ADDRESS
016764  004767  000344          JSR     PC,INPKB                ;GET KBD INPUT
016770  005067  010612          CLR     PCONT
016774  016777  001240  010632  MOV     KBBUF,@SR               ;LOAD NEW SWITCHES
017002                  CCRTN:  PNTM    TYPCTP                  ;PRINT 'P TO CONTINUE''
017002  012700  021650          MOV     #TYPCTP,R0              ;PRINT MESSAGE
017006  004767  000260          JSR     PC,TYPOUT               ;POINTED TO BY TYPCTP
017012  105777  010646  CONTW1: TSTB    @KBS
017016  100375                  BPL     CONTW1
017020  017700  010636          MOV     @KBD,R0
017024  042700  177600          BIC     #177600,R0              ;TRIM OFF PARITY BIT
017030  020027  000007          CMP     R0,#07                  ;^G?
017034  001731                  BEQ     SWDMP                   ;YES, GET SWR AGAIN
017036  020027  000120          CMP     R0,#'P                  ;'P'?
017042  001363                  BNE     CONTW1                  ;NO, KEEP LOOKING
017044  012700  000015          MOV     #15,R0                  ;RETURN LINE
017050  004767  001546          JSR     PC,TTO
017054  020027  000024  EX1:    CMP     R0,#24                  ;WAS A ^T TYPED?
017060  001004                  BNE     EX2                     ;NO, EXIT
017062  012706  002000          MOV     #ISP,SP                 ;YES,  RENEW STACK
017066  000167  163572          JMP     BCONT                   ;BACK TO DISPATCHER
017072  020027  000017  EX2:    CMP     R0,#17                  ;WAS CNTRL-O TYPED?
017076  001002                  BNE     EX3                     ;NO
017100  000167  176306          JMP     ODTPR                   ;AND GO TO DEBUG ROUTINE

017104  020027  000003  EX3:    CMP     R0,#3                   ;WAS CNTRL-C TYPED?
017110  001004                  BNE     EX4                     ;NO,
017112  012706  002000          MOV     #ISP,SP                 ;YES, REFRESH STACK
017116  000167  163542          JMP     BCONT                   ;AND RESTART
017122  020027  000006  EX4:    CMP     R0,#6                   ;WAS IT ^F?
```

```
                                        BNE     EX5                     ;NO, EXIT
                                        TSTB    DBFLG                   ;IS DEBUG FLAG SET?
                                        BNE     EX5                     ;YES, JUST RETURN
                                        TSTB    SAFE                    ;ALREADY IN FILL RTN?
                                        BNE     EX5                     ;YES, JUST RETURN
                                        CLR     PCONT                   ;CLEAR PROMPT CARRIER
                                        JSR     PC,KBRET                ;SNEAK INTO FILL COUNT ROUTINE
                                EX5:    CMP     R0,#1                   ;WAS ^A TYPED?
                                        BNE     EX6                     ;NOPE, BYE!
                                        JSR     PC,PNTCNF               ;YES, PRINT PORT CONFIG
                                EX6:    RTS     PC

                                ;ROUTINE TO PRINT ELAPSED TIME SINCE START-UP OR CNTRL-C

                                PRNTIM: PNTM    ELTIM                   ;PRINT 'EL. TIM. ''
                                        MOV     #ELTIM,R0               ;PRINT MESSAGE
                                        JSR     PC,TYPOUT               ;POINTED TO BY ELTIM
                                        MOVB    HOURS,R0                ;GET HOURS
                                        JSR     PC,DECPNT               ;PRINT IN DECIMAL
                                        MOV     #':,R0
                                        JSR     PC,TTO                  ;PRINT '':''
                                        MOVB    MINS,R0                 ;GET MINUTES
                                        JSR     PC,DECPNT               ;PRINT IN DECIMAL
                                        MOV     #':,R0
                                        JSR     PC,TTO                  ;ANOTHER '':''
                                        MOVB    SECS,R0                 ;GET SECS
                                        JSR     PC,DECPNT               ;PRINT IN DECIMAL
                                        MOV     #':,R0
                                        JSR     PC,TTO                  ;ANOTHER '':''
                                        MOVB    TICKS,R0                ;GET TICKS (1/60 SEC)
                                        JSR     PC,DECPNT               ;PRINT IN DECIMAL
                                        RTS     PC                      ;RETURN
```

```
                                .SBTTL  MESSAGE PRINT ROUTINE

                               ;MESSAGE TYPOUT ROUTINE (CALLED BY MACRO PNTM A)
                               ;MESSAGES ARE IN THE FORMAT:
                               ;    MESG:     .ASCII     /&MESSAGE@a/
                               ;
                               ;WHERE: & IS TRANSLATED INTO CR. AND LF.
                               ;
                               ;USES THE SUBROUTINE 'TTO'
                               ;WHICH PRINTS CR. & LF. UPON SEEING A CR. CODE.
                               ;AND    @ IS MESSAGE TERMINATOR
                               ;
                               ;ENTER WITH ADDRESS OF MESSAGE IN R0

017272  010046                 TYPOUT: MOV     R0,-(SP)            ;STACK ADDRESS OF MESSAGE
017274  117600  000000         TPOFCH: MOVB    @(SP),R0            ;FETCH ASCII BYTE
017300  022700  000100                 CMP     #100,R0             ;IS IT @ (TERMINATOR)?
017304  001411                         BEQ     TPOUTX              ;YES-EXIT
017306  022700  000046                 CMP     #46,R0              ;IS IT CRLF FLAG?
017312  001002                         BNE     TPCONT              ;NO-TYPE CHARACTER
017314  012700  000015                 MOV     #15,R0              ;YES, CHANGE DATA TO CR
017320  004767  001276         TPCONT: JSR     PC,TTO              ;TYPE IT
017324  005216                         INC     (SP)                ;MOVE POINTER TO NEXT BYTE
017326  000762                         BR      TPOFCH              ;FETCH NEXT CHARACTER
017330  005726                 TPOUTX: TST     (SP)+               ;POP STACK TO REACH RETURN VECTOR
017332  000207                         RTS     PC

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```
                                .SBTTL  KEYBOARD INPUT ROUTINE

                        ;KEYBOARD INPUT ROUTINE CALLED BY JSR   PC,INPKB
                        ;ENTERED WITH OLD CONTENTS IN KBBUF
                        ;IF JUST CR TYPED, EXIT WITH SAME CONTENTS IN KBBUF
                        ;IF NEW NUMBER TYPED, EXIT WITH NEW CONTENTS IN KBBUF

017334  005067  000676  INPKB:  CLR     NOKEFL          ;CLEAR NO NUMBER FLAG
017340  010146                  MOV     R1,-(SP)        ;STACK OLD R1
017342  016746  000672          MOV     KBBUF,-(SP)     ;STACK 'OLD CONTENTS'
017346  005067  000666          CLR     KBBUF           ;CLEAR INPUT BUFFER
017352  004767  000216  GETCHR: JSR     PC,KBRD         ;FETCH A CHARACTER IN R0
017356  004767  001240          JSR     PC,TTO          ;ECHO IT
017362  020027  000012          CMP     R0,#12          ;WAS IT A CR OR LF?
017366  001002                  BNE     1$              ;NO
017370  000167  000154          JMP     NRTRN           ;YES, RETURN WITH PROPER KBBUF
017374  010001          1$:     MOV     R0,R1           ;SET UP TO CHECK FOR A NUMBER
017376  042701  177407          BIC     #177407,R1      ;MASK ALL BUT # CODE
017402  020127  000060          CMP     R1,#60          ;IS IT A # FROM 0-7?
017406  001441                  BEQ     3$              ;YES, PACK IT
017410  020027  000177          CMP     R0,#177         ;WAS IT A DELETE/RUBOUT?
017414  001024                  BNE     2$              ;NO, MUST BE GARBAGE
017416  012700  000057          MOV     #57,R0          ;YES, BUT PRINT '\'
017422  004767  001174          JSR     PC,TTO
017426  000241                  CLC                     ;CLEAR THE C-BIT
017430  006067  000604          ROR     KBBUF           ;DELETE LAST DIGIT
017434  000241                  CLC
017436  006067  000576          ROR     KBBUF           ;  THAT WAS STUFFED
017442  000241                  CLC
017444  006067  000570          ROR     KBBUF           ;  INTO KBBUF
017450  005767  000564          TST     KBBUF           ;HAVE WE DELETED EVERYTHING?
017454  001002                  BNE     11$             ;NO
017456  005067  000554          CLR     NOKEFL          ;YES, BACK TO NO NUMBER INPUT
017462  000167  177664  11$:    JMP     GETCHR          ;GO FOR MORE INPUT
017466  012700  000207  2$:     MOV     #207,R0         ;ECHO 'BELL' FOR ERRONEOUS INPUT
017472  004767  001124          JSR     PC,TTO
017476  012700  000077          MOV     #77,R0          ;THEN '?'
017502  004767  001114          JSR     PC,TTO
017506  000167  177640          JMP     GETCHR          ;AND GET ANOTHER CHARACTER
017512  012767  177777  000516  3$:     MOV     #-1,NOKEFL      ;GOT A DIGIT, SET FLAG
017520  042700  177770          BIC     #177770,R0      ;GET THE DIGIT PART OF THE CHARACTER
017524  006367  000510          ASL     KBBUF           ;SHIFT KBBUF BUFFER
017530  006367  000504          ASL     KBBUF           ;  TO ACCEPT THE
017534  006367  000500          ASL     KBBUF           ;  NEW DIGIT.
017540  050067  000474          BIS     R0,KBBUF        ;ADD THE NEW DIGIT
017544  000167  177602          JMP     GETCHR          ;GO FOR MORE INPUT

017550  005767  000462  NRTRN:  TST     NOKEFL          ;WAS THERE NEW DATA?
017554  001004                  BNE     NEK             ;YES, GO BACK WITH IT
017556  012667  000456          MOV     (SP)+,KBBUF     ;NO, RETRIEVE OLD DATA
017562  012601                  MOV     (SP)+,R1        ;RESTORE R1
017564  000207                  RTS     PC              ;AND RETURN
017566  005726          NEK:    TST     (SP)+           ;DUMP OLD DATA
017570  012601                  MOV     (SP)+,R1        ;RESTORE R1
017572  000207                  RTS     PC              ;AND RETURN
```

```
                                ;KEYBOARD READ ROUTINE
                                ;CHECKS FOR THE FOLLOWING SPECIAL CHARACTERS:
                                ;       CNTRL-C         RESTART PROG.
                                ;       CNTRL-F         CHANGE/SHOW FILL COUNT
                                ;       CNTRL-A         PRINT PORT CONFIGURATION
                                ;                       STATUS IF AVAILABLE.
                                ;       CNTRL-O         ENTER 'DE-BUG' ROUTINE
                                ;                       UNLESS ALREADY THERE
                                ;                       OR UNLESS IN INITIAL DIALOGUE.
                                ; IF IN 'DE-BUG' ROUTINE:
                                ;       <CR>            CLOSE LOCATION
                                ;       <LF>            CLOSE LOC. AND OPEN NEXT
                                ;       '/'             OPEN LOCATION
                                ;       'G'             SET START FUNC OR MAINT
                                ;       'P'             RETURN AND CONTINUE

017574  105777  010064       KBRD:   TSTB    @KBS                    ;WAIT FOR INPUT FROM CONSOLE
017600  100375                       BPL     KBRD
017602  017700  010054               MOV     @KBD,R0                 ;PUT THE CHAR INTO R0
017606  105067  007725       KBRET:  CLRB    INCF                    ;CLEAR FLAGS
017612  105067  007717               CLRB    GOFLG
017616  105067  007725               CLRB    SLFL
017622  105067  007704               CLRB    CONFLG
017626  042700  177600               BIC     #177600,R0              ;TRIM PARITY
017632  020027  000003               CMP     R0,#3                   ;WAS ^C TYPED?
017636  001004                       BNE     1$                      ;YES, RESTART PROGRAM
017640  012706  002000               MOV     #ISP,SP
017644  000167  163014               JMP     BCONT
017650  105767  007660       1$:     TSTB    DBFLG                   ;DON'T ALLOW ^F IN 'DEBUG'
017654  001060                       BNE     4$
017656  020027  000006               CMP     R0,#6                   ;WAS CNTRL-F TYPED?
017662  001055                       BNE     4$                      ;NO
017664  105767  007655       2$:     TSTB    SAFE                    ;ALREADY IN FILL CNT RTN?
017670  001401                       BEQ     20$                     ;NO, SAFE TO ENTER
017672  000560                       BR      KRTN                    ;YES, IGNORE CHARACTER
017674                       20$:    PNTM    FILMSG                  ;PRINT 'FILL COUNT = '
017674  012700  020246               MOV     #FILMSG,R0              ;PRINT MESSAGE
017700  004767  177366               JSR     PC,TYPOUT               ;POINTED TO BY FILMSG
017704  112767  177777  007633       MOVB    #-1,SAFE                ;SET FLAG
017712  016700  000324               MOV     FILL,R0
017716  004767  000374               JSR     PC,OCTPNT               ;SHOW FILL COUNT
017722                               PNTM    TWOSP                   ;SPACE AND PROMPT
017722  012700  021571               MOV     #TWOSP,R0               ;PRINT MESSAGE
017726  004767  177340               JSR     PC,TYPOUT               ;POINTED TO BY TWOSP
017732  016767  000304  000300       MOV     FILL,KBBUF
017740  004767  177370               JSR     PC,INPKB                ;GET NEW COUNT
017744  026727  000270  000500       CMP     KBBUF,#500              ;TOO BIG?
017752  101406                       BLOS    3$
017754                               PNTM    AGAIN                   ;NO GOOD, GET IT AGAIN
017754  012700  021324               MOV     #AGAIN,R0               ;PRINT MESSAGE
017760  004767  177306               JSR     PC,TYPOUT               ;POINTED TO BY AGAIN
017764  000167  177704               JMP     20$
017770  016767  000244  000244 3$:   MOV     KBBUF,FILL              ;LOAD NEW COUNT
017776  005767  007604       30$:    TST     PCONT                   ;RETURNING TO A PROMPT?
020002  001514                       BEQ     KRTN                    ;NO, CLEAN RETURN
020004  062706  000006               ADD     #6,SP                   ;YES, BREAK UP WITH INPKB
020010  016716  007572               MOV     PCONT,(SP)              ;MODIFY RETURN ADDR
```

```
020014  000507                          BR      KRTN
020016  020027  000001          4$:     CMP     R0,#1                   ;^A TYPED?
020022  001012                          BNE     40$                     ;NO, SKIP
020024  105767  007515                  TSTB    SAFE                    ;IN FILL COUNT ROUTINE?
020030  001101                          BNE     KRTN                    ;IF YES, JUST EXIT.
020032  004767  000230                  JSR     PC,PNTCNF               ;YES, GO PRINT TABLES
020036  105767  007472                  TSTB    DBFLG                   ;IN DEBUG??
020042  001074                          BNE     KRTN                    ;IF YES, NORMAL RETURN
020044  000167  177726                  JMP     30$                     ;RE-PRINT ANY PROMPTS
020050  105767  007460          40$:    TSTB    DBFLG                   ;IS 'DEBUG'' FLAG SET?
020054  001021                          BNE     6$                      ;YES, CHECK FOR OTHER FLAGS
020056  020027  000017                  CMP     R0,#17                  ;CNTRL-O TYPED?
020062  001064                          BNE     KRTN                    ;NO, EXIT
020064  005767  007516                  TST     PCONT                   ;TEST IF ODT IS ALLOWED
020070  001404                          BEQ     5$                      ;YES, IF PCONT = 0 OR
020072  026727  007510  002372          CMP     PCONT,#PRMT4            ;  IF GREATER THAN PRIORITY
020100  103407                          BLO     6$                      ;  PROMPT.
020102  105767  007437          5$:     TSTB    SAFE                    ;ALSO, NOT WHILE IN FILL
020106  001052                          BNE     KRTN                    ;  COUNT ROUTINE.
020110  062706  000006                  ADD     #6,SP                   ;BREAK ALL TIES WITH ''INFKB''
020114  000167  175272                  JMP     ODTPR                   ;A-O.K. GO TO DEBUG-AID
020120  020027  000012          6$:     CMP     R0,#12                  ;CHECK FOR L.F.
020124  001007                          BNE     7$                      ;NOT A LINE FEED.
020126  012700  000015                  MOV     #15,R0                  ;CHANGE L.F. TO  C.R.
020132  112767  177777  007377          MOVB    #-1,INCF                ;IT WAS, SET INCR FLAG
020140  000167  000070                  JMP     KRTN                    ;AND LEAVE
020144  020027  000057          7$:     CMP     R0,#'/                  ;WAS IT A SLASH?
020150  001007                          BNE     8$                      ;NO.
020152  112767  177777  007367          MOVB    #-1,SLFL                ;YES, SET SLASH FLAG
020160  004767  000436                  JSR     PC,TTO                  ;ECHO THE SLASH
020164  012716  017550                  MOV     #NRTRN,(SP)             ;AND EXIT.
020170  020027  000107          8$:     CMP     R0,#'G                  ;WAS 'G'' TYPED?
020174  001007                          BNE     9$                      ;NO.
020176  112767  177777  007331          MOVB    #-1,GOFLG               ;YES, SET 'GO'' FLAG
020204  004767  000412                  JSR     PC,TTO                  ;ECHO THE 'G''
020210  012716  017550                  MOV     #NRTRN,(SP)
020214  020027  000120          9$:     CMP     R0,#'P                  ;WAS 'P'' TYPED?
020220  001005                          BNE     KRTN                    ;NO, EXIT
020222  112767  177777  007302          MOVB    #-1,CONFLG              ;YES, SET 'CONTINUE'' FLAG
020230  012716  017550                  MOV     #NRTRN,(SP)
020234  000207                  KRTN:   RTS     PC



                                ;ASSOCIATED VARIABLE STORAGE:

020236  000000                  NOKEFL: .WORD   0
020240  000000                  KBBUF:  .WORD   0
020242  000010                  FILL:   .WORD   10
020244  000000                  FLCNT:  .WORD   0
020246     046     106     111  FILMSG: .ASCII  /&FILL COUNT = @/
020251     114     114     040
020254     103     117     125
020257     116     124     040
020262     075     040     100
                                        .EVEN
```

```
                                        ;ROUTINE WHICH CHECKS AVAILABILITY OF THE PORT CONFIGURATION
                                        ;STATUS THEN PRINTS THE STATUS, OR PRINTS
                                        ;''** STATUS NOT AVAILABLE **''
                                        
020266  105767  007241          PNTCNF: TSTB    CNFGFL                  ;CHECK IF CONFIG IS AVAILABLE
020272  001404                          BEQ     PNTCO                   ;IF NOT, SAY SO.
020274  004767  174074                  JSR     PC,REPORT               ;IF SO, DUMP IT.
020300  000167  000010                  JMP     PNTCX                   ;AND LEAVE
020304                          PNTCO:  PNTM    NOCNF                   ;PRINT ''** STATUS NOT AVAILABLE **''
020304  012700  021605                  MOV     #NOCNF,R0               ;PRINT MESSAGE
020310  004767  176756                  JSR     PC,TYPOUT               ;POINTED TO BY NOCNF
020314  000207                  PNTCX:  RTS     PC                      ;RETURN
```

```
                                        .SBTTL BINARY TO ASCII CONVERSION ROUTINES

                                ;CONVERTS BINARY TO BINARY, BINARY TO
                                ;OCTAL, AND BINARY TO DECIMAL; EITHER
                                ;UNJUSTIFIED WITH LEADING ZERO'S SUPPRESSED
                                ;OR RIGHT JUSTIFIED WITH LEADING 0'S
                                ;SUPPRESSED


                                ;REGILAR BIN-OCTAL UNJUSTIFIED:

020316                          OCTPNT: REGSAV.
020316  004567  175546                  JSR     R5,REGSAV
020322  005067  000360                  CLR     RJFLG                   ;CLEAR RIGHT JUSTIFY FLAG
020326  012701  000010                  MOV     #10,R1                  ;SET RADIX FOR OCTAL
020332  004767  000156                  JSR     PC,NUMPNT               ;CONVERT & PRINT
020336                                  REGRES
020336  004567  175542                  JSR     R5,REGRES
020342  000207                          RTS     PC                      ;RETURN


                                ;BIN-OCTAL JUSTIFIED:

020344                          OCTJSP: REGSAV
020344  004567  175520                  JSR     R5,REGSAV
020350  012767  177777  000330        MOV     #-1,RJFLG               ;SET RIGHT JUSTIFY FLAG
020356  012701  000010                  MOV     #10,R1                  ;SET RADIX FOR OCTAL
020362  004767  000126                  JSR     PC,NUMPNT               ;CONVERT & PRINT
020366                                  REGRES
020366  004567  175512                  JSR     R5,REGRES
020372  000207                          RTS     PC


                                ;BIN-BIN

020374                          BINPNT: REGSAV
020374  004567  175470                  JSR     R5,REGSAV
020400  005067  000302                  CLR     RJFLG                   ;CLEAR RIGHT JUSTIFY FLAG
020404  012701  000002                  MOV     #2,R1                   ;SET RADIX FOR BINARY
020410  004767  000100                  JSR     PC,NUMPNT               ;CONVERT & PRINT
020414                                  REGRES
020414  004567  175464                  JSR     R5,REGRES
020420  000207                          RTS     PC


                                ;BIN-DECIMAL UNJUSTIFIED:

020422                          DECPNT: REGSAV
020422  004567  175442                  JSR     R5,REGSAV
020426  005067  000254                  CLR     RJFLG                   ;CLEAR RIGHT JUSTIFY FLAG
020432  012701  000012                  MOV     #12,R1                  ;SET RADIX FOR DECIMAL
020436  004767  000052                  JSR     PC,NUMPNT               ;CONVERT & PRINT
020442                                  REGRES
020442  004567  175436                  JSR     R5,REGRES
020446  000207                          RTS     PC


                                ;BIN-DECIMAL JUSTIFIED (6 PLACES)

020450                          DECJSP: REGSAV
020450  004567  175414                  JSR     R5,REGSAV
```

```
     49 020454  012767  177777  000224          MOV     #-1,RJFLG               ;SET RIGHT JUSTIFY FLAG
     50 020462  012701  000012                  MOV     #12,R1                  ;SET RADIX FOR DECIMAL
     51 020466  004767  000022                  JSR     PC,NUMPNT               ;CONVERT & PRINT
     52 020472                                  REGRES
        020472  004567  175406                  JSR     R5,REGRES
     53 020476  000207                          RTS     PC
     54
     55
     56 020500  005000                  NULLS:  CLR     R0
     57 020502  004767  000114                  JSR     PC,TTO
     58 020506  004767  000110                  JSR     PC,TTO
     59 020512  000207                NULOUT: RTS     PC
```

```
                                        ;UNSIGNED CONVERT-PRINT ROUTINE (BIN - ASCII)

020514  010167  000170        NUMPNT: MOV     R1,RADIX        ;SAVE RADIX
020520  005002                        CLR     R2              ;CLEAR TAB COUNTER
020522  005001                DIVSET: CLR     R1              ;CLEAR WORK REGISTER
020524  020067  000160        DIVID:  CMP     R0,RADIX        ;IS NUMBER BELOW RADIX?
020530  103404                        BLO     GETDG           ;IF YES, STORE DIGIT
020532  166700  000152                SUB     RADIX,R0        ;ELSE, KEEP SUBTRACTING
020536  005201                        INC     R1              ;AND KEEP COUNT
020540  000771                        BR      DIVID
020542  010046                GETDG:  MOV     R0,-(SP)        ;STACK REMAINDER
020544  010100                        MOV     R1,R0
020546  001403                        BEQ     PNTEXT          ;PRINT IF HIGHEST ORDER STACKED
020550  005202                        INC     R2              ;ELSE COUNT DIGITS FOR R. JUSTIFY
020552  004767  177744                JSR     PC,DIVSET

020556  012703  000006        PNTEXT: MOV     #6,R3           ;GET DIGIT COUNT CONSTANT
020562  160203                        SUB     R2,R3           ;HAVE WE PRODUCED 6 DIGITS?
020564  003413                        BLE     PNT             ;YES, JUSTIFICATION UNNECESSARY
020566  005767  000114                TST     RJFLG           ;IS THE JUSTIFY FLAG SET?
020572  001410                        BEQ     PNT             ;NO-DON'T JUSTIFY
020574  012700  000040        JUST:   MOV     #40,R0          ;YES, PRINT LEADING SPACES
020600  004767  000016                JSR     PC,TTO
020604  005303                        DEC     R3
020606  001372                        BNE     JUST
020610  005067  000072                CLR     RJFLG           ;CLEAR JUSTIFY FLG WHEN DONE
020614  012600                PNT:    MOV     (SP)+,R0        ;GET REST OF DIGITS OFF STACK
020616  052700  000060                BIS     #'0,R0          ;MAKE THEM ASCII
                                ;TYPE OUT ROUTINE
                                ;PRINTS A CHARACTER WHICH IS IN R0
                                ;IF THE CHARACTER IS 'CR.', ALSO PRINT A 'LF.'.


020622  010077  007042          TTO:    MOV     R0,@TTB         ;PRINT CONTENTS OF R0
020626  105777  007040          TTOLP:  TSTB    @TTS            ;WAIT TILL PRINT DONE
020632  100375                          BPL     TTOLP
020634  022700  000015                  CMP     #15,R0          ;WAS IT A CR?
020640  001401                          BEQ     TTOLF           ;YES, ECHO A LF AS WELL
020642  000207                          RTS     PC              ;NO, JUST RETURN
020644  012700  000012          TTOLF:  MOV     #12,R0
020650  004767  177746                  JSR     PC,TTO          ;ECHO A LINE FEED
020654  016767  177362  177362        MOV     FILL,FLCNT      ;PRINT NULLS FOR FILL
020662  012700  000000                  MOV     #0,R0
020666  004767  177730          1$:     JSR     PC,TTO
020672  005367  177346                  DEC     FLCNT
020676  003373                          BGT     1$
020700  012700  000012                  MOV     #12,R0          ;THEN RESTORE R0
020704  000207                          RTS     PC              ;AND LEAVE


                                ;ASSOCIATED VARIABLE STORAGE:

020706  000000          RJFLG:  .WORD   0
020710  000000          RADIX:  .WORD   0
```

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                                .SBTTL CONSTANTS, VARIABLES & ACSII

                                ;ASCII MESSAGES:

020712  046  103  132  TSTHDR: .ASCII  /&CZCMJBO CMR(V)-11 HOST EXERCISER   28-NOV-80/
020715  103  115  112
020720  102  060  040
020723  103  115  122
020726  050  126  051
020731  055  061  061
020734  040  110  117
020737  123  124  040
020742  105  130  105
020745  122  103  111
020750  123  105  122
020753  040  040  040
020756  062  070  055
020761  116  117  126
020764  055  070  060
020767  046  046  040          .ASCII  /&&      *** CAUTION ***/
020772  040  040  040
020775  040  040  052
021000  052  052  040
021003  103  101  125
021006  124  111  117
021011  116  040  052
021014  052  052
021016  046  124  110          .ASCII  /&THIS PROGRAM IS CAPABLE OF ALTERING THE STATE/
021021  111  123  040
021024  120  122  117
021027  107  122  101
021032  115  040  111
021035  123  040  103
021040  101  120  101
021043  102  114  105
021046  040  117  106
021051  040  101  114
021054  124  105  122
021057  111  116  107
021062  040  124  110
021065  105  040  123
021070  124  101  124
021073  105
021074  046  117  106          .ASCII  /&OF ANY FIELD EQUIPMENT ATTACHED TO ANY OF THE/
021077  040  101  116
021102  131  040  106
021105  111  105  114
021110  104  040  105
021113  121  125  111
021116  120  115  105
021121  116  124  040
021124  101  124  124
021127  101  103  110
021132  105  104  040
021135  124  117  040
021140  101  116  131
```

```
                021143      040     117     106
                021146      040     124     110
                021151      105
     10         021152      046     122     105         .ASCII  /&REMOTES ON THIS CMR-11./
                021155      115     117     124
                021160      105     123     040
                021163      117     116     040
                021166      124     110     111
                021171      123     040     103
                021174      115     122     055
                021177      061     061     056
     11         021202      046     046     120         .ASCII  /&&PROCEED WITH CAUTION IF FIELD HARDWARE IS STILL ON-LINE!&&a/
                021205      122     117     103
                021210      105     105     104
                021213      040     127     111
                021216      124     110     040
                021221      103     101     125
                021224      124     111     117
                021227      116     040     111
                021232      106     040     106
                021235      111     105     114
                021240      104     040     110
                021243      101     122     104
                021246      127     101     122
                021251      105     040     111
                021254      123     040     123
                021257      124     111     114
                021262      114     040     117
                021265      116     055     114
                021270      111     116     105
                021273      041     046     046
                021276      100
     12         021277      046     111     116 FRAD:   .ASCII  /&INTERFACE ADDRESS: a/
                021302      124     105     122
                021305      106     101     103
                021310      105     040     101
                021313      104     104     122
                021316      105     123     123
                021321      072     040     100
     13         021324      046     124     110 AGAIN:  .ASCII  /&THAT WON'T DO. TRY AGAIN&a/
                021327      101     124     040
                021332      127     117     116
                021335      047     124     040
                021340      104     117     056
                021343      040     124     122
                021346      131     040     101
                021351      107     101     111
                021354      116     046     100
     14         021357      046     111     116 DVECT:  .ASCII  /&INTERFACE VECTOR: a/
                021362      124     105     122
                021365      106     101     103
                021370      105     040     126
                021373      105     103     124
                021376      117     122     072
                021401      040     100
     15         021403      046     111     116 DVPRIO: .ASCII  /&INTERFACE PRIORITY (4 TO 7): a/
                021406      124     105     122
```

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                021411  106     101     103
                021414  105     040     120
                021417  122     111     117
                021422  122     111     124
                021425  131     040     050
                021430  064     040     124
                021433  117     040     067
                021436  051     072     040
                021441  100
     16         021442  046     103     115     DBAID:  .ASCII  /&CMR-11 DE-BUG AID&&a/
                021445  122     055     061
                021450  061     040     104
                021453  105     055     102
                021456  125     107     040
                021461  101     111     104
                021464  046     046     100
     17         021467  046     111     116     INVLAD: .ASCII  /&INVALID ADDRESS...(IT'S NOT THERE)a/
                021472  126     101     114
                021475  111     104     040
                021500  101     104     104
                021503  122     105     123
                021506  123     056     056
                021511  056     050     111
                021514  124     047     123
                021517  040     116     117
                021522  124     040     124
                021525  110     105     122
                021530  105     051     100
     18         021533  046     046     124     TRP4:   .ASCII  /&&TRAPPED TO 4 FROM LOCATION a/
                021536  122     101     120
                021541  120     105     104
                021544  040     124     117
                021547  040     064     040
                021552  106     122     117
                021555  115     040     114
                021560  117     103     101
                021563  124     111     117
                021566  116     040     100
     19         021571  040     040     072     TWOSP:  .ASCII  /  :a/
                021574  100
     20         021575  046     123     127     SWRMSG: .ASCII  /&SWR = a/
                021600  122     040     075
                021603  040     100
     21         021605  046     052     052     NOCNF:  .ASCII  /&** CONFIGURATION NOT AVAILABLE **a/
                021610  040     103     117
                021613  116     106     111
                021616  107     125     122
                021621  101     124     111
                021624  117     116     040
                021627  116     117     124
                021632  040     101     126
                021635  101     111     114
                021640  101     102     114
                021643  105     040     052
                021646  052     100
     22         021650  046     124     131     TYPCTP: .ASCII  /&TYPE 'P' TO CONTINUEa/
                021653  120     105     040
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                021656  042     120     042
                021661  040     124     117
                021664  040     103     117
                021667  116     124     111
                021672  116     125     105
                021675  100
     23         021676  046     123     105     TSTSEL: .ASCII  /&SELECT TEST (4=HELP) @/
                021701  114     105     103
                021704  124     040     124
                021707  105     123     124
                021712  040     050     064
                021715  075     110     105
                021720  114     120     051
                021723  040     100
     24         021725  046     123     105     HELPM:  .ASCII  /&SELECT ONE OF THE FOLLOWING:&/
                021730  114     105     103
                021733  124     040     117
                021736  116     105     040
                021741  117     106     040
                021744  124     110     105
                021747  040     106     117
                021752  114     114     117
                021755  127     111     116
                021760  107     072     046
     25         021763  046     103     122             .ASCII  /&CR OR 1 = LOGIC TEST/
                021766  040     117     122
                021771  040     061     040
                021774  075     040     114
                021777  117     107     111
                022002  103     040     124
                022005  105     123     124
     26         022010  046     040     040             .ASCII  /&      2 = PORT LOOP-BACK TEST/
                022013  040     040     040
                022016  040     062     040
                022021  075     040     120
                022024  117     122     124
                022027  040     114     117
                022032  117     120     055
                022035  102     101     103
                022040  113     040     124
                022043  105     123     124
     27         022046  046     040     040             .ASCII  /&      3 = CMR-11 EXERCISER/
                022051  040     040     040
                022054  040     063     040
                022057  075     040     103
                022062  115     122     055
                022065  061     061     040
                022070  105     130     105
                022073  122     103     111
                022076  123     105     122
     28         022101  046     040     040             .ASCII  /&      4 = THIS HELP INFO./
                022104  040     040     040
                022107  040     064     040
                022112  075     040     124
                022115  110     111     123
                022120  040     110     105
                022123  114     120     040
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                022126  111     116     106
                022131  117     056
     29 022133  046     103     116             .ASCII  /&CNTRL-C = TEST SELECT/
                022136  124     122     114
                022141  055     103     040
                022144  075     040     124
                022147  105     123     124
                022152  040     123     105
                022155  114     105     103
                022160  124
     30 022161  046     103     116             .ASCII  /&CNTRL-G = SWITCH OPTION SELECT/
                022164  124     122     114
                022167  055     107     040
                022172  075     040     123
                022175  127     111     124
                022200  103     110     040
                022203  117     120     124
                022206  111     117     116
                022211  040     123     105
                022214  114     105     103
                022217  124
     31 022220  046     103     116             .ASCII  /&CNTRL-F = CONSOLE FILL COUNT SELECT/
                022223  124     122     114
                022226  055     106     040
                022231  075     040     103
                022234  117     116     123
                022237  117     114     105
                022242  040     106     111
                022245  114     114     040
                022250  103     117     125
                022253  116     124     040
                022256  123     105     114
                022261  105     103     124
     32 022264  046     103     116             .ASCII  /&CNTRL-A = SHOW PORT CONFIG. STATUS/
                022267  124     122     114
                022272  055     101     040
                022275  075     040     123
                022300  110     117     127
                022303  040     120     117
                022306  122     124     040
                022311  103     117     116
                022314  106     111     107
                022317  056     040     123
                022322  124     101     124
                022325  125     123
     33 022327  046     040     040             .ASCII  /&              (ONLY WORKS IF TABLE ALREADY/
                022332  040     040     040
                022335  040     040     040
                022340  040     040     050
                022343  117     116     114
                022346  131     040     127
                022351  117     122     113
                022354  123     040     111
                022357  106     040     124
                022362  101     102     114
                022365  105     040     101
                022370  114     122     105
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                022373  101     104     131
     34         022376  046     040     040             .ASCII  /&          PRINTED AUTOMATICALLY)./
                022401  040     040     040
                022404  040     040     040
                022407  040     040     120
                022412  122     111     116
                022415  124     105     104
                022420  040     101     125
                022423  124     117     115
                022426  101     124     111
                022431  103     101     114
                022434  114     131     051
                022437  056
     35         022440  046     103     116             .ASCII  /&CNTRL-O = DEBUG ROUTINE WHICH ALLOWS/
                022443  124     122     114
                022446  055     117     040
                022451  075     040     104
                022454  105     102     125
                022457  107     040     122
                022462  117     125     124
                022465  111     116     105
                022470  040     127     110
                022473  111     103     110
                022476  040     101     114
                022501  114     117     127
                022504  123
     36         022505  046     040     040             .ASCII  /&          LOADING SCR. PAD AND STARTING/
                022510  040     040     040
                022513  040     040     040
                022516  040     040     114
                022521  117     101     104
                022524  111     116     107
                022527  040     123     103
                022532  122     056     040
                022535  120     101     104
                022540  040     101     116
                022543  104     040     123
                022546  124     101     122
                022551  124     111     116
                022554  107
     37         022555  046     040     040             .ASCII  /&          FUNCTIONS AND EXAMINING THE/
                022560  040     040     040
                022563  040     040     040
                022566  040     040     106
                022571  125     116     103
                022574  124     111     117
                022577  116     123     040
                022602  101     116     104
                022605  040     105     130
                022610  101     115     111
                022613  116     111     116
                022616  107     040     124
                022621  110     105
     38         022623  046     040     040             .ASCII  /&          RESULTS/
                022626  040     040     040
                022631  040     040     040
                022634  040     040     122
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                022637  105     123     125
                022642  114     124     123
     39         022645  046     040     040             .ASCII  /&    'P'' = PROCEED FROM SW. MONITOR   @/
                022650  040     040     042
                022653  120     042     040
                022656  075     040     120
                022661  122     117     103
                022664  105     105     104
                022667  040     106     122
                022672  117     115     040
                022675  123     127     056
                022700  040     115     117
                022703  116     111     124
                022706  117     122     040
                022711  040     040     100
     40         022714  046     111     106     HLPDSR: .ASCII  /&IF HELP IS REQUIRED, ENTER A '%''   @/
                022717  040     110     105
                022722  114     120     040
                022725  111     123     040
                022730  122     105     121
                022733  125     111     122
                022736  105     104     054
                022741  040     105     116
                022744  124     105     122
                022747  040     101     040
                022752  042     064     042
                022755  040     040     040
                022760  100
     41         022761  046     114     117     LGKTSM: .ASCII  /&LOGIC TEST&@/
                022764  107     111     103
                022767  040     124     105
                022772  123     124     046
                022775  100
     42         022776  046     123     103     SCPAD:  .ASCII  /&SCR.PAD ADDR = @/
                023001  122     056     120
                023004  101     104     040
                023007  101     104     104
                023012  122     040     075
                023015  040     100
     43         023017  046     046     110     VERSM:  .ASCII  /&&HOST FIRMWARE VERSION : @/
                023022  117     123     124
                023025  040     106     111
                023030  122     115     127
                023033  101     122     105
                023036  040     126     105
                023041  122     123     111
                023044  117     116     040
                023047  072     040     100
     44         023052  046     046     102     BAUDM:  .ASCII  /&&BAUD RATES:@/
                023055  101     125     104
                023060  040     122     101
                023063  124     105     123
                023066  072     100
     45         023070  046     120     117     PORTOM: .ASCII  /&PORT #0 = @/
                023073  122     124     040
                023076  043     060     040
                023101  075     040     100
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 46 023104      046      120      117   PORT1M: .ASCII  /&PORT #1 = @/
    023107      122      124      040
    023112      043      061      040
    023115      075      040      100
 47 023120      046      120      117   PORT2M: .ASCII  /&PORT #2 = @/
    023123      122      124      040
    023126      043      062      040
    023131      075      040      100
 48 023134      046      120      117   PORT3M: .ASCII  /&PORT #3 = @/
    023137      122      124      040
    023142      043      063      040
    023145      075      040      100
 49 023150      046      105      116   ENDPS:  .ASCII  /&END PASS #@/
    023153      104      040      120
    023156      101      123      123
    023161      040      043      100
 50 023164      040      105      114   ELTIM:  .ASCII  / EL. TIM.=@/
    023167      056      040      124
    023172      111      115      056
    023175      075      100
 51 023177      040      040      105   ERCTM:  .ASCII  /  ERR. CNT = @/
    023202      122      122      056
    023205      040      103      116
    023210      124      040      075
    023213      040      100
 52 023215      052      052      117   OVFLM:  .ASCII  /**OVERFLOW**@/
    023220      126      105      122
    023223      106      114      117
    023226      127      052      052
    023231      100
 53 023232      046      120      117   PLTM:   .ASCII  /&PORT LOOP-BACK TEST&@/
    023235      122      124      040
    023240      114      117      117
    023243      120      055      102
    023246      101      103      113
    023251      040      124      105
    023254      123      124      046
    023257      100
 54 023260      046      124      131   PORTN:  .ASCII  /&TYPE PORT # (<CR>=ALL): @/
    023263      120      105      040
    023266      120      117      122
    023271      124      040      043
    023274      040      050      074
    023277      103      122      076
    023302      075      101      114
    023305      114      051      072
    023310      040      100
 55 023312      046      124      131   TYPCR:  .ASCII  /&TYPE <CR> WHEN READY: @/
    023315      120      105      040
    023320      074      103      122
    023323      076      040      127
    023326      110      105      116
    023331      040      122      105
    023334      101      104      131
    023337      072      040      100
 56 023342      046      103      115   EXCM:   .ASCII  /&CMR EXERCISE ROUTINE&/
    023345      122      040      105
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                023350  130     105     122
                023353  103     111     123
                023356  105     040     122
                023361  117     125     124
                023364  111     116     105
                023367  046
     57         023370  046     050     107             .ASCII  /&(GIVE ME A FEW MINUTES ALONE WITH THE REMOTES)@/
                023373  111     126     105
                023376  040     115     105
                023401  040     101     040
                023404  106     105     127
                023407  040     115     111
                023412  116     125     124
                023415  105     123     040
                023420  101     114     117
                023423  116     105     040
                023426  127     111     124
                023431  110     040     124
                023434  110     105     040
                023437  122     105     115
                023442  117     124     105
                023445  123     051     100
     58         023450  046     052     052     NOREM:  .ASCII  /&*** NO REMOTES ON HOST ***&/
                023453  052     040     116
                023456  117     040     122
                023461  105     115     117
                023464  124     105     123
                023467  040     117     116
                023472  040     110     117
                023475  123     124     040
                023500  052     052     052
                023503  046
     59         023504  046     050     040             .ASCII  /&( I WILL KEEP LOOKING FOR ANY CHANGES )&a/
                023507  111     040     127
                023512  111     114     114
                023515  040     113     105
                023520  105     120     040
                023523  114     117     117
                023526  113     111     116
                023531  107     040     106
                023534  117     122     040
                023537  101     116     131
                023542  040     103     110
                023545  101     116     107
                023550  105     123     040
                023553  051     046     100
     60         023556  046     120     117     PORTMS: .ASCII  /&PORT #a/
                023561  122     124     040
                023564  043     100
     61         023566  046     122     105     REMSG:  .ASCII  /&REMOTE #a/
                023571  115     117     124
                023574  105     040     043
                023577  100
     62         023600  046     040     052     CONFMS: .ASCII  /& ** PORT CONFIGURATION **&a/
                023603  052     040     120
                023606  117     122     124
                023611  040     103     117
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        023614  116     106     111
        023617  107     125     122
        023622  101     124     111
        023625  117     116     040
        023630  052     052     046
        023633  100
    63  023634  046     123     124     STATEM: .ASCII  /&STATE = @/
        023637  101     124     105
        023642  040     075     040
        023645  100
    64  023646  046     125     123     USORM:  .ASCII  /&USOR = @/
        023651  117     122     040
        023654  075     040     100
    65  023657  046     052     052     REMCHG: .ASCII  /&*** REMOTE STATUS CHANGE ***@/
        023662  052     040     122
        023665  105     115     117
        023670  124     105     040
        023673  123     124     101
        023676  124     125     123
        023701  040     103     110
        023704  101     116     107
        023707  105     040     052
        023712  052     052     100
    66  023715  046     122     105     REMSTM: .ASCII  /&REMOTE STATUS NOW @/
        023720  115     117     124
        023723  105     040     123
        023726  124     101     124
        023731  125     123     040
        023734  116     117     127
        023737  040     100
    67  023741  040     122     105     REGMG:  .ASCII  / REGULAR@/
        023744  107     125     114
        023747  101     122     100
    68  023752  040     111     122     IRRGMG: .ASCII  / IRREGULAR@/
        023755  122     105     107
        023760  125     114     101
        023763  122     100
    69  023765  046     052     052     ALROFF: .ASCII  /&*** ALL REMOTES ARE IRREGULAR ***&@/
        023770  052     040     101
        023773  114     114     040
        023776  122     105     115
        024001  117     124     105
        024004  123     040     101
        024007  122     105     040
        024012  111     122     122
        024015  105     107     125
        024020  114     101     122
        024023  040     052     052
        024026  052     046     100
```

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                                        ;ERROR MESSAGES
                                        
     3 024031  040  110  117  NOGO:   .ASCII  / HOST MICRO FAILED TO START.@/
       024034  123  124  040
       024037  115  111  103
       024042  122  117  040
       024045  106  101  111
       024050  114  105  104
       024053  040  124  117
       024056  040  123  124
       024061  101  122  124
       024064  056  100
     4 024066  040  120  127  NOTUP:  .ASCII  / PWR-UP SEQUENCE NOT COMPLETE.(BAD CSR).@/
       024071  122  055  125
       024074  120  040  123
       024077  105  121  125
       024102  105  116  103
       024105  105  040  116
       024110  117  124  040
       024113  103  117  115
       024116  120  114  105
       024121  124  105  056
       024124  050  102  101
       024127  104  040  103
       024132  123  122  051
       024135  056  100
     5 024137  040  103  123  CSRRST: .ASCII  / CSR REG. NOT RESET.@/
       024142  122  040  122
       024145  105  107  056
       024150  040  116  117
       024153  124  040  122
       024156  105  123  105
       024161  124  056  100
     6 024164  040  103  101  SPRCLR: .ASCII  / CAN'T CLR SPAR REG.@/
       024167  116  047  124
       024172  040  103  114
       024175  122  040  123
       024200  120  101  122
       024203  040  122  105
       024206  107  056  100
     7 024211  040  102  101  SPRDAT: .ASCII  / BAD DATA IN SPAR REG.@/
       024214  104  040  104
       024217  101  124  101
       024222  040  111  116
       024225  040  123  120
       024230  101  122  040
       024233  122  105  107
       024236  056  100
     8 024240  040  122  105  ISATE:  .ASCII  / REQ SCPD ADR TST ERROR.@/
       024243  121  040  123
       024246  103  120  104
       024251  040  101  104
       024254  122  040  124
       024257  123  124  040
       024262  105  122  122
       024265  117  122  056
       024270  100
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      9 024271      040      122      105  OSDTE:  .ASCII  / RESULT SCPD DATA TST ERROR.@/
        024274      123      125      114
        024277      124      040      123
        024302      103      120      104
        024305      040      104      101
        024310      124      101      040
        024313      124      123      124
        024316      040      105      122
        024321      122      117      122
        024324      056      100
     10 024326      040      122      105  OSATE:  .ASCII  / RESULT SCPD ADR TST ERROR.@/
        024331      123      125      114
        024334      124      040      123
        024337      103      120      104
        024342      040      101      104
        024345      122      040      124
        024350      123      124      040
        024353      105      122      122
        024356      117      122      056
        024361      100
     11 024362      040      122      105  ISDTE:  .ASCII  / REQ SCPD DATA TST ERROR.@/
        024365      121      040      123
        024370      103      120      104
        024373      040      104      101
        024376      124      101      040
        024401      124      123      124
        024404      040      105      122
        024407      122      117      122
        024412      056      100
     12 024414      040      122      105  RQSPCL: .ASCII  / REQ. SCPD NOT ALL 0'S.@/
        024417      121      056      040
        024422      123      103      120
        024425      104      040      116
        024430      117      124      040
        024433      101      114      114
        024436      040      060      047
        024441      123      056      100
     13 024444      040      122      105  RSSPCL: .ASCII  / RES. SCPD NOT ALL 0'S.@/
        024447      123      056      040
        024452      123      103      120
        024455      104      040      116
        024460      117      124      040
        024463      101      114      114
        024466      040      060      047
        024471      123      056      100
     14 024474      040      042      103  CLTBER: .ASCII  / ''CLRTPB'' FAILED TO CLR TOP BYTE.@/
        024477      114      122      124
        024502      120      102      042
        024505      040      106      101
        024510      111      114      105
        024513      104      040      124
        024516      117      040      103
        024521      114      122      040
        024524      124      117      120
        024527      040      102      131
        024532      124      105      056
        024535      100
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     15 024536  040  127  122  DIERR:  .ASCII  / WRONG CSR FOR 'DIE'' FUNC.@/
        024541  117  116  107
        024544  040  103  123
        024547  122  040  106
        024552  117  122  040
        024555  042  104  111
        024560  105  042  040
        024563  106  125  116
        024566  103  056  100
     16 024571  040  102  101  CSRWE:  .ASCII  / BAD CSR BITS WHILE HUNG.@/
        024574  104  040  103
        024577  123  122  040
        024602  102  111  124
        024605  123  040  127
        024610  110  111  114
        024613  105  040  110
        024616  125  116  107
        024621  056  100
     17 024623  040  103  101  CSRCE:  .ASCII  / CAN'T CLR LOW CSR WHILE HUNG.@/
        024626  116  047  124
        024631  040  103  114
        024634  122  040  114
        024637  117  127  040
        024642  103  123  122
        024645  040  127  110
        024650  111  114  105
        024653  040  110  125
        024656  116  107  056
        024661  100
     18 024662  040  101  103  SPAVME: .ASCII  / ACCESSED REQ SCPD WITH 'MAIN' SET.@/
        024665  103  105  123
        024670  123  105  104
        024673  040  122  105
        024676  121  040  123
        024701  103  120  104
        024704  040  127  111
        024707  124  110  040
        024712  042  115  101
        024715  111  116  042
        024720  040  123  105
        024723  124  056  100
     19 024726  040  101  103  SPAVFE: .ASCII  / ACCESSED REQ SCPD WITH 'STFUN' SET.@/
        024731  103  105  123
        024734  123  105  104
        024737  040  122  105
        024742  121  040  123
        024745  103  120  104
        024750  040  127  111
        024753  124  110  040
        024756  042  123  124
        024761  106  125  116
        024764  042  040  123
        024767  105  124  056
        024772  100
     20 024773  040  110  117  NOINTR: .ASCII  / HOST CAN'T INTERRUPT UNIBUS.@/
        024776  123  124  040
        025001  103  101  116
```

```
025004  047  124  040
025007  111  116  124
025012  105  122  122
025015  125  120  124
025020  040  125  116
025023  111  102  125
025026  123  056  100
025031  040  105  122     ERINTR: .ASCII  / ERRONEOUS HOST INTERRUPT.@/
025034  122  117  116
025037  105  117  125
025042  123  040  110
025045  117  123  124
025050  040  111  116
025053  124  105  122
025056  122  125  120
025061  124  056  100
025064  040  127  122     WPODI:  .ASCII  / WRONG PRIORITY. DEV. IS HIGHER.@/
025067  117  116  107
025072  040  120  122
025075  111  117  122
025100  111  124  131
025103  056  040  104
025106  105  126  056
025111  040  111  123
025114  040  110  111
025117  107  110  105
025122  122  056  100
025125  040  120  122     HITER:  .ASCII  / PROG INIT. FAILED TO INIT CSR.@/
025130  117  107  040
025133  111  116  111
025136  124  056  040
025141  106  101  111
025144  114  105  104
025147  040  124  117
025152  040  111  116
025155  111  124  040
025160  103  123  122
025163  056  100
025165  040  115  111     VISF:   .ASCII  / MICRO DIDN'T STORE VERSION NO.@/
025170  103  122  117
025173  040  104  111
025176  104  116  047
025201  124  040  123
025204  124  117  122
025207  105  040  126
025212  105  122  123
025215  111  117  116
025220  040  116  117
025223  056  100
025225  040  062  116     VIDER:  .ASCII  / 2ND VERSION INFO DIFFERS FROM PWR-UP.@/
025230  104  040  126
025233  105  122  123
025236  111  117  116
025241  040  111  116
025244  106  117  040
025247  104  111  106
025252  106  105  122
```

```
          025255    123     040     106
          025260    122     117     115
          025263    040     120     127
          025266    122     055     125
          025271    120     056     100
    26    025274    040     101     103   SPAVIC: .ASCII  / ACCESSED RES. SCPD WITH INTR CLR.@/
          025277    103     105     123
          025302    123     105     104
          025305    040     122     105
          025310    123     056     040
          025313    123     103     120
          025316    104     040     127
          025321    111     124     110
          025324    040     111     116
          025327    124     122     040
          025332    103     114     122
          025335    056     100
    27    025337    040     127     122   STESTF: .ASCII  / WRONG CSR WITH 'STFUN'.@/
          025342    117     116     107
          025345    040     103     123
          025350    122     040     127
          025353    111     124     110
          025356    040     042     123
          025361    124     106     125
          025364    116     042     056
          025367    100
    28    025370    040     042     115   RSPESF: .ASCII  / 'MAIN' RESULT FUNC. CODE WRONG.@/
          025373    101     111     116
          025376    042     040     122
          025401    105     123     125
          025404    114     124     040
          025407    106     125     116
          025412    103     056     040
          025415    103     117     104
          025420    105     040     127
          025423    122     117     116
          025426    107     056     100
    29    025431    040     102     101   USOFE1: .ASCII  / BAD USOF FROM 'STFUN' ON MAINT.@/
          025434    104     040     125
          025437    123     117     106
          025442    040     106     122
          025445    117     115     040
          025450    042     123     124
          025453    106     125     116
          025456    042     040     117
          025461    116     040     115
          025464    101     111     116
          025467    124     056     100
    30    025472    040     127     122   STEMF:  .ASCII  / WRONG CSR WITH 'MAINT'.@/
          025475    117     116     107
          025500    040     103     123
          025503    122     040     127
          025506    111     124     110
          025511    040     042     115
          025514    101     111     116
          025517    124     042     056
          025522    100
```

```
     31 025523  040  102  101  USOFE2: .ASCII  / BAD USOF FROM 'MAINT'' FUNC.@/
        025526  104  040  125
        025531  123  117  106
        025534  040  106  122
        025537  117  115  040
        025542  042  115  101
        025545  111  116  124
        025550  042  040  106
        025553  125  116  103
        025556  056  100
     32 025560  040  042  115  DATLER: .ASCII  / 'MAIN'' FUNC GAVE BAD DATA LEN.@/
        025563  101  111  116
        025566  042  040  106
        025571  125  116  103
        025574  040  107  101
        025577  126  105  040
        025602  102  101  104
        025605  040  104  101
        025610  124  101  040
        025613  114  105  116
        025616  056  100
     33 025620  040  122  105  RSPEMF: .ASCII  / RES. FUNC CODE WRONG FOR 'MAIN'.@/
        025623  123  056  040
        025626  106  125  116
        025631  103  040  103
        025634  117  104  105
        025637  040  127  122
        025642  117  116  107
        025645  040  106  117
        025650  122  040  042
        025653  115  101  111
        025656  116  042  056
        025661  100
     34 025662  040  102  101  USOFE3: .ASCII  / BAD USOF FROM 'MAIN'' ON REG FUNC.@/
        025665  104  040  125
        025670  123  117  106
        025673  040  106  122
        025676  117  115  040
        025701  042  115  101
        025704  111  116  042
        025707  040  117  116
        025712  040  122  105
        025715  107  040  106
        025720  125  116  103
        025723  056  100
     35 025725  040  127  122  USOFE4: .ASCII  / WRONG USOF ON REGULAR FUNC.@/
        025730  117  116  107
        025733  040  125  123
        025736  117  106  040
        025741  117  116  040
        025744  122  105  107
        025747  125  114  101
        025752  122  040  106
        025755  125  116  103
        025760  056  100
     36 025762  040  124  117  PLFFE:  .ASCII  / TOTAL FAILURE ON 'MAIN'' FUNCTION.@/
        025765  124  101  114
```

```
        025770  040     106     101
        025773  111     114     125
        025776  122     105     040
        026001  117     116     040
        026004  042     115     101
        026007  111     116     042
        026012  040     106     125
        026015  116     103     124
        026020  111     117     116
        026023  056     100
37      026025  040     120     117     PLTXTO: .ASCII  / PORT XMTR TIMED OUT.@/
        026030  122     124     040
        026033  130     115     124
        026036  122     040     124
        026041  111     115     105
        026044  104     040     117
        026047  125     124     056
        026052  100
38      026053  040     120     117     PLRCTO: .ASCII  / PORT RCVR TIMED OUT.@/
        026056  122     124     040
        026061  122     103     126
        026064  122     040     124
        026067  111     115     105
        026072  104     040     117
        026075  125     124     056
        026100  100
39      026101  040     120     117     PLDERR: .ASCII  / PORT-LOOP DETECTED DATA ERROR.@/
        026104  122     124     055
        026107  114     117     117
        026112  120     040     104
        026115  105     124     105
        026120  103     124     105
        026123  104     040     104
        026126  101     124     101
        026131  040     105     122
        026134  122     117     122
        026137  056     100
40      026141  040     110     117     SYSER:  .ASCII  / HOST SYS ERROR. RUN LOGIC TEST.@/
        026144  123     124     040
        026147  123     131     123
        026152  040     105     122
        026155  122     117     122
        026160  056     040     122
        026163  125     116     040
        026166  114     117     107
        026171  111     103     040
        026174  124     105     123
        026177  124     056     100
41      026202  040     042     104     DIAGF:  .ASCII  / 'DIAG' FUNC GAVE WRONG FUNC CODE.@/
        026205  111     101     107
        026210  042     040     106
        026213  125     116     103
        026216  040     107     101
        026221  126     105     040
        026224  127     122     117
        026227  116     107     040
        026232  106     125     116
```

```
          026235      103       040       103
          026240      117       104       105
          026243      056       100
    42    026245      040       125       123   DIAGUF: .ASCII  / USOF WRONG ON 'DIAG'' FUNC.@/
          026250      117       106       040
          026253      127       122       117
          026256      116       107       040
          026261      117       116       040
          026264      042       104       111
          026267      101       107       042
          026272      040       106       125
          026275      116       103       056
          026300      100
    43
    44                                              .EVEN
```

```
                                        ;TABLE STORAGE
                                        ;TABLE OF BAUD RATE MESSAGE POINTERS
026302  026322                          BDRTBL: .WORD   BD1
026304  026327                                  .WORD   BD2
026306  026334                                  .WORD   BD3
026310  026342                                  .WORD   BD4
026312  026350                                  .WORD   BD5
026314  026356                                  .WORD   BD6
026316  026364                                  .WORD   BD7
026320  026402                                  .WORD   BD8
                                        ;TABLE OF ASCII STORAGE FOR BAUD RATES
026322  040     063     060     BD1:    .ASCII  / 300a/
026325  060     100
026327  040     066     060     BD2:    .ASCII  / 600a/
026332  060     100
026334  040     061     062     BD3:    .ASCII  / 1200a/
026337  060     060     100
026342  040     062     064     BD4:    .ASCII  / 2400a/
026345  060     060     100
026350  040     064     070     BD5:    .ASCII  / 4800a/
026353  060     060     100
026356  040     071     066     BD6:    .ASCII  / 9600a/
026361  060     060     100
026364  040     042     110     BD7:    .ASCII  / 'HIGH'' SPEEDa/
026367  111     107     110
026372  042     040     123
026375  120     105     105
026400  104     100
026402  040     042     123     BD8:    .ASCII  / 'SPECIAL'' SPEEDa/
026405  120     105     103
026410  111     101     114
026413  042     040     123
026416  120     105     105
026421  104     100
                                        .EVEN
                                        ;DATA TABLE FOR MAINTENANCE AND DIAGNOSTIC FUNCTION
026424  000001                          DATBL:  .WORD   001
026426  000003                                  .WORD   003
026430  000007                                  .WORD   007
026432  000017                                  .WORD   017
026434  000037                                  .WORD   037
026436  000077                                  .WORD   077
026440  000177                                  .WORD   177
026442  000377                                  .WORD   377
026444  000376                                  .WORD   376
026446  000374                                  .WORD   374
026450  000370                                  .WORD   370
026452  000360                                  .WORD   360
026454  000340                                  .WORD   340
026456  000300                                  .WORD   300
```

```
     43 026460  000200                          .WORD   200
     44 026462  000000                          .WORD   000
     45
```

```
                                ;PORT CONFIGURATION STATUS TABLES.

026464                          EXTBL1: .BLKW   64.
026664                          EXTBL2: .BLKW   64.
027064                          EXTBL3: .BLKW   64.
027264                          EXTBL4: .BLKW   64.

                                ;TABLE FOR ORIGINAL (PWR-UP) VERSION DATA

027464                          VERSP:  .BLKW   9.

                                ;TABLE FOR 2ND VERSION DATA

027506                          VERSUN: .BLKW   9.

                                ;SOFTWARE FLAG BYTES

027530      000                 CLKFL1: .BYTE   0               ;CLOCK TICKING
027531      000                 CLKFLG: .BYTE   0               ;CLOCK PRESENT
027532      000                 CONFLG: .BYTE   0               ;CONTINUE FLAG
027533      000                 CNFGFL: .BYTE   0               ;CONFIGURATION AVAILABLE
027534      000                 DBFLG:  .BYTE   0               ;DEBUG FLAG
027535      000                 GOFLG:  .BYTE   0               ;'GO' FLAG
027536      000                 HOURS:  .BYTE   0               ;HOURS STORAGE
027537      000                 INCF:   .BYTE   0               ;LINE FEED FLAG
027540      000                 LSIFLG: .BYTE   0               ;THIS IS AN 11/03
027541      000                 MINS:   .BYTE   0               ;MINUTES STORAGE
027542      000                 OFLOF:  .BYTE   0               ;ERROR COUNT OVERFLOW
027543      000                 ONCE:   .BYTE   0               ;INDICATOR THAT CONFIG HAS BEEN PRINTED
027544      000                 PNCFLG: .BYTE   0               ;PRINTED ANY REMOTE INFO?
027545      000                 SAFE:   .BYTE   0               ;DON'T ALLOW ^F IN FILL COUNT RTN.
027546      000                 SECS:   .BYTE   0               ;SECONDS STORAGE
027547      000                 SLFL:   .BYTE   0               ;'SLASH' FLAG
027550      000                 THRUF:  .BYTE   0               ;'THRU' FLAG
027551      000                 TICKS:  .BYTE   0               ;1/60 SEC. TICKS STORAGE
                                        .EVEN
```

```
                                ;VARIABLES:
                                
027552  000000                  ADDR:    .WORD   0
027554  000000                  ALLFLG:  .WORD   0
027556  000000                  BAUD:    .WORD   0
027560  000000                  CHNGFL:  .WORD   0
027562  000000                  CLK:     .WORD   0
027564  000000                  CNTR:    .WORD   0
027566  000000                  CSR:     .WORD   0
027570  000000                  DEVER:   .WORD   0
027572  000000                  ERRCNT:  .WORD   0
027574  000000                  ITER:    .WORD   0
027576  000000                  LINLEN:  .WORD   0
027600  000000                  MASK:    .WORD   0
027602  000000                  PASCNT:  .WORD   0
027604  000000                  PAT:     .WORD   0
027606  000000                  PCONT:   .WORD   0
027610  000000                  PORN:    .WORD   0
027612  000000                  PORT:    .WORD   0
027614  000000                  PRIO:    .WORD   0
027616  000000                  REMFLG:  .WORD   0
027620  000000                  REMNO:   .WORD   0
027622  000000                  REMTN:   .WORD   0
027624  000000                  REMST:   .WORD   0
027626  000000                  SAVEC:   .WORD   0
027630  000000                  SPAR:    .WORD   0
027632  000000                  SPDR:    .WORD   0
027634  000000                  SR:      .WORD   0
027636  000000                  SWREG:   .WORD   0
027640  000000                  SWRFLG:  .WORD   0
027642  000000                  TALLY:   .WORD   0
027644  000000                  TBLAD:   .WORD   0
027646  000000                  TEMP:    .WORD   0
027650  000000                  VERFLG:  .WORD   0
027652  000000                  WORD:    .WORD   0


                                ;CONSTANTS:

027654  000170                  VECTOR:  .WORD   170
027656  164070                  DEVADR:  .WORD   164070
027660  000004                  FKPRIO:  .WORD   4
027662  177562                  KBD:     .WORD   177562
027664  177560                  KBS:     .WORD   177560
027666  177546                  LCS:     .WORD   177546
027670  177566                  TTB:     .WORD   177566
027672  177564                  TTS:     .WORD   177564

        000001                          .END
```

```
ADDR    027552
AGAIN   021324
ALLFLG  027554
ALROFF  023765
BAD     016614
BAUD    027556
BAUDM   023052
BCNT0   003020
BCNT1   003024
BCNT2   003054
BCNT3   003050
BCNT4   003100
BCONT   002664
BDRTBL  026302
BD1     026322
BD2     026327
BD3     026334
BD4     026342
BD5     026350
BD6     026356
BD7     026364
BD8     026402
BEGIN   002000
BINPNT  020374
B00   = 000001
B01   = 000002
B02   = 000004
B03   = 000010
B04   = 000020
B05   = 000040
B06   = 000100
B07   = 000200
B08   = 000400
B09   = 001000
B10   = 002000
B11   = 004000
B12   = 010000
B13   = 020000
B14   = 040000
B15   = 100000
CCRTN   017002
CELP    012542
CHNGFL  027560
CLK     027562
CLKEXT  002662
CLKFLG  027531
CLKFL1  027530
CLKINT  002574
CLKTRP  002566
CLTBER  024474
CMREXC  012500
CNFGFL  027533
CNTR    027564
CONFLG  027532
CONFMS  023600
CONTW1  017012
CSR     027566
CSRCE   024623
CSRRST  024137
CSRWE   024571
DATBL   026424
DATLER  025560
DBAID   021442
DBFLG   027534
DECJSP  020450
DECPNT  020422
DERR    016526
DEVADR  027656
DEVER   027570
DEVGEN  016262
DIAGF   026202
DIAGFU  013226
DIAGNF  014764
DIAGUF  026245
DIAG0   015046
DIAG00  015064
DIAG1   015104
DIAG10  015122
DIAG2   015210
DIAG3S  015374
DIAG4   015402
DIERR   024536
DIVID   020524
DIVSET  020522
DVATST  016150
DVECT   021357
DVPRIO  021403
ELTIM   023164
ENDCHK  012270
ENDPS   023150
ENDO    012350
ENPRTN  011050
ENRET   011130
EN01    011120
ERCTM   023177
ERINT   006302
ERINTR  025031
ERINT1  006422
ERR     016442
ERRAD   016606
ERRCNT  027572
ERRM    016616
ERRNUM  016610
ERR1    016454
EXCM    023342
EXS1    012612
EXS2    012702
EXS2B   012742
EXS3    013002
EXS3A   013050
EXS3B   013072
EXTBL1  026464
EXTBL2  026664
EXTBL3  027064
EXTBL4  027264
EX1     017054
EX2     017072
EX3     017104
EX4     017122
EX5     017154
EX6     017166
FILL    020242
FILMSG  020246
FKPRIO  027660
FLCNT   020244
FRAD    021277
GDINT   006344
GETCHR  017352
GETDG   020542
GOFLG   027535
GOOD    016612
HDER    016370
HELPM   021725
HITER   025125
HLPASK  003130
HLPDSR  022714
HOURS   027536
HWSWR = 177570
INCF    027537
INPKB   017334
INTCNR  006416
INTCNT  006356
INVLAD  021467
IRRGMG  023752
ISATE   024240
ISDTE   024362
ISP   = 002000
ITER    027574
JUST    020574
KBBUF   020240
KBD     027662
KBRD    017574
KBRET   017606
KBS     027664
KRTN    020234
LCS     027666
LGKTSM  022761
LINLEN  027576
LOGTST  003144
LSIFLG  027540
LSTST   016122
MASK    027600
MINS    027541
MONCH   016706
MONIC   016702
MONIT   016666
MOV     006476
MOVB    003212
N     = 000054
NEK     017566
NOCNF   021605
NOGO    024031
NOINTR  024773
NOKEFL  020236
NOREM   023450
NOTUP   024066
NRTRN   017550
NULLS   020500
NULOUT  020512
NUMPNT  020514
OCTJSP  020344
OCTPNT  020316
ODTPR   015412
OFLOF   027542
ONCE    027543
OSATE   024326
OSDTE   024271
OVFLM   023215
PASCNT  027602
PAT     027604
PCONT   027606
PLDERR  026101
PLFFE   025762
PLRCTO  026053
PLTM    023232
PLTXTO  026025
PNCFLG  027544
PNT     020614
PNTCNF  020266
PNTCX   020314
PNTC0   020304
PNTEND  012406
PNTEXT  020556
PNTRTN  012470
PNT0    012424
PNT1    012432
POK     011210
PORCN   014316
PORCNF  014072
PORLD   014304
PORN    027610
PORT    027612
PORTLP  011132
PORTMS  023556
PORTN   023260
PORT0M  023070
PORT1M  023104
PORT2M  023120
PORT3M  023134
PORXT   014346
POR0    014166
POR00   014204
POR1    014260
PRDFLT  016326
PREML   014744
PREM0   014616
PREM1   014726
PRIO    027614
PRLC    011140
PRMT1   002200
PRMT2   002224
PRMT3   002312
PRMT4   002372
PRMT5   002416
PRNREM  014576
PRNTIM  017170
PROMT   002112
PRTCNF  013106
PS    = 177776
PSTE    011342
PSTS    011504
PST0    011246
PST1    011330
PST2    011356
PST2A   011364
PST3    011466
PST4    011514
PST5    011550
PST6    011576
PST60   011612
PST7    011640
PST7S   011726
PST8    011740
PST8S   012026
PST80   012040
PST80S  012126
PST9    012140
PST9S   012262
P0    = 000000
P1    = 000040
P2    = 000100
P3    = 000140
P4    = 000200
P5    = 000240
P6    = 000300
P7    = 000340
RADIX   020710
REGMG   023741
REGRES  016104
REGSAV  016070
REMCHG  023657
REMFLG  027616
REMNO   027620
REMSG   023566
REMST   027624
REMSTM  023715
REMTN   027622
REPORT  014374
REP0    014446
REP1    014476
REP2    014526
REP20   014556
REP3    014574
RESTRT  002514
RJFLG   020706
```

SYMBOL TABLE

RQSPCL	024414	SPAVME	024662	ST160	005666	ST60	003616	TYPCTP	021650		
RSPEMF	025620	SPDR	027632	ST161	005754	ST61	003632	TYPOUT	017272		
RSPESF	025370	SPRCLR	024164	ST162	006062	ST62	003742	USOFE1	025431		
RSSPCL	024444	SPRDAT	024211	ST17	006170	ST7	004002	USOFE2	025523		
SAFE	027545	SR	027634	ST170	006214	ST70	004012	USOFE3	025662		
SAVEC	027626	SRTST	016132	ST170R	006276	ST71	004064	USOFE4	025725		
SBAK	016226	SSWR =	027636	ST18	006470	ST80	004074	USORM	023646		
SCALM	013502	STATEM	023634	ST180	006622	ST80S	004176	VECTOR	027654		
SCART	014070	STEMF	025472	ST181	006650	ST81	004204	VERFLG	027650		
SCA1	013544	STESTF	025337	ST182	006712	ST82	004226	VERSM	023017		
SCA2	013632	ST0	003202	ST183	007002	ST90	004242	VERSP	027464		
SCA2A	013726	ST1	003322	ST19	007022	ST90S	004336	VERSUN	027506		
SCA2B	013750	ST10	004362	ST2	003416	ST91	004344	VIDER	025225		
SCA2C	013762	ST100	004374	ST20	007130	SWDMP	016720	VISF	025165		
SCA2D	013770	ST101	004446	ST200	007240	SWHLT	016170	WDAT	016631		
SCA2E	014002	ST110	004460	ST201	007254	SWREG	027636	WDSDB	016643		
SCA2F	014024	ST110S	004562	ST202	007334	SWRFLG	027640	WDWAS	016657		
SCA3	014044	ST111	004570	ST203	007422	SWRMSG	021575	WORD	027652		
SCONT	016244	ST112	004612	ST204	007510	SYSER	026141	WPODI	025064		
SCORTN	016260	ST120	004624	ST205	007540	TALLY	027642	0	015454		
SCPAD	022776	ST120S	004720	ST206	007620	TBLAD	027644	00	015430		
SCPRTN	016210	ST121	004726	ST207	007706	TEMP	027646	1	015460		
SECS	027546	ST13	004744	ST21	007774	THRUF	027550	10	015544		
SKPD2	013410	ST130	004750	ST22	010022	TICKS	027551	11	015670		
SKPX0	013426	ST131	005026	ST220	010102	TPCONT	017320	13	016006		
SKPX1	013472	ST131A	004774	ST221	010110	TPOFCH	017274	$2A$	015572		
SKP1	013244	ST131B	005002	ST222	010206	TPOUTX	017330	2	015556		
SKP2	013262	ST132	005040	ST223	010274	TRP4	021533	20	015736		
SKP3	013300	ST132S	005134	ST224	010310	TSTHDR	020712	21	015750		
SKP4	013316	ST133	005142	ST23	010406	TSTRSK	003104	22	015766		
SKP5	013334	ST134	005162	ST23A	010420	TSTSEL	021676	23	016020		
SKP6	013352	ST135	005176	ST230	010454	TTB	027670	24	016066		
SKP7	013370	ST135S	005272	ST24	010770	TTO	020622	25	016036		
SKP8	013406	ST136	005300	ST25	011006	TTOLF	020644	26	016050		
SLFL	027547	ST14	005316	ST26	011040	TTOLP	020626	3	015624		
SPAR	027630	ST15	005402	ST3	003502	TTS	027672	4	015632		
SPAVFE	024726	ST150	005556	ST4	003522	TWOSP	021571	5	015650		
SPAVIC	025274	ST16	005600	ST6	003542	TYPCR	023312				

. ABS. 027674 000
000000 001
ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 1395 WORDS (6 PAGES)
DYNAMIC MEMORY AVAILABLE FOR 65 PAGES
DK1:ZCMJB0,ZCMJB0/C=DK1:ZCMJB0

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BD2       38-7    38-18#
BD3       38-8    38-19#
BD4       38-9    38-20#
BD5       38-10   38-21#
BD6       38-11   38-22#
BD7       38-12   38-23#
BD8       38-13   38-24#
BDRTBL    17-24   17-32   17-44   17-52   38-6#
BEGIN      1-52    4-4     4-11#
BINPNT    34-30#
CCRTN     29-28#
CELP      19-18#  19-21
CHNGFL    19-24*  19-44   19-53   19-58*  20-5*   20-19   22-51*  40-6#
CLK        7-40*   7-44*  25-27*  25-30*  26-5*   26-17*  40-7#
CLKEXT     5-7     5-11    5-15    5-17#
CLKFL1     5-4*    6-7*   18-148  21-49   39-18#
CLKFLG     4-74*   4-96*   6-21    6-27    6-33    27-17   27-84   39-19#
CLKINT     4-87    5-4#
CLKTRP     4-75    4-96#
CLTBER    11-10   37-14#
CMREXC     6-36   19-12#
CNFGFL     6-6*   19-65*  33-5    39-21#
CNTR       7-13*   7-29*  11-25*  11-28*  11-34*  11-37*  15-8*   15-27*  15-45*  15-52*  17-11*  17-14*  18-7*   18-10*
          18-48*  18-52*  19-17*  19-20*  21-5*   21-10*  21-14*  21-19*  21-22*  21-27*  21-30*  21-35*  23-41*  23-47*
          24-8*   24-14*  24-20*  24-26*  25-20*  40-8#
CONFLG    27-79   32-23*  32-90*  39-20#
CONFMS    24-4    36-62#
CONTW1    29-29#  29-30   29-36
CSR        7-20    7-25    7-33   11-5*   11-7    11-24*  11-26   11-31   11-36*  11-39*  12-4*   12-5    12-11*  12-12
          12-17*  12-27*  13-8*   13-12*  13-20*  13-23*  13-25*  13-30*  14-4*   14-12   14-17   14-44*  15-9*   15-22*
          15-24   15-46*  15-47*  15-49   16-5*   16-14*  16-15   16-31*  16-32*  16-33   18-8    18-37*  18-65*  18-66*
          18-67   18-121* 19-18   19-25*  19-26*  19-27*  19-41   19-43*  19-59*  22-6    22-13*  22-17   22-52*  22-54
          22-57*  23-13*  23-23*  23-24   23-53*  26-20*  26-21*  26-22   26-54*  27-22   27-30   27-32   27-43*  27-47*
          27-49*  27-50   28-70*  40-9#
CSRCE     12-15   37-17#
CSRRST     7-38   37-5#
CSRWE     12-8    37-16#
DATBL     18-49   26-6    38-29#
DATLER    15-68   37-32#
DBAID     27-23   36-16#
DBFLG      6-13*  27-21*  27-87*  29-53   32-29   32-58   32-61   39-22#
DECJSP    34-48#
DECPNT    17-76   17-83   29-69   29-73   29-77   29-81   34-39#
DERR       7-31    7-38    8-9     8-21    9-22    9-39    9-68    9-85   10-22   10-38   11-10   11-35   12-8    12-15
          14-15   14-32   15-29   15-36   15-43   15-54   15-61   15-68   16-22   16-29   16-40   18-112  26-31   26-38
          28-122#
DEVADR     4-26    4-30*   4-37   28-69   40-41#
DEVER      4-14*  40-10#
DEVGEN     4-69   28-69#
DIAG0     26-15#  26-18
DIAG00    26-19#  26-32   26-53
DIAG1     26-22#  26-25
DIAG10    26-23   26-26#
DIAG2     26-30   26-33#
DIAG3S    26-40   26-53#
DIAG4     26-37   26-54#
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DIAGF    26-31    37-41#
DIAGFU   19-55    21-4#
DIAGNF   21-9     21-18    21-26    21-34    26-5#
DIAGUF   26-38    37-42#
DIERR    11-35    37-15#
DIVID    35-6#    35-10
DIVSET   35-5#    35-15
DVATST    3-6      4-36    28-36#
DVECT     4-40    36-14#
DVPRIO    4-50    36-15#
ELTIM    29-67    36-50#
EN01     17-79    17-82#
ENDO     18-125   18-132#
ENDCHK   18-75    18-85    18-95    18-105   18-121#
ENDPS    17-74    36-49#
ENPRTN   17-68    17-74#   18-147   21-48
ENRET    17-81    17-84#
ERCTM    17-77    36-51#
ERINT    13-3     13-15#
ERINT1   13-22    13-29#
ERINTR   13-16    37-21#
ERR       7-22    12-25    12-35    13-11    13-16    13-31    14-24    14-52    18-12    18-78    18-88    18-98    19-22    22-22
         23-32    28-108#
ERR1     28-110#  28-124
ERRAD    28-108*  28-109*  28-115   28-122*  28-123*  28-136#
ERRCNT    7-10*   17-82    18-17*   19-16*   28-61*   40-11#
ERRM     28-111   28-144#
ERRNUM    7-22*    7-31*    7-38*    8-9*     8-21*    9-22*    9-39*    9-68*    9-85*    10-22*   10-38*   11-10*   11-35*   12-8*
         12-15*   12-25*   12-35*   13-11*   13-16*   13-31*   14-15*   14-24*   14-32*   14-52*   15-29*   15-36*   15-43*   15-54*
         15-61*   15-68*   16-22*   16-29*   16-40*   18-12*   18-78*   18-88*   18-98*   18-112*  19-22*   22-22*   23-32*   26-31*
         26-38*   28-112   28-137#
EX1      29-18    29-39#
EX2      29-40    29-43#
EX3      29-44    29-47#
EX4      29-48    29-51#
EX5      29-52    29-54    29-56    29-59#
EX6      29-14    29-60    29-62#
EXCM     19-28    36-56#
EXS1     19-19    19-24#
EXS2     19-39#   19-50    19-52    19-70    19-73    21-54
EXS2B    19-42    19-47#
EXS3     19-45    19-48    19-54    19-57#
EXS3A    19-61    19-67#
EXS3B    19-63    19-66    19-71#
EXTBL1    4-81*   19-32*   20-7     21-4     24-7     39-3#
EXTBL2    4-82*   19-33*   20-10    21-13    24-13    39-4#
EXTBL3    4-83*   19-34*   20-13    21-21    24-19    39-5#
EXTBL4    4-84*   19-35*   20-16    21-29    24-25    39-6#
FILL     32-38    32-41    32-47*   32-99#   35-42
FILMSG   32-36    32-101#
FKPRIO    4-51    40-42#
FLCNT    32-100#  35-42*   35-45*
FRAD      4-25    36-12#
GDINT    13-7     13-19#
GETCHR   31-12#   31-34    31-39    31-46
GETDG    35-7     35-11#
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NEK       31-49   31-53#
NOCNF     33-9    36-21#
NOGO       7-22   18-12    19-22    37-3#
NOINTR    13-11   37-20#
NOKEFL    31-8*   31-33*   31-40*   31-48    32-97#
NOREM     19-68   36-58#
NOTUP      7-31   37-4#
NRTRN     31-16   31-48#   32-82    32-87    32-91
NULLS     17-57   17-69    18-151   21-52    28-100   34-56#
NULOUT    34-59#
NUMPNT    34-15   34-24    34-33    34-42    34-51    35-3#
OCTJSP    25-12   27-33    27-60    34-21#
OCTPNT     9-27    9-44     9-73     9-90    10-27    10-43    18-83    18-93    18-103   18-117   22-28    22-40    25-9     25-17
          26-44   26-48    26-52    27-72    28-85    28-99    28-113   28-116   28-127   28-130   29-21    32-39    34-12#
ODTPR     27-17#  29-45    32-72
OFLOF      7-9*   17-78    18-18*   19-15*   28-63*   39-28#
ONCE      19-29*  19-49    19-62    19-67*   19-72*   22-49*   39-29#
OSATE      9-68   37-10#
OSDTE      9-39   37-9#
OVFLM     17-80   36-52#
P0         1-32#  18-64
P1         1-31#
P2         1-30#
P3         1-29#
P4         1-28#
P5         1-27#
P6         1-26#
P7         1-25#   4-13     4-17     4-21     4-89     6-5
PASCNT     7-8*   17-65*   17-75    18-16*   18-144*  19-13*   21-45*   40-15#
PAT        8-11*   8-13     8-23     8-25*    8-26*    40-16#
PCONT      4-28*   4-43*    4-53*    6-16*    6-18*    18-22*   18-24*   18-55*   18-58*   27-88    27-90    29-24*   29-26*   29-57*
          32-48   32-51    32-65    32-67    40-17#
PLDERR    18-112  37-39#
PLFFE     18-78   37-36#
PLRCTO    18-98   37-38#
PLTM      18-19   36-53#
PLTXTO    18-88   37-37#
PNCFLG    24-5*   24-10*   24-16*   24-22*   24-28*   24-31    39-30#
PNT       35-19   35-21    35-27#
PNTO      18-140  18-143#
PNT1      18-144#
PNTCO     33-6    33-9#
PNTCNF    29-61   32-57    33-5#
PNTCX     33-8    33-10#
PNTEND    18-123  18-131   18-139#
PNTEXT    35-13   35-17#
PNTRTN    18-142  18-146   18-152#
POK       18-9    18-14#
PORO      23-24#  23-27
PORO0     23-25   23-28#
POR1      23-31   23-34#
PORCN     23-43#  23-48
PORCNF    20-9    20-12    20-15    20-18    23-12#
PORLD     23-39   23-41#
PORN      20-8*   20-11*   20-14*   20-17*   23-21    23-49    24-11*   24-17*   24-23*   24-29*   25-8     40-18#
PORT      18-28*  18-36*   18-45    18-47    18-82    18-92    18-102   18-116   18-124   18-126*  18-128   18-130   18-132*  18-134
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REP1     24-15    24-19#
REP2     24-21    24-25#
REP20    24-27    24-31#
REP3     24-32    24-34#
REPORT   19-64    24-4#    33-7
RESTRT    4-7      4-85#   28-102
RJFLG    34-13*   34-22*   34-31*   34-40*   34-49*   35-20    35-26*   35-53#
RQSPCL   10-22    37-12#
RSPEMF   16-22    37-33#
RSPESF   15-36    37-28#
RSSPCL   10-38    37-13#
SAFE      6-12*   29-55    32-33    32-37*   32-55    32-69    39-31#
SAVEC    27-22*   40-25#
SBAK     28-54    28-56#
SCA1     22-7     22-14#   22-53
SCA2     22-21    22-24#
SCA2A    22-32    22-35#
SCA2B    22-36    22-39#
SCA2C    22-34    22-42#
SCA2D    22-38    22-44#
SCA2E    22-41    22-43    22-45    22-47#
SCA2F    22-48    22-51#
SCA3     22-18    22-54#
SCALM    19-39    22-6#    23-22    23-26    26-19    26-24
SCART    22-55    22-58#
SCONT    28-58    28-61#
SCORTN   28-62    28-64#
SCPAD     9-25     9-42     9-71     9-88    10-25    10-41    36-42#
SCPRTN    7-23     7-32     7-39     8-10     8-22     9-28     9-45     9-74     9-91    10-28    10-44    11-11    11-40    12-9
         12-16    12-26    12-36    13-13    13-17    13-32    14-16    14-25    14-33    14-53    15-30    15-37    15-44    15-55
         15-62    15-69    16-23    16-30    16-41    18-84    18-94    18-104   18-118   26-32    26-53    28-52#
SECS      5-9*     5-10     5-12*    6-9*    29-76    39-32#
SKP1     21-6     21-8#    21-11
SKP2     21-7     21-13#
SKP3     21-15    21-17#   21-20
SKP4     21-16    21-21#
SKP5     21-23    21-25#   21-28
SKP6     21-24    21-29#
SKP7     21-31    21-33#   21-36
SKP8     21-32    21-37#
SKPD2    19-56    21-40#
SKPX0    21-41    21-44#
SKPX1    21-43    21-47    21-53#
SLFL     27-39    27-76    32-22*   32-80*   39-33#
SPAR      7-41*    7-46*    8-5*     8-7      8-15*    8-16     9-5*     9-8*    9-10*    9-11     9-13*    9-16*    9-26     9-29
          9-31*    9-34*    9-43     9-46     9-48*    9-51*    9-54*    9-56*    9-57     9-59*    9-62*    9-72     9-75     9-77*
          9-81*    9-89     9-92     9-94*    10-5*    10-7     10-9*    10-11*   10-13    10-15*   10-17*   10-26    10-29    10-31*
         10-33*   10-42    10-45    10-47*   11-18*   11-20*   11-22*   12-18*   12-28*   14-19*   14-35    14-37*   14-45*   15-10*
         15-12*   15-14*   15-16*   15-18*   15-20*   15-31*   15-38*   15-56*   15-63*   15-71*   15-73*   16-6*    16-8*    16-10*
         16-12*   16-17*   16-24*   16-35*   18-38*   18-40*   18-42*   18-44*   18-46*   18-50*   18-71*   18-106*  18-107*  18-109*
         18-110*  18-127*  18-129*  18-133*  18-135*  22-19*   22-26*   22-30*   23-14*   23-16*   23-18*   23-20*   23-29*   23-34*
         23-42*   23-44*   23-46*   26-7*    26-9*    26-11*   26-13*   26-15*   26-26*   26-33*   26-42*   26-46*   26-50*   27-44*
         27-58*   28-72*   40-26#
SPAVFE   12-35    37-19#
SPAVIC   14-52    37-26#
SPAVME   12-25    37-18#
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