PCL11-A,B

STAND ALONE V020

CZPLBB0

AH-E263B-MC

FICHE 1 OF 1

DEC 1978

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MADE IN USA

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                        ;               I D E N T I F I C A T I O N
                        ;       PROGRAM CODE            AC-E262B-MC
                        ;       PPROGRAM NAME           CZPLBB0 PCL11 STAND ALONE TEST
                        ;       DATE CREATED            22-OCT-75
                        ;       UPDATED                 13-MAR-78
                        ;       MODIFIED                8-SEP-78
                        ;       MAINTAINER              SPECIAL SYSTEMS KANATA
                        ;       AUTHOR                  DAVID G. WIENS


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                        .SBTTL HEADER AND INSTRUCTIONS
000000                  .REPT 0


                1.      GENERAL

                  THE PARALLEL COMMUNICATIONS LINK (PCL11) TEST WILL VIGOROUSLY
                TEST THE HARDWARE INVOLVED IN ANY ONE PDP 11 PROCESSOR CONTAINING
                PCL11 HARDWARE.
                  THERE ARE THREE SEPARATE SECTIONS TO THIS TEST. TO COMPLETELY
                CHECK BOTH TRANSMITTER AND RECEIVER PORTIONS OF THE PCL11, ALL
                THREE SECTIONS MUST BE RUN SUCCESSFULLY.
                  THE FIRST TEST IS THE BASIC TRANSMITTER TEST WHICH IS
                DESIGNED TO BE RUN AS A STAND ALONE DEVICE TEST
                ON THE TRANSMITTER. IT WILL RUN WITH NO MANUAL INTERVENTION
                (AFTER INITIAL SETUP) ASSUMING THAT THE TRANSMITTER ADDRESS
                SWITCHES IN THE MASTER SECTION ARE SET TO BE AT LEAST EQUAL TO
                THE TRANSMITTERS OWN ADDRESS SWITCHES. THIS ASSURES THAT TIMING
                SLICES WILL SELECT THE TRANSMITTER BEING TESTED.
                  THE SECOND TEST IS THE BASIC RECEIVER TEST WHICH IS DESIGNED TO
                RUN AS A STAND ALONE DEVICE TEST FOR THE RECEIVER MODULE.
                AFTER INITIAL SETUP, THIS TEST RUNS WITH NO MANUAL INTERVENTION.
                  THE THIRD TEST IS THE TRANSMITTER-RECEIVER LOOP TEST.
                THE OBJECTIVE OF THE THIRD TEST IS TO TEST ANY FUNCTIONS THAT
                WERE NEGLECTED IN THE FIRST AND SECOND TESTS DUE TO THE NEED FOR
                TRANSMITTER TO RECEIVER COMMUNICATIONS. IT WILL ALSO TEST THE
                T.D.M. BUS DRIVERS AND RECEIVERS BY SENDING DATA PATTERNS AND
                CHECKING THE DATA RECEIVED. FURTHER, IT WILL EXERCISE THE ABILITY
                TO REJECT OR TRUNCATE COMMUNICATIONS.


                  THE TESTS ARE SELECTED, IN THE START-UP PROCEDURE, SO THAT ANY
                ONE OF THE TESTS MAY BE LOOPED INDIVIDUALLY, OR ALL THREE MAY BE
                LOOPED AS AN OVERALL TEST.
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                        2.      REQUIREMENTS

                        2.1     GENERAL:

                        2.11            PDP-11 PROCESSOR WITH 8K OF MEMORY
                                        AND A CONSOLE DEVICE ON-LINE.

                        2.12            PCL11 HARDWARE ON THE UNIBUS

                        2.13            ALL PROCESSOR MAINDECS MUST HAVE BEEN RUN
                                        SUCCESSFULLY PRIOR TO RUNNING PCL11 TEST.
                        2.14            ONE PCL11 CONNECTED TO UNIBUS
                                        (SEE PCL11 OPTION DESCRIPTION SEC 2.1)
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                        3.      RESTRICTIONS

                        3.1             THIS TEST CANNOT BE LOADED INTO A PDP-11 WITH
                                        LESS THAN 8K OF MEMORY.

                        3.3             SINCE THERE ARE TIMING LOOPS IN THIS TEST,
                                        IT MAY NOT RUN SUCCESSFULLY IN SOLID-STATE MEMORY
                                        IF THE DELAY CONSTANT  (CNTRL-D)  IS LOWERED TO
                                        BELOW 6.
                                        *** THIS ALSO APPLIES TO USING FASTER PDP-11'S (45, 70, ETC.)***


                        4.      TEST SET-UP

                        4.1             ENSURE PCL11 HAS BEEN INSTALLED CORRECTLY
                                        AS PER THE INSTALLATION PROCEDURE IN SEC 2.1 OF
                                        PCL11 OPTION DESCRIPTION (YC-A20TC-00)

                        4.2             ENSURE ALL CABLES CONNECTING THE PCL11 UNDER
                                        TEST TO OTHER PCL11 UNITS OR DISPLAY PANELS
                                        ARE DISCONNECTED (OR DISABLED).

                        4.3             DETERMINE OR SET UP PROPER TDM ADDRESSES FOR
                                        THE RECEIVER AND TRANSMITTER. THE TRANSMITTER'S
                                        ADDRESS IS IN S1 ON THE M7991 MODULE; THE
                                        RECEIVER'S IS IN S1 ON THE M7997 MODULE.

                        4.4             ENSURE S1 ON THE M7994 MODULE IS SET TO A NUMBER
                                        GREATER THAN OR EQUAL TO THE TRANSMITTER'S ADDRESS.
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                        5.      LOADING

                                THE PCL11 TEST IS ON PAPER TAPE IN PDP-11 .ABS
                                FORMAT. THE TAPE IS LOADED BY MEANS OF THE PDP-11
                                ABSOLUTE LOADER.

                        6.      STARTING AND RESTARTING ADDRESSES

                                START ADDR              RESTART ADDR
                                ----------              ------------

                                  200                     204   (FOR DIFFERENT T.D.M. BUS ADDRESSES)
                                                          224   (FOR TEST SELECT)

                        7.      SWITCH REGISTER OPTIONS

                        7.1     ALL TESTS

                                        SW 15 = 0       HALT AFTER ERRORS
                                        SW 15 = 1       DON'T HALT AFTER ERRORS
                                        SW 14 = 0       ALLOW PRINTING
                                        SW 14 = 1       INHIBIT PRINTING
                                        SW 13 = 0       SEE SW 15
                                        SW 13 = 1       AFTER ERROR, RE-TRY CURRENT ROUTINE
                                        SW 12 = 0       CARRY ON TO NEXT SUBTEST
                                        SW 12 = 1       DON'T EXIT THIS SUBTEST
                                        SW 11 = 0       10 TIMES THRU ALL SUBTESTS PER PASS
                                        SW 11 = 1       ONCE THRU ALL SUBTESTS PER PASS

                        7.2     TRANSMITTER TEST

                                        SW 10 = 0       START AT 1ST SUBTEST AND RUN
                                        SW 10 = 1       START AT SUBTEST # IN SW'S <3:0>
                                        SW 09 = 0       STAY IN MASTER SECTION SCOPE LOOP
                                        SW 09 = 1       EXIT MASTER SECTION SCOPE LOOP

                        7.3     RECEIVER TEST

                                        SW 10 = 0       START AT 1ST SUBTEST AND RUN
                                        SW 10 = 1       START AT SUBTEST # IN SW'S <2:0>

                        7.4     TRANSMITTER-RECEIVER LOOP

                                        SW 10 = 0       START AT 1ST SUBTEST AND RUN
                                        SW 10 = 1       START AT SUBTEST # IN SW'S <2:0>
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                        7.5     SWITCH REGISTER OPTION USE ON NON-SWITCH-REGISTER PDP-11'S

                        AT START UP TIME
                        THE PROGRAM WILL DECIDE WHETHER A HARDWARE SWITCH REGISTER
                        EXSISTS ON THE PDP-11. IF NONE EXSISTS, A SOFTWARE
                        FLAG WILL BE SET INDICATING TO THE REST OF THE PROGRAM THAT
                        THE "SWITCH MONITOR" IS TO BE USED TO ACHIEVE CHANGING OF
                        SWITCH OPTIONS.
                          THE MONITOR IS ENTERED AT THE START OF THE TEST PROGRAM
                        AUTOMATICALLY. IT IS ALSO ENTERED AUTOMATICALLY ON AN ERROR
                        HALT IF SW 15 = 0. AT OTHER TIMES IT MUST BE CALLED BY THE
                        OPERATER BY TYPING CNTRL-S
                          WHEN THE MONITOR IS ENTERED THE FOLLOWING IS PRINTED:
                                SWR = XXXXXX  :
                        SHOWING THE OPERATER THE PRESENT CONTENTS OF THE SOFTWARE
                        SWITCH REGISTER LOCATION. HE MAY CHANGE THE LOCATION BY TYPING:
                                YYYYYY <CR>
                        IN RESPONSE; OR HE MAY LEAVE THE LOCATION UNCHANGED BY TYPING
                        ONLY <CR>.
                          REFERENCE PAGE 9 OF THIS LISTING FOR "SWITCH" BIT POSITIONS.
                        UPON DETECTING A <CR> THE MONITOR WILL TYPE:
                                CNTRL-P TO CONTINUE
                          THE OPERATER NOW HAS THE OPTION OF TYPING ^P TO CONTINUE
                        THE PROGRAM WHERE IT LEFT OFF, OR ^S TO RE-ENTER THE
                        SWITCH MONITOR.



                8.      TEST DESCRIPTION

                8.1     TEST 1 - TRANSMITTER TEST:

                                SUBTEST 00      TEST INITIAL CONDITIONS AFTER RESET
                                SUBTEST 01      COMMAND REGISTER TEST
                                SUBTEST 02      BYTE COUNT REGISTER TEST
                                SUBTEST 03      BUS ADDRESS REGISTER TEST
                                SUBTEST 04      MASTER SECTION TEST
                                SUBTEST 05      DATA SILO TEST
                                SUBTEST 06      STATUS REGISTER AND ERRORS TEST
                                SUBTEST 07      INTERRUPT TEST
                                SUBTEST 10      C.R.C GENERATION TEST

                8.2     TEST 2 - RECEIVER TEST:

                                SUBTEST 00      TEST INITIAL CONDITIONS AFTER RESET
                                SUBTEST 01      COMMAND REGISTER TEST
                                SUBTEST 02      BYTE COUNT REGISTER TEST
                                SUBTEST 03      BUS ADDRESS REGISTER TEST
                                SUBTEST 04      DATA SILO TEST
                                SUBTEST 05      STATUS REGISTER AND ERRORS TEST
                                SUBTEST 06      INTERRUPT TEST
                                SUBTEST 07      C.R.C GENERATION TEST

                8.3     TEST 3 - XMTR-RCVR LOOP TEST:

                                SUBTEST 00      CHK NPR FROM RCVR SILO TO XMTR SILO
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                        SUBTEST 01      DATA LOOPS TEST
                        SUBTEST 02      TRANSMISSION ERRORS TEST
                        SUBTEST 03      REJECT AND TRUNCATE TEST


                8.4     TEST 4 - COMBINATION RUN

                        RUN TEST 1 THEN
                        RUN TEST 2 THEN
                        RUN TEST 3 THEN
                        RUN TEST 1 ETC .



                8.5     THE TESTS WILL IDENTIFY THEMSELVES UPON SELECTION, IN THE
                        FOLLOWING WAY:

                        TEST 1  'PCL11 TRANSMITTER TEST''

                        TEST 2  'PCL11 RECEIVER TEST''

                        TEST 3  'TRANSMITTER - RECEIVER LOOP TESTS''

                        TEST 4  'PCL11 TESTS 1 - 3 SEQUENCE''


                8.6     THE TESTS WILL SIGNIFY COMPLETION BY PRINTING THE FOLLOWING
                        END PASS MESSAGES ALONG WITH THE PASS COUNT IN DECIMAL:

                        TEST 1  -- END PASS # N

                        TEST 2  -- END PASS # NA

                        TEST 3  -- END PASS # NB

                        TEST 4  -- END PASS # NC
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                        9.      STARTING AND OPERATING PROCEDURE

                                LOAD THE PROGRAM TAPE USING THE PDP-11 ABSOLUTE LOADER

                        9.1     START UP:

                                START PROGRAM AT 200
                                PROGRAM WILL ASK THE FOLLOWING (ONE AT A TIME)
                        XMTR 1ST UNIBUS ADDR..  (DEFAULT = 164200)
                        RCVR 1ST UNIBUS ADDR... (DEFAULT = 164220)
                        XMTR VECTOR..           (DEFAULT = 170)
                        RCVR VECTOR..           (DEFAULT = 174)
                        XMTR PRIORITY (4-7)..   (DEFAULT = 5)
                        RCVR PRIORITY (4-7)..   (DEFAULT = 5)
                        XMTR TDM BUS ADDR (1-37)..      (DEFAULT = 1)
                        RCVR TDM BUS ADDR (1-37)..      (DEFAULT = 1)

                        RESPOND TO EACH PROMPT WITH:
                        <CR> IF DEFAULT IS DESIRED
                        XXXXX <CR> IF XXXXX IS DESIRED FOR NEW ENTRY

                        9.11    SELECT TEST:

                                THE PROGRAM THEN TYPES:

                                SELECT TEST (<CR> FOR HELP)..

                        THE OPERATOR HAS THE FOLLOWING CHOICES:

                        1 = SELECT TEST 1 TO RUN ONLY (TRANSMITTER LOGIC TEST)
                        2 = SELECT TEST 2 TO RUN ONLY (RECEIVER LOGIC TEST)
                        3 = SELECT TEST 3 TO RUN ONLY (XMTR -TO- RCVR LOOP TEST)
                        4 = SEQUENCE TEST 1, TEST 2, TEST 3  REPETEDLY.
                        <CR>  PRINT THIS HELP MESSAGE.


                9.12            POSSIBLE INTERVENTION:

                9.121            IF SW 12 IS UP AT START TIME, THE FIRST SUBTEST
                                WILL RUN CONTINUOUSLY AND THE TEST WILL NEVER
                                ACHIEVE A SUCCESSFUL PASS COMPLETE. SWITCH 12
                                MUST BE LEFT DOWN UNLESS AN INTERMITTENT ERROR
                                OCCURS IN A SUBTEST AND IT IS DESIRED TO SCOPE
                                THE MODULE WITH THE SAME SUBTEST RUNNING CONTINUOUSLY.
                                AT ANY TIME, SW 12 MAY BE LOWERED AND THE TEST
                                SEQUENCE WILL RESUME.

                9.122            ANY PARTICULAR SUBTEST MAY BE STARTED BY
                                STARTING WITH OPTION SWITCH 10 = 1 AND THE
                                NUMBER OF THE DESIRED SUBTEST IN SW'S <3:0>.
                                IF IT IS DESIRED, HOWEVER, TO CONTINUOUSLY
                                RUN ONLY THE SELECTED SUBTEST, SW 12 MUST BE RAISED
                                AS WELL AS SW 10 AT START UP TIME.

                9.123            WHEN THE MASTER SECTION TEST HAS IT'S TURN TO RUN
                                THE FOLLOWING MESSAGE WILL APPEAR ON THE CONSOLE
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                                        PRINTER

                                           SCOPE SECTION FOR SLICE TIMING
                                           RAISE SW 09 TO EXIT THIS LOOP

                                        THIS IS A 'HANG-UP'' PROVIDED FOR MAINTENANCE
                                        PURPOSES OF CHECKING AND ADJUSTING SLICE
                                        TIMING IN THE MASTER SECTION. NEITHER THE
                                        PRINTOUT NOR THE 'HANG-UP'' WILL OCCUR IF
                                        SW 09 IS UP.


                                9.124    NORMALLY, 10 (OCTAL) PASSES ARE MADE OF THE
                                        COMPLETE TEST BEFORE A PASS COMPLETE IS
                                        ACHIEVED AND

                                               END PASS XX

                                        IS PRINTED ON THE CONSOLE PRINTER.
                                        HOWEVER, RAISING SW 11 WILL CAUSE EVERY SINGLE
                                        PASS TO BE CONSIDERED AS COMPLETE.

                                9.13    RESTARTING:

                                      , THE TEST MAY BE RE-STARTED AT LOC. 204
                                        THIS WILL OMIT MOST OPENING DIALOGUE.
                                        THE FOLLOWING WILL STILL BE REQUESTED, HOWEVER:

                                        TRANSMITTER TDM BUS ADDRESS IS (1-37).. (DEFAULT = 1)
                                        RECEIVER TDM BUS ADDRESS IS (1-37)..    (DEFAULT = 1)

                                        OR --THE TEST MAY BE RE-STARTED AT LOC. 224
                                        THIS WILL OMIT ALL OF THE OPENING DIALOGUE
                                        AND BEGIN RIGHT AT THE TEST SELECTOR.

                        9.14    (CONTROL CHARACTERS)

                                        CNTRL-C RESTART TO SELECT NEW TDM BUS ADDRESSES
                                        CNTRL-T RESTART AT TEST SELECTOR
                                        CNTRL-D MODIFY DELAY CONSTANT
                                                (NORMALLY SET FOR FASTEST PDP-11)
                                        CNTRL-S MODIFY SWITCH OPTIONS ON NON-
                                                SWITCH REGISTER PDP-11'S
                                        CNTRL-P CONTINUE AFTER CONTROL FUNCTION
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                        10      ERRORS

                                 BASICALLY, THE ERRORS IN THIS TEST ARE IN THE FORM:

                                **ERROR X AT LOCATION YYYYYY

                                WHERE X IS THE ERROR NUMBER:

                                   TRANSMITTER TEST ERROR #'S 1 TO 121  (TEST # 1)
                                   RECEIVER TEST ERROR #'S 200-262      (TEST # 2)
                                   LOOP TEST ERROR #'S 300-355          (TEST # 3)

                                AND YYYYYY IS THE ADDRESS IN THE LISTING WHERE THE
                                ERROR OCCURRED.

                                 REFER TO THE LISTING ABOVE THE COMMENT:

                                   ******* ERROR X *******

                                TO DETERMINE THE CAUSE OF THE ERROR PRINTOUT.

                                 DATA ERRORS WILL CAUSE A FURTHER PRINTOUT INDICATING
                                THE ERRONEOUS DATA:

                                   SHOULD BE AAAAAA, WAS BBBBBB


                                 OTHER ERRORS WILL CAUSE THE FOLLOWING FURTHER
                                PRINTOUTS:

                                   TRANSMITTER STATUS REGISTER = CCCCCC

                                   RECEIVER STATUS REGISTER = DDDDDD

                                   NO. OF WORDS RECEIVED = EEEEEE

                                   SILO OUTPUT WORD WAS FFFFFF

                                   SILO INPUT WORD WAS HHHHHH
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                                .ENDR
                        .TITLE  CZPLBB0 PCL11 STND ALN V02A
                                .SBTTL SYMBOLIC DEFINITIONS

                        ;INTERNAL DEFINITIONS:

177776                  PS      =       177776
177570                  HWSWR   =       177570
031746                  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

                        ;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

                        ;OTHER DEFINITIONS:

002000                  ISP     =       BEGIN           ;INITIAL STACK POINTER
```

```
                        .SBTTL MACRO DEFINITIONS

                        ;BOARD INIT!ALIZE MACRO

                                .MACRO  BDINIT  DEV
                                .NLIST
                        .IF     IDN     <DEV>,<XMTR>
                                BIS     #B01,@TCR
                        .IFF
                           .IF  IDN     <DEV>,<RCVR>
                                BIS     #B01,@RCR
                           .IFF
                                .ERROR          ;BAD ARGUMENT FOR BDINIT
                           .ENDC
                        .ENDC
                                .LIST
                                .ENDM

000001                  N       =       1                       ;INITIAL ERROR NUMBER
                        ;ERROR MACROS

                                .MACRO  ERROR   P
                                                                ;******* ERROR P *******
                                BIT     #B14,@SR
                                BNE     .+14
                                MOV     #P,ERRNUM
                                JSR     PC,ERR
                        N       =       N+1
                                .ENDM

                                .MACRO  DATERR  P
                                                        ;******* ERROR P *******
                                BIT     #B14,@SR
                                BNE     .+14
                                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
                        ;TO RUN ON LSI-11: CHANGE THIS MACRO TO:
                        ;       MOV     SRC,-(SP)
                        ;       MOV     #LLL,-(SP)
                        ;       RTI
                        ;LLL:

                                .MACRO  MTPS    SRC,?LLL
                                MOV     SRC,@#PS
                                .ENDM
```

```
                                        .SBTTL TRAP CATCHERS
                                        .ENABLE ABS
000000                                  .       =       0
000000  000002                          .WORD   .+2
000002  000000                          .WORD   0
000004  004262                          .WORD   ERRTRP                  ;TRAP BAD DEVICE ADDRESSES
000006  000340                          .WORD   340
000176                                  .REPT   126.
                                        .WORD   .+2
                                        .WORD   0
                                        .ENDR
```

```
                                        .SBTTL TEST SUPERVISOR

                    000200              .       =       200

000200  000167  001574                        JMP     BEGIN           ;TEST STARTS AT 200
000204  012706  002000                        MOV     #ISP,SP
000210                                        MTPS    #P7
000216  000005                                RESET
000220  000167  002472                        JMP     RESTRT
000224  012706  002000                        MOV     #ISP,SP
000230                                        MTPS    #P7
000236  000167  002670                        JMP     BCONT           ;GO TO TEST SELECT

                    002000              .       =       2000

002000  000005                        BEGIN:  RESET                   ;CLEAR ALL
002002  012706  002000                        MOV     #ISP,SP         ;SET UP STACK
002006                                        MTPS    #P7             ;DISABLE C.P. INTERRUPT
002014  005067  033276                        CLR     SWRFLG          ;CLEAR SWR FLAG
002020  012737  003774  000004                MOV     #SRTST,@#4      ;SET UP TO TRAP IF NO HSWR
002026  012737  000340  000006                MOV     #P7,@#6
002034  012767  177570  027706                MOV     #HWSWR,SR       ;SET SR TO HDWARE SW REG
002042  005777  027702                        TST     @SR             ;SEE IF IT'S THERE
002046                                        PNTM    TSTHDR          ;PRINT TEST HEADER
002056                                PROMT:  PNTM    TMTR            ;PRINT 'TRANSMITTER'
002066                                        PNTM    FRAD            ;PRINT '1ST BUS ADDR'
002076  016767  033346  030420                MOV     TXMADR,KBBUF    ;LOAD DEFAULT ADDR
002104  004767  030142                        JSR     PC,INPKB        ;GET KBD INPUT
002110  016767  030410  033332                MOV     KBBUF,TXMADR    ;REPLACE XMTR ADDR
002116  026727  033326  164000                CMP     TXMADR,#164000  ;IS IT WITHIN LIMITS?
002124  103006                                BHIS    PRMT1           ;YES, CARRY ON
002126                                        PNTM    TOOLOW          ;NO ERROR, ASK AGAIN
002136  000167  177714                        JMP     PROMT
002142  012737  004242  000004        PRMT1:  MOV     #DVATST,@#4
002150  005777  033274                        TST     @TXMADR         ;IS IT A GOOD ADDRESS?
002154                                PRMT2:  PNTM    RECVR           ;PRINT 'RECEIVER'
002164                                        PNTM    FRAD            ;PRINT 1ST UNIBUS ADDR'
002174  016767  033252  030322                MOV     RCVADR,KBBUF    ;LOAD DEFAULT ADDRESS
002202  004767  030044                        JSR     PC,INPKB        ;GET KBD INPUT
002206  016767  030312  033236                MOV     KBBUF,RCVADR    ;LOAD NEW ADDRESS
002214  026727  033232  164000                CMP     RCVADR,#164000  ;IS IT WITHIN LIMITS?
002222  103006                                BHIS    PRMT3           ;YES, CARRY ON
002224                                        PNTM    TOOLOW
002234  000167  177714                        JMP     PRMT2
002240  005777  033206                PRMT3:  TST     @RCVADR         ;IS IT A GOOD ADDRESS?
002244  012737  004262  000004                MOV     #ERRTRP,@#4     ;SET UP FOR FURTHER TRAPS
002252                                PRMT4:  PNTM    TMTR            ;PRINT 'TRANSMITTER'
002262                                        PNTM    VCTR            ;PRINT 'VECTOR IS'
002272  016767  033146  030224                MOV     TXMVEC,KBBUF    ;LOAD DEFAULT VECTOR
002300  004767  027746                        JSR     PC,INPKB        ;GET KBD INPUT
002304  016767  030214  033132                MOV     KBBUF,TXMVEC    ;REPLACE XMTR VECTOR
002312  026727  030206  000776                CMP     KBBUF,#776      ;IS IT WITHIN LIMITS?
002320  101406                                BLOS    PRMT5
002322                                        PNTM    AGAIN           ;NO, TELL HIM
002332  000167  177714                        JMP     PRMT4
```

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  605  002336                          PRMT5:  PNTM    RECVR                   ;PRINT 'RECEIVER''
  606  002346                                  PNTM    VCTR                    ;PRINT 'VECTOR IS''
  607  002356  016767  033064  030140          MOV     RCVVEC,KBBUF            ;LOAD DEFAULT VECTOR
  608  002364  004767  027662                  JSR     PC,INPKB                ;GET KEYBOARD INPUT
  609  002370  016767  030130  033050          MOV     KBBUF,RCVVEC            ;LOAD NEW VECTOR
  610  002376  026727  030122  000776          CMP     KBBUF,#776              ;IS IT WITHIN LIMITS?
  611  002404  101406                          BLOS    PRMT6
  612  002406                                  PNTM    AGAIN
  613  002416  000167  177714                  JMP     PRMT5
  614  002422                          PRMT6:  PNTM    TMTR                    ;PRINT 'TRANSMITTER''
  615  002432                                  PNTM    PRIOTY                  ;PRINT 'PRIORITY LEVEL IS''
  616  002442  016767  032714  030054          MOV     FKPRIO,KBBUF            ;LOAD DEFAULT PRIORITY
  617  002450  004767  027576                  JSR     PC,INPKB                ;GET KBD INPUT
  618  002454  026727  030044  000007          CMP     KBBUF,#7                ;IS IT WITHIN LIMITS?
  619  002462  003406                          BLE     PRMT7                   ;LOW ENOUGH, O.K.
  620  002464                                  PNTM    AGAIN
  621  002474  000167  177722                  JMP     PRMT6
  622  002500  026727  030020  000004  PRMT7:  CMP     KBBUF,#4                ;HIGH ENOUGH?
  623  002506  002006                          BGE     PRMT8
  624  002510                                  PNTM    AGAIN
  625  002520  000167  177676                  JMP     PRMT6
  626  002524  006367  027774          PRMT8:  ASL     KBBUF
  627  002530  006367  027770                  ASL     KBBUF
  628  002534  006367  027764                  ASL     KBBUF
  629  002540  006367  027760                  ASL     KBBUF
  630  002544  006367  027754                  ASL     KBBUF                   ;SHIFT INTO PLACE
  631  002550  016767  027750  032612          MOV     KBBUF,XPRIO             ;LOAD NEW PRIORITY.
  632  002556                          PRMT9:  PNTM    RECVR                   ;PRINT 'RECEIVER
  633  002566                                  PNTM    PRIOTY                  ;PRINT 'PRIORITY LEVEL IS ''
  634  002576  016767  032560  027720          MOV     FKPRIO,KBBUF            ;LOAD DEFAULT PRIORITY
  635  002604  004767  027442                  JSR     PC,INPKB                ;GET KBD .NPUT
  636  002610  026727  027710  000007          CMP     KBBUF,#7                ;LOW ENOUGH, O.K.
  637  002616  003406                          BLE     3$
  638  002620                                  PNTM    AGAIN
  639  002630  000167  177722                  JMP     PRMT9
  640  002634  026727  027664  000004  3$:     CMP     KBBUF,#4                ;HIGH ENOUGH?
  641  002642  002006                          BGE     4$
  642  002644                                  PNTM    AGAIN
  643  002654  000167  177676                  JMP     PRMT9
  644  002660  006367  027640          4$:     ASL     KBBUF
  645  002664  006367  027634                  ASL     KBBUF
  646  002670  006367  027630                  ASL     KBBUF
  647  002674  006367  027624                  ASL     KBBUF
  648  002700  006367  027620                  ASL     KBBUF                   ;SHIFT INTO PLACE
  649  002704  016767  027614  032460          MOV     KBBUF,RPRIO             ;LOAD NEW PRIORITY
  650  002712  004767  001132                  JSR     PC,DEVGEN               ;GENERATE PCL-11 ADDRESSES
  651  002716                          RESTRT: PNTM    TMTR                    ;PRINT 'TRANSMITTER''
  652  002726                                  PNTM    TDMAD                   ;PRINT 'TDM BUS ADDRESS''
  653  002736  012767  000001  027560          MOV     #1,KBBUF                ;LOAD DEFAULT OF '1''
  654  002744  004767  027302                  JSR     PC,INPKB                ;GET KBD INPUT.
  655  002750  005767  027550                  TST     KBBUF                   ;DON'T ALLOW 0
  656  002754  001006                          BNE     ADOK
  657  002756                                  PNTM    AGAIN
  658  002766  000167  177724                  JMP     RESTRT
  659  002772  026727  027526  000040  ADOK:   CMP     KBBUF,#40               ;CAN'T BE 40 OR HIGHER
  660  003000  103406                          BLO     ADGD
```

```
                                                PNTM    AGAIN
                                                JMP     RESTRT
003016  116767  027502  032327  ADGD:   MOVB    KBBUF,TRAD+1            ;SAVE ADDR IN UPPER BYTE
003024                          PRMT10: PNTM    RECVR                   ;PRINT 'RECIEVER'
003034                                  PNTM    TDMAD                   ;PRINT 'TDM BUS ADDRESS'
003044  012767  000001  027452          MOV     #1,KBBUF                ;LOAD DEFAULT OF 1
003052  004767  027174                  JSR     PC,INPKB                ;GET KBD INPUT
003056  005767  027442                  TST     KBBUF                   ;DON'T ALLOW 0
003062  001006                          BNE     ADROK
003064                                  PNTM    AGAIN
003074  000167  177724                  JMP     PRMT10
003100  026727  027420  000040  ADROK:  CMP     KBBUF,#40               ;CAN'T BE 40 OR HIGHER
003106  103406                          BLO     ADRGD
003110                                  PNTM    AGAIN
003120  000167  177700                  JMP     PRMT10
003124  116767  027374  032217  ADRGD:  MOVB    KBBUF,RCAD+1            ;SAVE ADDR IN UPPER BYTE
003132                          BCONT:  PNTM    TSTSEL                  ;PRINT 'SELECT TEST <CR> = HELP'
003142  012767  000077  027354          MOV     #77,KBBUF               ;DEFAULT TO HELP
003150  004767  027076                  JSR     PC,INPKB                ;GET KEYBOARD INPUT
003154  026727  027344  000005          CMP     KBBUF,#5                ;DID HE TYPE 5 OR HIGHER?
003162  103005                          BHIS    BHLPMG                  ;YES, GIVE ASSISTANCE.
003164  005767  027334                  TST     KBBUF                   ;HOPE IT WASN'T '0'
003170  001402                          BEQ     BHLPMG                  ;'CAUSE THAT'S NO GOOD EITHER
003172  000167  000014                  JMP     TESTGO                  ;EVERYTHING OK. GO TO TESTS
003176                          BHLPMG: PNTM    HLPMSG                  ;NO GOOD, PRINT HELP MESSAGE.
003206  000167  177720                  JMP     BCONT

003212  016767  027306  032124  TESTGO: MOV     KBBUF,TESTNO            ;SAVE TEST NUMBER
003220  005767  032072                  TST     SWRFLG                  ;GOT ANY SWITCHES?
003224  001402                          BEQ     1$                      ;YES, YOU'RE ON YOUR OWN
003226  004767  026154                  JSR     PC,SWDMP                ;OTHERWISE, SHOW SW OPTIONS.
003232  005067  032074          1$:     CLR     PSNO1                   ;CLEAR END PASS COUNTER
003236  005067  032072                  CLR     PSNO2                   ;CLEAR END PASS A COUNTER
003242  005067  032070                  CLR     PSNO3                   ;CLEAR END PASS B COUNTER
003246  005067  032066                  CLR     PSNO4                   ;CLEAR END PASS C COUNTER
003252  026727  032066  000001          CMP     TESTNO,#1               ;SELECT TEST 1?
003260  001012                          BNE     2$                      ;NO.
003262  005067  032060                  CLR     $4FLAG                  ;CLEAR END PASS INHIBIT FLAG
003266                                  PNTM    TXHDR                   ;PRINT XMTR TEST HEADER
003276  004767  000220          11$:    JSR     PC,TEST1                ;YES, GO DO IT (LOOP)
003302  000167  177770                  JMP     11$
003306  026727  032032  000002  2$:     CMP     TESTNO,#2               ;SELECT TEST 2?
003314  001012                          BNE     3$                      ;NO.
003316  005067  032024                  CLR     $4FLAG                  ;CLEAR END PASS INHIBIT FLAG
003322                                  PNTM    RCHDR           ;PRINT RCVR TEST HEADER
003332  004767  011304          21$:    JSR     PC,TEST2                ;YES, GO DO IT (LOOP)
003336  000167  177770                  JMP     21$
003342  026727  031776  000003  3$:     CMP     TESTNO,#3               ;SELECT TEST 3?
003350  001012                          BNE     4$                      ;NO.
003352  005067  031770                  CLR     $4FLAG                  ;CLEAR END PASS INHIBIT FLAG
003356                                  PNTM    XRHDR                   ;PRINT LOOP TEST HEADER
003366  004767  017144          31$:    JSR     PC,TEST3                ;YES, GO DO IT.
003372  000167  177770                  JMP     31$
003376  026727  031742  000004  4$:     CMP     TESTNO,#4               ;SELECT TEST 4?
003404  001044                          BNE     5$                      ;NO?????
003406  012767  177777  031732          MOV     #-1,$4FLAG              ;SET FLAG TO INHIBIT END PASS
```

```
717  003414                                  PNTM    ALTHDR                  ;PRINT TRIPLE TEST HEADER
718  003424  004767  000072          41$:    JSR     PC,TEST1
719  003430  004767  011206                  JSR     PC,TEST2
720  003434  004767  017076                  JSR     PC,TEST3                ;DO ALL TESTS (LOOP)
721  003440  005267  031674                  INC     PSN04                   ;UPDATE PASS COUNTER
722  003444                                  PNTM    PEND                    ;PRINT END PASS #
723  003454  016700  031660                  MOV     PSN04,R0                ;GET PASS # TO R0
724  00346C  004767  027116                  JSR     PC,DECPNT               ;PRINT IT IN DECIMAL
725  003464  012700  000040                  MOV     #40,R0                  ;ALSO, PRINT "C"
726  003470  004767  027276                  JSR     PC,TTO
727  003474  012700  000103                  MOV     #'C,R0                  ;TO IDENTIFY END PASS OF
728  003500  004767  027266                  JSR     PC,TTO                  ;TEST 4
729  003504  005000                          CLR     R0
730  003506  004767  027260                  JSR     PC,TTO                  ;NULLS TO ALLOW PASS #
731  003512  004767  027254                  JSR     PC,TTO
732  003516  000167  177702          5$:     JMP     41$
```

```
                                        .SBTTL  TRANSMITTER TESTS

                                ;TEST 1: TRANSMITTER LOGIC TESTS
                                ;  (00) RESET TEST
                                ;  (01) TCR REG. TEST
                                ;  (02) TSBC REG TEST
                                ;  (03) TSBA REG TEST
                                ;  (04) MASTER SECT. TEST
                                ;  (05) DATA SILO TEST
                                ;  (06) TSR REG. & ERRORS TEST
                                ;  (07) INTERRUPT TEST
                                ;  (10) C.R.C. TEST

003522                          TEST1:  MTPS    #P7
003530  012767  000010  031564          MOV     #10,ITER                ;INITIAL ITERATION OF 10 PER PASS
003536  004767  025612          PNTM    JSR     PC,MONIT                ;CHECK FOR KBD INPUT
003542  032777  002000  026200          BIT     #B10,@SR                        ;CHECK SW 10
003550  001424                          BEQ     LOOP                    ;IF 0, RUN SEQUENTIALLY
003552  017767  026172  031544          MOV     @SR,SWI         ;IF SET, GET TEST # FROM SWR
003560  042767  177760  031536          BIC     #-20,SWI                ;MASK LOW DIGIT
003566  026727  031532  000010          CMP     SWI,#10                 ;DON'T ALLOW SW = >10
003574  003012                          BGT     LOOP                    ;IF GREATER, START 1'ST TEST
003576  000241                          CLC                             ;CLEAR "C" BIT BEFORE ROTATE
003600  006167  031520                  ROL     SWI
003604  006167  031514                  ROL     SWI                     ;MULTIPLY BY 4
003610  062767  003622  031506          ADD     #LOOP,SWI               ;GENERATE OFFSET
003616  000177  031502                  JMP     @SWI                    ;GO TO SELECTED TEST
003622  004767  000550          LOOP:   JSR     PC,XINIT                        ;DO INITIAL CLR TEST
003626  004767  001176                  JSR     PC,TCRTST               ;DO TCR REG TEST
003632  004767  001760                  JSR     PC,BCTST                ;DO BYTE COUNT REG TST
003636  004767  002130                  JSR     PC,BATST                ;DO BYTE ADDR REG TEST
003642  004767  002300                  JSR     PC,MSRTST               ;DO MASTER SECTION TEST
003646  004767  004312                  JSR     PC,SILTST               ;DO DATA SILO TEST
003652  004767  005760                  JSR     PC,TSRTST               ;DO TSR REG & ERRORS TEST
003656  004767  010016                  JSR     PC,INTST                ;DO INTERRUPT TEST
003662  004767  010476                  JSR     PC,CRCTST               ;DO CRC GENERATION TEST
003666  032777  004000  026054          BIT     #B11,@SR                ;CHECK SWITCH 11
003674  001003                          BNE     XEND                    ;PRINT END IF SET
003676  005367  031420                  DEC     ITER                    ;OTHERWISE, REITERATE
003702  001347                          BNE     LOOP
003704  005767  031436          XEND:   TST     $4FLAG                  ;SHOULD WE PRINT END PASS?
003710  001020                          BNE     REPEAT                  ;NO, LEAVE
003712  005267  031414                  INC     PSNO1                   ;UPDATE PASS NUMBER
003716                                  PNTM    PEND                    ;PRINT "END PASS # "
003726  016700  031400                  MOV     PSNO1,R0
003732  004767  026644                  JSR     PC,DECPNT               ;PRINT PASSNO.
003736  005000                          CLR     R0
003740  004767  027026                  JSR     PC,TTO                  ;PRINT NULLS TO ALLOW TIME
003744  005000                          CLR     R0                      ;FOR PASS # TO BE PRINTED
003746  004767  027020                  JSR     PC,TTO
003752  000207          REPEAT: RTS     PC                              ;RETURN TO SUPERVISOR

                                ;NON-SWR PROCESSOR HALT SUBROUTINE

003754  005767  031336          SWHLT:  TST     SWRFLG                  ;ANY HARDWARE SWR?
```

```
                                                                H 2
   790  003760  001403                    BEQ     1$                      ;IF YES GO HALT
   791  003762  004767  025420            JSR     PC,SWDMP                ;IF NOT GO GET SW LOC
   792  003766  000207                    RTS     PC
   793  003770  000000            1$:     HALT
   794  003772  000207                    RTS     PC                      ;RETURN IF CONT KEY HIT
   795
   796  003774  012767  031746  025746  SRTST:  MOV     #SSWR,SR                ;NO HDWARE SWR, USE MEM LOC
   797  004002  012767  177777  031306          MOV     #-1,SWRFLG              ;SET SOFT SWR FLAG
   798  004010  000002                    RTI                             ;RETURN
   799
   800                                    ;THIS ROUTINE ENTERED FOR SCOPE ROUTINES
   801
   802  004012  004767  025336  SCPRTN: JSR     PC,MONIT                ;SEE IF ^S WAS TYPED
   803  004016  005777  025726          TST     @SR                     ;BIT 15 SET?
   804  004022  100402                  BMI     SBAK                    ;YES, DON'T HALT
   805  004024                          HLT                             ;COMMON ERROR HALT. EXAMINE
   806                                                                  ;R5 FOR PC OF ERROR
   807  004030  012500  SBAK:   MOV     (R5)+,R0                ;GET DIRECTION FOR SCOPE LOOP
   808  004032  032777  020000  025710          BIT     #B13,@SR                ;SW 13 SET?
   809  004040  001402                  BEQ     SCONT                   ;NO, DON'T LOOP
   810  004042  012605                  MOV     (SP)+,R5                ;YES, RESTORE R5
   811  004044  000110                  JMP     (R0)                    ;AND LOOP
   812  004046  000205  SCONT:  RTS     R5                      ;JUST RETURN
```

```
                                        .SBTTL UTILITY ROUTINES

                                ;DEVICE ADDRESS GENERATION

004050  016700  031374          DEVGEN: MOV     TXMADR,R0               ;GET BASIC XMTR ADDRESS
004054  010067  031314                  MOV     R0,TCR                  ;GENERATE TCR
004060  062700  000002                  ADD     #2,R0
004064  010067  031306                  MOV     R0,TSR                  ;GENERATE TSR
004070  062700  000002                  ADD     #2,R0
004074  010067  031300                  MOV     R0,TSDB                 ;GENERATE TSDB
004100  062700  000002                  ADD     #2,R0
004104  010067  031272                  MOV     R0,TSBC                 ;GENERATE TSBC
004110  062700  000002                  ADD     #2,R0
004114  010067  031264                  MOV     R0,TSBA                 ;GENERATE TSBA
004120  062700  000002                  ADD     #2,R0
004124  010067  031256                  MOV     R0,TMMR                 ;GENERATE TMMR
004130  005200                          INC     R0
004132  010067  031252                  MOV     R0,TMMRH                ;GEN. TMMR HIGH BYTE
004136  005200                          INC     R0
004140  010067  031246                  MOV     R0,TSCRC                ;GENERATE TSCRC
004144  016767  031274  031212          MOV     TXMVEC,TXVEC            ;GENERATE TXVEC
004152  016700  031274                  MOV     RCVADR,R0               ;GET BASIC RCVR ADDRESS
004156  010067  031232                  MOV     R0,RCR                  ;GENERATE RCR
004162  062700  000002                  ADD     #2,R0
004166  010067  031224                  MOV     R0,RSR                  ;GENERATE RSR
004172  062700  000002                  ADD     #2,R0
004176  010067  031216                  MOV     R0,RDDB                 ;GENERATE RDDB
004202  062700  000002                  ADD     #2,R0
004206  010067  031210                  MOV     R0,RDBC                 ;GENERATE RDBC
004212  062700  000002                  ADD     #2,R0
004216  010067  031202                  MOV     R0,RDBA                 ;GENERATE RDBA
004222  062700  000004                  ADD     #4,R0
004226  010067  031174                  MOV     R0,RDCRC                ;GENERATE RDCRC
004232  016767  031210  031126          MOV     RCVVEC,RCVEC            ;GENERATE RCVEC
004240  000207                          RTS     PC                      ;RETURN.


                                ;DEVICE TEST TRAP HANDLER

004242  012706  002000          DVATST: MOV     #ISP,SP
004246                                  PNTM    INVLAD                  ;PRINT NON-EXST ADDR MSG
004256  000167  175574                  JMP     PROMT                   ;RETURN TO ASK ALL AGAIN


                                ;ROUTINE TO CATCH TRAPS TO 4

004262  011667  031054          ERRTRP: MOV     (SP),TEMP               ;SAVE STACK FOR ADDRESS OF TRAP
004266  012737  000340  177776          MOV     #P7,@#PS                ;RAISE PRIORITY
004274  012706  002000                  MOV     #ISP,SP                 ;FIX THE STACK
004300                                  PNTM    TRAP4                   ;PRINT 'TRAPPED TO 4 '' MSG
004310  162767  000002  031024          SUB     #2,TEMP
004316  016700  031020                  MOV     TEMP,R0
004322  004767  026200                  JSR     PC,OCTPNT               ;PRINT WHERE FROM.
004326  000167  176600                  JMP     BCONT
```

```
                                        ;STANDARD DELAY SUBROUTINE
                                        ;MODIFY LOCATION 'DLCON'' TO CHANGE
                                        ;DELAY PERIOD.
004332  012567  030754          DELAY:  MOV     (R5)+,DILLY             ;GET DELAY PARAMETER
004336  005767  025410                  TST     DLCON                   ;IS DLCON = 0?
004342  001003                          BNE     DLWT                    ;IF NOT, CARRY ON
004344  012767  000001  025400          MOV     #1,DLCON                ;IF SO, MAKE IT = 1
004352  016767  025374  030734  DLWT:   MOV     DLCON,DLY               ;GET DELAY CONSTANT
004360  005367  030730          DLWT1:  DEC     DLY
004364  001375                          BNE     DLWT1
004366  005367  030720                  DEC     DILLY
004372  001367                          BNE     DLWT
004374  000205                          RTS     R5
```

```
                                        .SBTTL  INITIALIZE TEST

                                        ;CHECK INITIAL CONDITIONS AFTER A RESET

004376  000005                  XINIT:  RESET                           ;CLEAR ALL
004400  017767  030776  025576          MOV     @TSBC,BAD               ;GET BYTE COUNT REGISTER
004406  005067  025574                  CLR     GOOD
004412  005767  025566                  TST     BAD                     ;WAS TSBC = 0?
004416  001414                          BEQ     XA1
004420                                  DATERR  \N              ;ERROR:TSBC NOT CLEARED BY RESET
004442                                  SCOPE   XINIT
004450  017767  030730  025526  XA1:    MOV     @TSBA,BAD               ;GET BYTE ADDRESS REGISTER
004456  005067  025524                  CLR     GOOD
004462  005767  025516                  TST     BAD                     ;WAS TSBA = 0?
004466  001414                          BEQ     XA2
004470                                  DATERR  \N              ;ERROR:TSBA NOT CLEARED BY RESET
004512                                  SCOPE   XINIT
004520  017767  030662  025456  XA2:    MOV     @TMMR,BAD               ;GET TMMR REGISTER
004526  042767  000377  025450          BIC     #377,BAD                ;MASK OFF ANY ADDR SILO DATA
004534  012767  050000  025444          MOV     #50000,GOOD             ;SET UP GOOD FOR COMPARE
004542  026767  025440  025434          CMP     GOOD,BAD                ;IGNORE BIT 8 WHEN DETERMINING
004550  001420                          BEQ     XA3                     ;ERROR
004552  022767  050400  025424          CMP     #50400,BAD
004560  001414                          BEQ     XA3
004562                                  DATERR  \N              ;ERROR:TMMR NOT INITIATED BY RESET
004604                                  SCOPE   XINIT
004612  017767  030560  025364  XA3:    MOV     @TSR,BAD                ;GET TSR REGISTER
004620  012767  000400  025360          MOV     #400,GOOD               ;SET UP GOOD FOR COMPARE
004626  026767  025354  025350  XA4:    CMP     GOOD,BAD
004634  001414                          BEQ     XA5
004636                                  DATERR  \N              ;ERROR:TSR NOT INITIALIZED BY RESET
004660                                  SCOPE   XINIT
004666  017767  030502  025310  XA5:    MOV     @TCR,BAD                ;GET TCR REGISTER
004674  005067  025306                  CLR     GOOD
004700  005767  025300                  TST     BAD                     ;WAS TCR = 0?
004704  001414                          BEQ     XA6
004706                                  DATERR  \N              ;ERROR:TCR NOT CLR'D BY RESET
004730                                  SCOPE   XINIT
004736  017767  030450  025240  XA6:    MOV     @TSCRC,BAD
004744  005067  025236                  CLR     GOOD                    ;CHECK CRC REGISTER
004750  005767  025230                  TST     BAD                     ;WAS IT 0?
004754  001414                          BEQ     XA7                     ;YES,CONTINUE
004756                                  DATERR  \N              ;ERROR:TSCRC NOT CLEARED BY RESET
005000                                  SCOPE   XINIT
005006  004767  024342          XA7:    JSR     PC,MONIT
005012  032777  010000  024730          BIT     #B12,@SR                ;CHECK EXIT SW (SW 12)
005020  001402                          BEQ     XART
005022  000167  177350                  JMP     XINIT                   ;IF SET, STAY IN THIS TEST
005026  000207                  XART:   RTS     PC
```

```
                                        .SBTTL  TCR TEST

                                ;TRANSMITTER COMMAND REGISTER TEST

005030  005077  030340        TCRTST: CLR     @TCR                    ;CLEAR TCR REG
005034  012767  017400  025144  XD1:  MOV     #17400,GOOD             ;SET ALL DEST. CODE BITS
005042  016777  025140  030324        MOV     GOOD,@TCR
005050  017767  030320  025126        MOV     @TCR,BAD                ;AND READ THEM BACK
005056  026767  025124  025120        CMP     GOOD,BAD                ;ALL DEST CODE BITS SET?
005064  001414                        BEQ     XD2
005066                                DATERR  \N              ;ERROR:CANNOT SET SOME DEST. CODE BITS
005110                                SCOPE   XD1
005116  005067  025064          XD2:  CLR     GOOD                    ;NOW CLR DEST. CODE BITS AFTER
005122  005077  030246                CLR     @TCR                    ;SETTING THEM
005126  017767  030242  025050        MOV     @TCR,BAD                ;READ THEM BACK
005134  042767  160377  025042        BIC     #160377,BAD             ;IGNORE ALL BUT DEST. CODE BITS
005142  026767  025040  025034        CMP     GOOD,BAD                ;ALL CLEAR?
005150  001414                        BEQ     XD3
005152                                DATERR  \N              ;ERROR:CANNOT CLR SOME DEST.CODE BITS
005174                                SCOPE   XD2
005202  005077  030166          XD3:  CLR     @TCR
005206  005077  030164                CLR     @TSR                    ;CLEAR POSSIBLE TIMEOUT
005212  012767  120365  024766        MOV     #120365,GOOD            ;SET ST TXM,INH ADR INC,EA 16&17,
005220  016777  024762  030146        MOV     GOOD,@TCR               ;IE,RD SILO,SND WD,&RIB
005226  017767  030142  024750        MOV     @TCR,BAD                ;SEE IF THEY ALL SET
005234  026767  024746  024742        CMP     GOOD,BAD
005242  001414                        BEQ     XD4
005244                                DATERR  \N              ;ERROR:BAD BITS IN TCR
005266                                SCOPE   XD3
005274  012777  137765  030072  XD4:  MOV     #137765,@TCR            ;SET ALL SETTABLE BITS IN TCR
005302  012777  177777  030072        MOV     #-1,@TSBC               ;AND IN TSBC
005310  012777  177777  030066        MOV     #-1,@TSBA               ;AND IN TSBA
005316  012777  037240  030052        MOV     #37240,@TSR             ;AND IN TSR
005324  052777  000002  030042        BIS     #2,@TCR                 ;B O A R D  I N I T
005332  017767  030036  024644        MOV     @TCR,BAD                ;CHK TCR
005340  005067  024642                CLR     GOOD
005344  026767  024636  024632        CMP     GOOD,BAD                ;TCR = 0?
005352  001414                        BEQ     XD5
005354                                DATERR  \N              ;ERROR:TCR NOT CLR'D BY BOARD INIT
005376                                SCOPE   XD4
005404  017767  027772  024572  XD5:  MOV     @TSBC,BAD               ;CHECK TSBC
005412  026767  024570  024564        CMP     GOOD,BAD                ;TSBC = 0?
005420  001414                        BEQ     XD6
005422                                DATERR  \N              ;ERROR:TSBC NOT CLR'D BY BD INIT
005444                                SCOPE   XD4
005452  017767  027726  024524  XD6:  MOV     @TSBA,BAD               ;TSBA = 0?
005460  026767  024522  024516        CMP     GOOD,BAD
005466  001414                        BEQ     XD7
005470                                DATERR  \N              ;ERROR:TSBA NOT CLR'D BY BD INIT
005512                                SCOPE   XD4
005520  017767  027652  024456  XD7:  MOV     @TSR,BAD                ;TSR OK?
005526  012767  000400  024452        MOV     #400,GOOD
005534  026767  024446  024442  XD8:  CMP     GOOD,BAD
005542  001414                        BEQ     XD9
005544                                DATERR  \N              ;ERROR:TSR BAD AFTER BD INIT
005566                                SCOPE XD4
```

```
  994  005574  004767  023554          XD9:    JSR     PC,MONIT
  995  005600  032777  010000  024142          BIT     #B12,@SR
  996  005606  001402                  BEQ     XDRT                    ;LEAVE IF SW 12 = 0
  997  005610  000167  177214          JMP     TCRTST                  ;OTHERWISE, MUST STAY
  998  005614  000207                  XDRT:   RTS     PC
```

```
1000                                        .SBTTL  TSBC TEST
1001
1002                                    ;BYTE COUNT REG. DATA TEST
1003
1004  005616                            BCTST:  BDINIT  XMTR                    ;INIT XMTR MODULE
1005  005624  012767  177777  027474            MOV     #-1,PAT                ;SET PATTERN
1006  005632  012767  000001  027470            MOV     #B00,MASK              ;SET BIT MASK
1007  005640  016767  027462  024340  XB1:     MOV     PAT,GOOD               ;LOAD "GOOD" WITH PATTERN
1008  005646  016777  024334  027526            MOV     GOOD,@TSBC             ;LOAD PATTERN INTO TSBC
1009  005654  017767  027522  024322            MOV     @TSBC,BAD              ;READ TSBC
1010  005662  026767  024320  024314            CMP     GOOD,BAD
1011  005670  001414                           BEQ     XB2
1012  005672                                    DATERR  \N              ;ERROR:BAD DATA IN TSBC
1013  005714                                    SCOPE   XB1
1014  005722  032767  100000  027376  XB2:     BIT     #B15,PAT               ;DONE WHOLE REGISTER?
1015  005730  001407                           BEQ     XB3                    ;IF YES, DONE
1016  005732  046767  027372  027366            BIC     MASK,PAT               ;NO, PREPARE FOR NEXT BIT
1017  005740  006367  027364                    ASL     MASK                   ;ROTATE MASK
1018  005744  000167  177670                    JMP     XB1                    ;AND CONTINUE
1019  005750  004767  023400          XB3:     JSR     PC,MONIT
1020  005754  032777  010000  023766            BIT     #B12,@SR               ;IF SO, CONSIDER LEAVING
1021  005762  001402                           BEQ     XBRT                   ;EXIT IF SW 12 - 0
1022  005764  000167  177626                    JMP     BCTST                  ;STAY HERE IF SW 12   1
1023  005770  000207                  XBRT:    RTS     PC
```

```
                                        .SBTTL  TSBA TEST

                                ;BYTE ADDRESS REGISTER TEST

005772                          BATST:  BDINIT  XMTR                    ;INIT XMTR MODULE
006000  012767  177777  027320          MOV     #-1,PAT                 ;SET PATTERN
006006  012767  000001  027314          MOV     #B00,MASK               ;SET BIT MASK
006014  016767  027306  024164  XC1:    MOV     PAT,GOOD                ;LOAD ''GOOD'' WITH PATTERN
006022  016777  024160  027354          MOV     GOOD,@TSBA              ;LOAD PATTERN INTO TSBA
006030  017767  027350  024146          MOV     @TSBA,BAD               ;READ IT BACK
006036  026767  024144  024140          CMP     GOOD,BAD
006044  001414                          BEQ     XC2
006046                                  DATERR  \N              ;ERROR:BAD DATA IN TSBA
006070                                  SCOPE   XC1
006076  032767  100000  027222  XC2:    BIT     #B15,PAT                ;DONE WHOLE REGISTER?
006104  001407                          BEQ     XC3                     ;IF YES, DONE
006106  046767  027216  027212          BIC     MASK,PAT                ;NO,PREPARE FOR NEXT BIT
006114  006367  027210                  ASL     MASK                    ;ROTATE MASK
006120  000167  177670                  JMP     XC1                     ;AND CONTINUE
006124  004767  023224          XC3:    JSR     PC,MONIT
006130  032777  010000  023612          BIT     #B12,@SR                ;IF SO, CONSIDER LEAVING
006136  001402                          BEQ     XCRT                    ;EXIT IF SW 12 - 0
006140  000167  177626                  JMP     BATST                   ;STAY HERE IF SW 12 = 1
006144  000207                  XCRT:   RTS     PC
```

```
                                        .SBTTL  MASTER SECTION TEST

                                        ;TEST MASTER CONTROL AND ADDRESS SILO

006146                          MSRTST: BDINIT  XMTR                    ;INIT BOADR
006154  112777  000001  027226          MOVB    #1,@TMMRH               ;SET MASTER FLOP
006162  132777  000001  027220          BITB    #1,@TMMRH               ;IS MASTER SET?
006170  001014                          BNE     XE1
006172                                  ERROR   \N              ;ERROR:COULD NOT SET MASTER FLOP
006214                                  SCOPE   MSRTST
006222  004767  023126          XE1:    JSR     PC,MONIT
006226  032777  001000  023514          BIT     #B09,@SR                ;CHECK SW 09
006234  001024                          BNE     XE3                     ;IF ON, SKIP SCOPE LOOP
006236  012767  177777  027054          MOV     #-1,PNTFLG              ;SET PRINT ALLOW FLAG
006244                                  PNTM    SCSEC                   ;OTHERWISE PRINT "SCOPE SECTION..ETC"
006254  005067  027040                  CLR     PNTFLG                  ;CLEAR PRINT ALLOW FLAG
006260  005767  027032                  TST     SWRFLG                  ;REAL SW REG?
006264  001402                          BEQ     XE2                     ;YES, SKIP
006266  004767  023114                  JSR     PC,SWDMP
006272  004767  023056          XE2:    JSR     PC,MONIT
006276  032777  001000  023444          BIT     #B09,@SR                ;KEEP AN EYE ON SW 09
006304  001772                          BEQ     XE2                     ;STAY HERE 'TILL IT GETS SET
006306  142777  000001  027074  XE3:    BICB    #1,@TMMRH               ;CLR MASTER FLOP
006314  132777  000001  027066          BITB    #1,@TMMRH               ;IS MASTER CLEAR?
006322  001414                          BEQ     XE3A
006324                                  ERROR   \N              ;ERROR:COULD NOT CLR MASTER FLOP
006346                                  SCOPE   XE3
006354  152777  000004  027026  XE3A:   BISB    #4,@TMMRH               ;SET 'NOW MASTER' FLOP
006362  132777  000004  027020          BITB    #4,@TMMRH               ;IS IT SET?
006370  001014                          BNE     XE3B                    ;YES, GO TO CLEAR IT
006372                                  ERROR   \N              ;ERROR:COULD NOT SET 'NOW MASTER FLOP
006414                                  SCOPE   XE3A
006422  142777  000004  026760  XE3B:   BICB    #4,@TMMRH               ;OKAY, NOW CLEAR 'NOW MASTER'
006430  132777  000004  026752          BITB    #4,@TMMRH               ;IS IT CLEAR?
006436  001414                          BEQ     XE5A                    ;YES, OKAY.
006440                                  ERROR   \N              ;ERROR:COULD NOT CLEAR 'NOW MASTER'
006462                                  SCOPE   XE3B
006470  112777  000002  026712  XE5A:   MOVB    #2,@TMMRH               ;SET SECONDARY FLOP
006476  132777  000001  026704          BITB    #1,@TMMRH               ;IS MASTER SET?
006504  001017                          BNE     XE6
006506  142777  000002  026674          BICB    #2,@TMMRH               ;CLR SEC FOR RE-TRY
006514                                  ERROR   \N              ;ERROR:SETTING SEC DID NOT SET MASTER
006536                                  SCOPE   XE5A
006544  132777  000002  026636  XE6:    BITB    #2,@TMMRH               ;IS SEC CLR?
006552  001417                          BEQ     XE6A
006554  142777  000002  026626          BICB    #2,@TMMRH               ;CLR SEC FOR RETRY
006562                                  ERROR   \N              ;ERROR:SEC NOT CLR'D BY THE SETTING OF MASTER
006604                                  SCOPE   XE5A
006612  132777  000004  026570  XE6A:   BITB    #4,@TMMRH               ;IS 'NOW MASTER '' SET?
006620  001017                          BNE     XE7                     ;YES, OKAY
006622  142777  000002  026560          BICB    #2,@TMMRH               ;CLR SEC FOR RETRY.
006630                                  ERROR   \N              ;ERROR:'NOW MASTER'' NOT SET VIA SECONDARY
006652                                  SCOPE   XE5A
```

```
                                        ;ADDRESS SILO TEST

006660  152777  000060  026522  XE7:    BISB    #60,@TMMRH              ;SET AUT ADR TO LD SILO &CLR SILO
006666  132777  000020  026514          BITB    #20,@TMMRH              ;IS AUT ADR SET?
006674  001014                          BNE     XE7A
006676                                  ERROR   \N              ;ERROR:COULD NOT SET TMMR BIT 12
006720                                  SCOPE   XE7
006726  132777  000200  026454  XE7A:   BITB    #200,@TMMRH             ;CHECK FOR OUTPUT RDY
006734  001414                          BEQ     XE8
006736                                  ERROR   \N              ;ERROR:TMMR BIT 13 DOES NOT CLR ADDR SILO
006760                                  SCOPE   XE7
006766  012704  177700          XE8:    MOV     #-64.,R4                ;R4 IS COUNTER
006772  005003                          CLR     R3                      ;R3 IS DATA
006774  132777  000100  026406          BITB    #100,@TMMRH             ;ADR SILO INPUT RDY?
007002  001014                          BNE     XE9
007004                                  ERROR   \N              ;ERROR:ADR SILO INPUT NOT RDY
007026                                  SCOPE   XE8
007034  110377  026346          XE9:    MOVB    R3,@TMMR                ;LOAD ADDR SILO
007040  005203                          INC     R3
007042  005204                          INC     R4
007044  001420                          BEQ     XE11
007046  132777  000100  026334  XE10:   BITB    #100,@TMMRH             ;INPUT READY?
007054  001367                          BNE     XE9
007056                                  ERROR   \N              ;ERROR:INPUT NOT RDY-PREMATURLY FULL?
007100                                  SCOPE   XE7
007106  132777  000100  026274  XE11:   BITB    #100,@TMMRH             ;SILO SHOULD BE FULL NOW
007114  001414                          BEQ     XE12                    ;INPUT READY?
007116                                  ERROR   \N              ;ERROR:SILO FULL-BUT STILL RDY FOR INPUT
007140                                  SCOPE   XE7
007146  132777  000200  026234  XE12:   BITB    #200,@TMMRH             ;SILO OUTPUT RDY?
007154  001014                          BNE     XE13
007156                                  ERROR   \N              ;ERROR:FULL SILO NOT RDY FOR OUTPUT
007200                                  SCOPE   XE7
007206  005003          XE13:   CLR     R3                      ;R3 IS FOR DATA COMPARE
007210  012704  177700                  MOV     #-64.,R4                ;R4 IS COUNTER
007214  052777  000200  026152  XE14:   BIS     #B07,@TCR               ;SET RD SILO
007222  117767  026160  022754          MOVB    @TMMR,BAD               ;READ WORD FROM ADDRESS SILO
007230  005077  026140                  CLR     @TCR                    ;CLEAR RD SILO BIT
007234  042767  177400  022742          BIC     #177400,BAD             ;ONLY INTERRESTED IN LOW BYTE
007242  010367  022740                  MOV     R3,GOOD
007246  026767  022734  022730  XE15:   CMP     GOOD,BAD                ;SILO OUTPUT OK?
007254  001414                          BEQ     XE16
007256                                  DATERR  \N              ;ERROR:BAD DATA READ FROM ADDR SILO
007300                                  SCOPE   XE7
007306  005203          XE16:   INC     R3
007310  042703  177740                  BIC     #177740,R3              ;KEEP R3 DOWN TO 5 BITS
007314  005204                          INC     R4
007316  001420                          BEQ     XE18                    ;AFTER 64 WDS, EXIT
007320  132777  000200  026062  XE17:   BITB    #200,@TMMRH             ;SILO OUTPUT READY?
007326  001332                          BNE     XE14
007330                                  ERROR   \N              ;ERROR:SILO OUT NOT RDY-SILO NOT EMPTY
007352                                  SCOPE   XE7
007360  132777  000200  026022  XE18:   BITB    #200,@TMMRH             ;SILO OUT RDY AFTER 64 READS?
007366  001414                          BEQ     XE19
007370                                  ERROR   \N              ;ERROR:EMPTY SILO READY FOR OUTPUT
007412                                  SCOPE   XE7
```

```
1160  007420  005077  025750          XE19:  CLR     @TCR                    ;CLR RD SILO
1161  007424  112777  000000  025754         MOVB    #0,@TMMR                ;LOAD A WORD INTO SILO
1162  007432  004567  174674                 JSR     R5,DELAY                ;WAIT FOR MIGRATION
1163  007436  000010                          .WORD   10
1164  007440  132777  000200  025742         BITB    #200,@TMMRH             ;CHECK OUT RDY AFTER DELAY
1165  007446  001022                          BNE     XE20
1166  007450                                  ERROR   \N              ;ERROR:SILO SETTLING TIME TOO LONG
1167  007472  052777  000200  025674         BIS     #B07,@TCR               ;SET RD SILO BIT
1168  007500  117767  025702  022476         MOVB    @TMMR,BAD               ;GET RID OF THE WORD IN SILO
1169  007506                                  SCOPE   XE19
1170  007514  152777  000041  025666  XE20:  BISB    #41,@TMMRH              ;SET 'CLR SILO' BIT & SET MASTER
1171  007522  132777  000200  025660         BITB    #200,@TMMRH             ;SILO RDY?
1172  007530  001414                          BEQ     XE21
1173  007532                                  ERROR   \N              ;ERROR:BIT 13 OF TMMR DID NOT CLR ADR SILO
1174  007554                                  SCOPE   XE20
1175  007562  112777  000037  025616  XE21:  MOVB    #37,@TMMR               ;LOAD SILO WITH TEST WORD
1176  007570  132777  000200  025612  XE22:  BITB    #200,@TMMRH             ;SILO OUT RDY?
1177  007576  001774                          BEQ     XE22                    ;WAIT FOR IT
1178  007600  142777  000020  025602  XE22A: BICB    #20,@TMMRH              ;CLR AUT ADR
1179  007606  016704  022140                 MOV     DLCON,R4
1180  007612  012703  177000          XE22B: MOV     #177000,R3              ;SET UP FOR ABOUT 5MS DELAY
1181  007616  132777  000200  025564  XE23:  BITB    #200,@TMMRH             ;OUTPUT RDY?
1182  007624  001420                          BEQ     XE24                    ;IF NO - CARRY ON
1183  007626  005203                          INC     R3                      ;WAITED 5MS?
1184  007630  001372                          BNE     XE23                    ;NOT YET
1185  007632  005304                          DEC     R4
1186  007634  001366                          BNE     XE22B
1187  007636                                  ERROR   \N              ;ERROR:ADDRESS SILO IS NOT CYCLING
1188  007660                                  SCOPE   XE22A
1189  007666  142777  000001  025514  XE24:  BICB    #1,@TMMRH               ;CLEAR MASTER FOR SYNC.
1190  007674  004567  174432                 JSR     R5,DELAY
1191  007700  000010                          .WORD   10
1192  007702  132777  000200  025500         BITB    #200,@TMMRH             ;OUTPUT READY
1193  007710  001014                          BNE     XE25
1194  007712                                  ERROR   \N              ;ERROR:CYCLED WORD WAS LOST-OUT NOT RDY
1195  007734                                  SCOPE   XE20
1196  007742  004567  174364          XE25:  JSR     R5,DELAY
1197  007746  000010                          .WORD   10
1198  007750  152777  000021  025432         BISB    #21,@TMMRH              ;SET AUTO ADDR & MASTER
1199  007756  052777  000200  025410         BIS     #B07,@TCR               ;SET RD SILO
1200  007764  117767  025416  022212         MOVB    @TMMR,BAD               ;CHECK VALIDITY OF OUTPUT
1201  007772  042767  177400  022204         BIC     #177400,BAD             ;ONLY INTERRESTED IN LOW BYTE
1202  010000  012767  000037  022200         MOV     #37,GOOD
1203  010006  026767  022174  022170         CMP     GOOD,BAD                ;OUTPUT SHOULD BE 37
1204  010014  001417                          BEQ     XE26
1205  010016                                  DATERR  \N              ;ERROR:CYCLED WORD IS BAD DATA
1206  010040  042777  000200  025326         BIC     #B07,@TCR               ;CLR RD SILO BIT FOR SCOPE
1207  010046                                  SCOPE   XE20
1208  010054  004567  174252          XE26:  JSR     R5,DELAY                ;WAIT ANOTHER SETTLING TIME
1209  010060  000010                          .WORD   10
1210  010062  132777  000200  025320         BITB    #200,@TMMRH             ;IS SILO OUT RDY (SHOULDN'T BE)?
1211  010070  001417                          BEQ     XE27                    ;NO, LEAVE
1212  010072                                  ERROR   \N              ;ERROR:EXTRA WORD FOUND IN SILO
1213  010114  042777  000200  025252         BIC     #B07,@TCR               ;CLR RD SILO
1214  010122                                  SCOPE   XE20
1215  010130  152777  000060  025252  XE27:  BISB    #60,@TMMRH              ;SET AUTO ADDRESS & CLR ADDR SILO
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```
 1216  010136  005077  025232                CLR     @TCR                    ;CLEAR RD SILO
 1217  010142  004767  021206                .SR     PC,MONIT
 1218  010146  032777  010000  021574        BIT     #B12,@SR                ;OK TO EXIT IF SW 12 - 0
 1219  010154  001402                        BEQ     XERT
 1220  010156  000167  175764                JMP     MSRTST                  ;OTHERWISE, STAY HERE
 1221  010162  000207              XERT:     RTS     PC
```

```
1223                                            .SBTTL  DATA SILO TEST
1224
1225                                            ;TRANSMITTER DATA SILO TEST
1226
1227  010164                                    SILTST: BDINIT  XMTR                    ;CLEAR BOARD
1228  010172  004567  174134                           JSR     R5,DELAY
1229  010176  000010                                   .WORD   10
1230  010200  032777  000010  025166                   BIT     #B03,@TCR               ;SILO OUTPUT READY?
1231  010206  001414                                   BEQ     XF1
1232  010210                                           ERROR   \N              ;ERROR:BD INIT DID NOT CLEAR DATA SILO
1233  010232                                           SCOPE   SILTST
1234  010240  032777  000400  025130  XF1:     BIT     #B08,@TSR               ;SILO INPUT READY?
1235  010246  001014                                   BNE     XF2
1236  010250                                           ERROR   \N              ;ERROR:BD INIT DID NOT SET INPUT READY
1237  010272                                           SCOPE   SILTST
1238  010300  012777  177777  025072  XF2:     MOV     #-1,@TSDB               ;LOAD 177777 INTO DATA SILO
1239  010306  004567  174020                           JSR     R5,DELAY
1240  010312  000010                                   .WORD   10
1241  010314  032777  000010  025052                   BIT     #B03,@TCR               ;SILO OUTPUT READY?
1242  010322  001017                                   BNE     XF3
1243  010324                                           ERROR   \N              ;ERROR:NO SILO OUTPUT 37 US. AFTER LOAD
1244  010346                                           BDINIT  XMTR                    ;CLEAR SILO
1245  010354                                           SCOPE   XF2
1246  010362  017767  025012  021614  XF3:     MOV     @TSDB,BAD               ;READ WORD FROM SILO
1247  010370  012767  177777  021610                   MOV     #-1,GOOD
1248  010376  026767  021604  021600                   CMP     GOOD,BAD                ;SILO OUTPUT = 177777
1249  010404  001417                                   BEQ     XF3A
1250  010406                                           DATERR  \N              ;ERROR:DROPPED BITS IN DATA SIL
1251  010430                                           BDINIT  XMTR                    ;CLEAR SILO
1252  010436                                           SCOPE   XF2
1253  010444  052777  000200  024722  XF3A:    BIS     #B07,@TCR               ;SET RD SILO BIT IN TCR
1254  010452  017703  024722                           MOV     @TSDB,R3                ;POP WORD FROM SILO
1255  010456  032777  000010  024710                   BIT     #B03,@TCR               ;SILO OUTPUT READY?
1256  010464  001414                                   BEQ     XF5
1257  010466                                           ERROR   \N              ;ERROR:WORD DID NOT GET POPPED FROM SILO
1258  010510                                           SCOPE   XF3
1259  010516  032777  000400  024652  XF5:     BIT     #B08,@TSR               ;IS INPUT READY?
1260  010524  001014                                   BNE     XF6
1261  010526                                           ERROR   \N              ;ERROR:DATA SILO INPUT NOT READY
1262  010550                                           SCOPE   XF5
1263  010556  042777  000200  024610  XF6:     BIC     #B07,@TCR               ;CLEAR RD SILO BIT
1264  010564  005077  024610                           CLR     @TSDB                   ;LOAD 0'S INTO SILO
1265  010570  032777  000010  024576  XF6A:    BIT     #B03,@TCR               ;OUTPUT RDY?
1266  010576  001774                                   BEQ     XF6A                    ;WAIT FOR IT
1267  010600  017767  024574  021376                   MOV     @TSDB,BAD               ;READ OUTPUT OF SILO
1268  010606  005067  021374                           CLR     GOOD
1269  010612  026767  021370  021364                   CMP     GOOD,BAD                ;OUTPUT = 0?
1270  010620  001417                                   BEQ     XF7
1271  010622                                           DATERR  \N              ;ERROR:BITS PICKED UP IN DATA SILO
1272  010644                                           BDINIT  XMTR                    ;CLR SILO
1273  010652                                           SCOPE   XF6
1274  010660                                  XF7:     BDINIT  XMTR                    ;CLR XMITTER BOARD
1275  010666  012777  177600  024506                   MOV     #-128.,@TSBC            ;SET BYTE COUNT TO -128
1276  010674  012777  033026  024502                   MOV     #SILDAT,@TSBA           ;POINT DEVICE AT CORE BUFFER
1277  010702  052777  040000  024464                   BIS     #B14,@TCR               ;SET TX NPR
1278  010710  032777  040000  024456                   BIT     #B14,@TCR               ;IS TX NPR SET?
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1279  010716  001014                        BNE     XF8
1280  010720                                ERROR   \N              ;ERROR:CANNOT SET TX NPR
1281  010742                                SCOPE   XF7
1282  010750  016704  020776        XF8:    MOV     DLCON,R4
1283  010754  012703  177500        XF8A:   MOV     #177500,R3              ;SET UP 2 MS DELAY
1284  010760  005777  024416        XF9:    TST     @TSBC                   ;IS BYTE COUNT 0?
1285  010764  001420                        BEQ     XF10
1286  010766  005203                        INC     R3                      ;WAITED 2 MS?
1287  010770  001373                        BNE     XF9                     ;NO, KEEP LOOKING
1288  010772  005304                        DEC     R4
1289  010774  001367                        BNE     XF8A
1290  010776                                ERROR   \N              ;ERROR: NPR NOT COMPLETE AFTER 2 MS
1291  011020                                SCOPE   XF7
1292  011026  032777  000400  024342  XF10:  BIT     #B08,@TSR               ;INPUT READY?
1293  011034  001414                        BEQ     XF11
1294  011036                                ERROR   \N              ;ERROR:SILO FULL BUT INPUT RDY SET
1295  011060                                SCOPE   XF10
1296  011066  032777  000010  024300  XF11:  BIT     #B03,@TCR               ;OUTPUT READY?
1297  011074  001014                        BNE     XF12
1298  011076                                ERROR   \N              ;ERROR:FULL SILO NOT RDY FOR OUTPUT
1299  011120                                SCOPE   XF11
1300  011126  052777  000200  024240  XF12:  BIS     #B07,@TCR               ;SET RD SILO BIT
1301  011134  012704  033026                MOV     #SILDAT,R4              ;R4 IS DATA POINTER
1302  011140  012703  177700                MOV     #-64.,R3                ;R3 IS COUNTER
1303  011144  017767  024230  021032  XF13:  MOV     @TSDB,BAD               ;POP WORD FROM SILO TO 'BAD'
1304  011152  012467  021030                MOV     (R4)+,GOOD              ;AND POP A WORD FROM BUFFER
1305  011156  026767  021024  021020        CMP     GOOD,BAD                ;DATA OK?
1306  011164  001422                        BEQ     XF14
1307  011166                                DATERR  \N              ;ERROR:DATA FROM SILO IS WRONG
1308  011210  042777  000200  024156        BIC     #B07,@TCR               ;CLR RD SILO BIT
1309  011216                                SCOPE   XF7                     ;GO TO RE-FILL SILO FOR RE-TRY
1310  011224  052777  000200  024142        BIS     #B07,@TCR               ;RE-SET RD SILO BIT
1311  011232  005203                XF14:   INC     R3                      ;ALL DONE?
1312  011234  001343                        BNE     XF13                    ;IF NOT, POP ANOTHER WORD
1313  011236                        XF17:   BDINIT  XMTR                    ;CLEAR THE BOARD
1314  011244  012777  177774  024130        MOV     #-4,@TSBC               ;SET BYTE COUNT TO -4
1315  011252  012777  033026  024124        MOV     #SILDAT,@TSBA           ;POINT NPR TO DATA BUFFER
1316  011260  012767  033026  020720        MOV     #SILDAT,GOOD
1317  011266  052777  040004  024100        BIS     #40004,@TCR             ;SET TX NPR AND INH ADR INC
1318  011274  005777  024102        XF18:   TST     @TSBC                   ;WAIT FOR NPR TO FINISH
1319  011300  001375                        BNE     XF18
1320  011302  017767  024076  020674        MOV     @TSBA,BAD               ;READ BYTE ADDRESS
1321  011310  026767  020672  020666        CMP GOOD,BAD                    ;HAS IT CHANGED?
1322  011316  001417                        BEQ     XF19
1323  011320                                DATERR  \N              ;ERROR:TSBA SHD NOT CHANGE WITH INH ADR INC SET
1324  011342                                BDINIT  XMTR
1325  011350                                SCOPE   XF17
```

```
1327                                        .SBTTL  DATA SILO BLOCK COUNTER TEST
1328
1329                                    ;THIS TESTS THAT, AFTER PULLING 200 (OCTAL) WORDS THRU THE SILO
1330                                    ;THE BLOCK COUNTER COUNTS THE 200 WORDS AND HOLDS SILO OUTPUT READY
1331                                    ;IN A FALSE STATE.
1332
1333  011356                            XF19:   BDINIT  XMTR                    ;CLEAR THE BOARD
1334  011364  142777  000001  024016            BICB    #B00,@TMMRH             ;CLEAR MASTER FOR THIS TEST
1335  011372  004767  000136                    JSR     PC,XFSR                 ;FILL THE DATA SILO
1336  011376  012702  000100                    MOV     #64.,R2
1337  011402  004767  000176                    JSR     PC,XFEMT                ;POP ALL 64 WORDS OUT
1338  011406  004767  000122                    JSR     PC,XFSR                 ;FILL SILO AGAIN
1339  011412  012702  000020                    MOV     #20,R2
1340  011416  004767  000162                    JSR     PC,XFEMT                ;POP 20 (OCTAL) WORDS OUT
1341  011422  004767  000106                    JSR     PC,XFSR                 ;FILL SILO AGAIN
1342  011426  012702  000060                    MOV     #60,R2
1343  011432  004767  000146                    JSR     PC,XFEMT                ;POP 60 (OCTAL) WORDS OUT
1344                                                                            ;  LEAVING 20 (OCTAL) IN SILO
1345                                                                            ;  AND HAVING PULLED OUT 200 TOTAL (OCTAL)
1346  011436  032777  000010  023730            BIT     #B03,@TCR               ;NOW CHECK OUTPUT READY
1347  011444  001414                            BEQ     XF19A                   ;IF IT'S CLEAR, OKAY
1348  011446                                    ERROR   \N              ;ERROR:OUTPUT RDY AFTER 200 WORD BLOCK
1349  011470                                    SCOPE   XF19
1350  011476                            XF19A:  BDINIT  XMTR                    ;CLEAN UP.
1351  011504  152777  000020  023676    XF20:   BISB    #20,@TMMRH              ;SET AUT ADR
1352  011512  004767  017636                    JSR     PC,MONIT
1353  011516  032777  010000  020224            BIT     #B12,@SR                ;CAN WE EXIT NOW?
1354  011524  001402                            BEQ     XFRT                    ;OK IF SW 12 = 0
1355  011526  000167  176432                    JMP     SILTST                  ;NO IF SW 12 = 1
1356  011532  000207                    XFRT:   RTS     PC
1357
1358                                    ;ROUTINE TO FILL DATA SILO VIA NPR
1359
1360  011534  012777  177600  023640    XFSR:   MOV     #-128.,@TSBC            ;SET BYTE COUNT FOR FILL-UP
1361  011542  012777  033026  023634            MOV     #SILDAT,@TSBA           ;POINT DEVICE AT CORE BUFFER
1362  011550  052777  040000  023616            BIS     #B14,@TCR               ;START NPR
1363  011556  016704  020170                    MOV     DLCON,R4
1364  011562  012703  175000            XFSR1:  MOV     #175000,R3              ;SET UP TO WAIT FOR CMPL
1365  011566  005203                    XFSRW:  INC     R3
1366  011570  001376                            BNE     XFSRW                   ;WAIT FOR NPR COMPLETION
1367  011572  005304                            DEC     R4
1368  011574  001372                            BNE     XFSR1
1369  011576  005077  023572                    CLR     @TCR                    ;CLEAR TXNPR
1370  011602  000207                            RTS     PC                      ;RETURN WITH SILO FULL
1371
1372                                    ;ROUTINE TO POP (R2) NUMBER OF WORDS FROM DATA SILO
1373
1374  011604  052777  000200  023562    XFEMT:  BIS     #B07,@TCR               ;SET RD SILO
1375  011612  010203                            MOV     R2,R3
1376  011614  017767  023560  020362    XFMTW:  MOV     @TSDB,BAD               ;POP A WORD OUT
1377  011622  005303                            DEC     R3                      ;KEEP TRACK OF # OF WORDS
1378  011624  001373                            BNE     XFMTW
1379  011626  042777  000200  023540            BIC     #B07,@TCR               ;LEAVE WITH RD SILO CLEAR
1380  011634  000207                            RTS     PC
```

```
                                        .SBTTL  TSRTST

                                ;STATUS REGISTER AND ERRORS TEST

011636                          TSRTST: BDINIT  XMTR                    ;CLR BOARD
011644  052777  000200  023524          BIS     #B07,@TSR               ;SET SUCC XFER
011652  032777  000200  023516          BIT     #B07,@TSR               ;IS IT SET?
011660  001014                          BNE     XH1
011662                                  ERROR   \N              ;ERROR:CANNOT SET TSR BIT 07
011704                                  SCOPE   TSRTST
011712  042777  000200  023456  XH1:    BIC     #B07,@TSR               ;CLR SUCC XFER
011720  032777  000200  023450          BIT     #B07,@TSR               ;IS IT CLR?
011726  001414                          BEQ     XH2
011730                                  ERROR   \N              ;ERROR:CANNOT CLR SUCC XFR
011752                                  SCOPE   XH1
011760                          XH2:    BDINIT  XMTR                    ;CLEAR BOARD
011766  012777  177777  023404          MOV     #-1,@TSDB               ;LOAD WORD INTO SILO
011774  032777  000010  023372          BIT     #B03,@TCR               ;OUTPUT READY?
012002  001774                          BEQ     .-6                     ;WAIT FOR WORD TO HIT BOTTOM
012004  152777  000001  023376          BISB    #1,@TMMRH               ;SET MASTER FOR TIME SLICES
012012  012777  120000  023354          MOV     #120000,@TCR            ;SET RIB AND SND WD
012020  016704  017726                  MOV     DLCON,R4
012024  012703  177763          XH2B:   MOV     #177763,R3              ;SET UP FOR 100 U.S. ALARM
012030  032777  000020  023340  XH2A:   BIT     #B04,@TSR               ;TDM BUS BSY SET?
012036  001020                          BNE     XH3
012040  005203                          INC     R3                      ;WAIT 100 US.
012042  001372                          BNE     XH2A
012044  005304                          DEC     R4
012046  001366                          BNE     XH2B
012050                                  ERROR   \N              ;ERROR:TDM BUS BSY NOT SET
012072                                  SCOPE   XH2
012100  032777  000100  023270  XH3:    BIT     #B06,@TSR               ;IS BUSY SET?
012106  001014                          BNE     XH4
012110                                  ERROR   \N              ;ERROR:BUSY NOT SET WITH SND WD & RIB
012132                                  SCOPE   XH2
012140  042777  100000  023226  XH4:    BIC     #B15,@TCR               ;CLEAR RIB
012146  000240                          NOP                             ;WAIT FOR TIME SLICE
012150  032777  020000  023216          BIT     #B13,@TCR               ;IS SND WD CLR?
012156  001414                          BEQ     XH5
012160                                  ERROR   \N              ;ERROR:INTR REQ DID NOT CLR SND WD
012202                                  SCOPE   XH2
012210  032777  000100  023160  XH5:    BIT     #B06,@TSR               ;IS BUSY CLR?
012216  001414                          BEQ     XH6
012220                                  ERROR   \N              ;ERROR:SND WD-0 DID NOT CLR BUSY
012242                                  SCOPE   XH2
012250  005077  023122          XH6:    CLR     @TSR                    ;CLEAR TSR
012254  052777  120000  023112          BIS     #120000,@TCR            ;SET RIB & SND WD
012262  052777  001000  023106          BIS     #B09,@TSR               ;SET OVERRUN ERR BIT
012270  032777  001000  023100          BIT     #B09,@TSR               ;IS IT SET?
012276  001014                          BNE     XH7
012300                                  ERROR   \N              ;ERROR:CANNOT SET TSR BIT 09
012322                                  SCOPE   XH6
012330  032777  100000  023040  XH7:    BIT     #B15,@TSR               ;IS ERROR BIT SET (BIT 15)
012336  001014                          BNE     XH8
012340                                  ERROR   \N              ;ERROR:OVERRUN DID NOT SET ERROR BIT 15 IN TSR
012362                                  SCOPE   XH6
```

```
1438  012370  032777  020000  022776  XH8:    BIT     #B13,@TCR               ;IS SND WD CLR?
1439  012376  001414                          BEQ     XH8A
1440  012400                                  ERROR   \N              ;ERROR:TSR BIT 15 DID NOT CAUSE INTR REQ
1441  012422                                  SCOPE   XH6
1442  012430                          XH8A:   BDINIT  XMTR                    ;CLEAR ALL IN XMTR
1443  012436  012777  000000  022734          MOV     #0,@TSDB                ;LOAD A WORD INTO SILO
1444  012444  032777  001000  022724          BIT     #B09,@TSR               ;IS OVERRUN SET??
1445  012452  001414                          BEQ     XH9
1446  012454                                  ERROR   \N              ;ERROR:LOADING EMPTY SILO GIVES OVERRUN ERROR!
1447  012476                                  SCOPE   XH8A
1448  012504  005077  022666          XH9:    CLR     @TSR
1449  012510  052777  002000  022660          BIS     #B10,@TSR               ;SET TIMEOUT BIT IN TSR
1450  012516  032777  002000  022652          BIT     #B10,@TSR               ;IS IT SET?
1451  012524  001014                          BNE     XH10
1452  012526                                  ERROR   \N              ;ERROR:CANNOT SET TSR BIT 10
1453  012550                                  SCOPE   XH9
1454  012556  032777  100000  022612  XH10:   BIT     #B15,@TSR               ;IS ERROR BIT SET?
1455  012564  001014                          BNE     XH11
1456  012566                                  ERROR   \N              ;ERROR:TIMEOUT DID NOT SET TSR BIT 15
1457  012610                                  SCOPE   XH9
1458  012616  005077  022554          XH11:   CLR     @TSR                    ;CLR TSR
1459  012622  052777  004000  022546          BIS     #B11,@TSR               ;SET MST DWN
1460  012630  032777  004000  022540          BIT     #B11,@TSR               ;IS IT SET?
1461  012636  001014                          BNE     XH12
1462  012640                                  ERROR   \N              ;ERROR:CANNOT SET TSR BIT 11
1463  012662                                  SCOPE   XH11
1464  012670  032777  100000  022500  XH12:   BIT     #B15,@TSR               ;IS ERROR BIT SET?
1465  012676  001014                          BNE     XH13
1466  012700                                  ERROR   \N              ;ERROR:MST DWN DIDN'T SET TSR BIT 15
1467  012722                                  SCOPE   XH11
1468  012730  005077  022442          XH13:   CLR     @TSR
1469  012734  052777  010000  022434          BIS     #B12,@TSR               ;SET TXM ERR
1470  012742  032777  010000  022426          BIT     #B12,@TSR               ;IS IT SET?
1471  012750  001014                          BNE     XH14
1472  012752                                  ERROR   \N              ;ERROR:CANNOT SET TSR BIT 12
1473  012774                                  SCOPE   XH13
1474  013002  032777  100000  022366  XH14:   BIT     #B15,@TSR               ;IS ERROR BIT SET?
1475  013010  001014                          BNE     XH15
1476  013012                                  ERROR   \N              ;ERROR:TXM ERR DIDN'T SET TSR BIT 15
1477  013034                                  SCOPE   XH13
1478  013042  005077  022330          XH15:   CLR     @TSR
1479  013046  052777  020000  022322          BIS     #B13,@TSR               ;SET MEM OFL
1480  013054  032777  020000  022314          BIT     #B13,@TSR               ;IS IT SET?
1481  013062  001014                          BNE     XH16
1482  013064                                  ERROR   \N              ;ERROR:CANNOT SET TSR BIT 13
1483  013106                                  SCOPE   XH15
1484  013114  032777  100000  022254  XH16:   BIT     #B15,@TSR               ;IS ERROR BIT SET?
1485  013122  001014                          BNE     XH17
1486  013124                                  ERROR   \N              ;ERROR:MEM OFL DIDN'T SET TSR BIT 15
1487  013146                                  SCOPE   XH15
```

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1489                                        ;ERROR GENERATION TESTS
1490
1491  013154                          XH17:  BDINIT  XMTR                    ;CLEAR BOARD
1492  013162  012777  177774  022212        MOV     #-4,@TSBC               ;SET UP TO GENERATE NXM ERR
1493  013170  012777  164176  022206        MOV     #164176,@TSBA           ;LOAD NON-EXST ADDR INTO TSBA
1494  013176  052777  040060  022170        BIS     #40060,@TCR             ;START NPR AND SET EXT ADD BITS
1495  013204  000240                        NOP
1496  013206  000240                        NOP
1497  013210  005777  022166               TST     @TSBC                   ;DID BYTE COUNT GO TO 0 ?
1498  013214  001014                        BNE     XH18
1499  013216                                ERROR   \N              ;ERROR:REPLACE #764176 WITH NON EXST ADDR
1500  013240                                SCOPE   XH17
1501  013246  032777  040000  022122  XH18: BIT     #B14,@TSR               ;NOW CHECK NXL ERR BIT
1502  013254  001014                        BNE     XH19
1503  013256                                ERROR   \N              ;ERROR:NPR TO NON-EXST ADDR DIDN'T SET NXL ERR
1504  013300                                SCOPE   XH17
1505  013306  032777  100000  022062  XH19: BIT     #B15,@TSR               ;IS ERROR BIT (15) SET?
1506  013314  001014                        BNE     XH20
1507  013316                                ERROR   \N              ;ERROR:NXL ERR DIDN'T SET TSR BIT 15
1508  013340                                SCOPE   XH17
1509  013346                          XH20: BDINIT  XMTR                    ;CLEAR BOARD
1510  013354  016777  177774  022016  XH20L: MOV     XH20L,@TSDB             ;FILL THE SILO WITH GARBAGE
1511  013362  000240                        NOP
1512  013364  000240                        NOP
1513  013366  032777  000400  022002        BIT     #B08,@TSR               ;SILO INPUT READY?
1514  013374  001367                        BNE     XH20L                   ;IF YES, KEEP LOADING
1515  013376  016777  177752  021774        MOV     XH20L,@TSDB             ;NO,SILO FULL;LOAD 1 MORE WORD
1516  013404  032777  001000  021764        BIT     #B09,@TSR               ;IS TSR BIT 9 SET?
1517  013412  001014                        BNE     XH21
1518  013414                                ERROR   \N              ;ERROR:LOADING FULL SILO DIDN'T SET TSR-09
1519  013436                                SCOPE   XH20L
1520  013444                          XH21: BDINIT  XMTR                    ;CLEAR BOARD
1521  013452  052777  120000  021714        BIS     #120000,@TCR            ;SET SND WD & RIB
1522  013460  016702  016266                MOV     DLCON,R2
1523  013464  005003                  XH21A: CLR     R3                      ;R3 AND R4 ARE COUNTERS
1524  013466  012704  177773                MOV     #-5,R4
1525  013472  032777  002000  021676  XH22: BIT     #B10,@TSR               ;IS TIMEOUT SET?
1526  013500  001022                        BNE     XH22A
1527  013502  005203                        INC     R3                      ;WATCH IT FOR A SEC
1528  013504  001372                        BNE     XH22
1529  013506  005204                        INC     R4
1530  013510  001370                        BNE     XH22
1531  013512  005302                        DEC     R2
1532  013514  001363                        BNE     XH21A
1533  013516                                ERROR   \N              ;ERROR:NO TIMEOUT IN A SECOND
1534  013540                                SCOPE   XH21
1535  013546                          XH22A: BDINIT  XMTR                    ;CLR XMTR
1536  013554  105077  021630               CLRB    @TMMRH                  ;CLEAR MASTER
1537  013560  012777  177777  021612        MOV     #-1,@TSDB               ;LOAD A WORD INTO XMTR DATA SILO
1538  013566  004567  170540                JSR     R5,DELAY                ;WAIT FOR MIGRATION
1539  013572  000010                        .WORD   10
1540  013574  052777  120000  021572        BIS     #120000,@TCR            ;SET RIB AND SND WORD
1541  013602  004567  170524                JSR     R5,DELAY
1542  013606  000010                        .WORD   10
1543  013610  032777  004000  021560        BIT     #B11,@TSR               ;CHECK FOR MASTER DOWN
1544  013616  001014                        BNE     XH23            ;ERROR:ATTEMPT TO SEND WORD WITH MASTER CLEAR
```

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 1545  013620                                    ERROR   \N                  ;DID NOT SET MASTER DOWN
 1546  013642                                    SCOPE   XH22A
 1547  013650                          XH23:     BDINIT  XMTR
 1548  013656  004767  015472                    JSR     PC,MONIT
 1549  013662  032777  010000  016060            BIT     #B12,@SR            ;IS SW 12 = 1?
 1550  013670  001402                            BEQ     XHRT
 1551  013672  000167  175740                    JMP     TSRTST              ;IF SO, TRY THIS TEST OVER
 1552  013676  000207                  XHRT:     RTS     PC
```

```
                                        .SBTTL  INTERRUPT TEST

                                ;TRANSMITTER INTERRUPT TEST

013700                          INTST:  MTPS    #P7                     ;DIS-ALLOW INTERRUPT
013706                                  BDINIT  XMTR                    ;CLR THE BOARD
013714  016700  021444                  MOV     TXVEC,R0
013720  012760  000340  000002          MOV     #340,2(R0)              ;SET NEW PS = P7
013726  012777  013756  021430          MOV     #ERRINT,@TXVEC          ;SET-UP FOR ERROR INTERRUPT
013734  052777  000100  021432          BIS     #B06,@TCR               ;SET INTERRUPT ENABLE
013742                                  MTPS    #0                      ;ALLOW INTERRUPT
013750  000240                          NOP
013752  000167  000046                  JMP     XJ0                     ;SKIP ERROR IF NO INTERRUPT
013756                          ERRINT: MTPS    #P7                     ;INTERRUPT OFF
013764  022626                          CMP     (SP)+,(SP)+             ;CORRECT STACK
013766  042777  000100  021400          BIC     #B06,@TCR               ;CLR INTERRUPT ENABLE
013774                                  ERROR   \N              ;ERROR:ERRONEOUS INTERRUPT;NO FLAGS SET
014016                                  SCOPE   INTST
014024  005067  021330          XJ0:    CLR     TMPRIO                  ;START WITH C.P. AT PRIORITY 0
014030  012777  014304  021326          MOV     #INTA,@TXVEC            ;SET VECTOR FOR GOOD INTERRUPT
014036                          XJ1:    MTPS    #P7                     ;INTERRUPT OFF
014044  052777  000100  021322          BIS     #B06,@TCR               ;ENABLE XMTR INTERRUPT
014052  052777  000200  021316          BIS     #B07,@TSR               ;FORCE INTR WITH SUCC XFER
014060                                  MTPS    TMPRIO                  ;ALLOW INTERRUPT
014066  000240                          NOP
014070  000240                          NOP                             ;WAIT FOR IT
014072  005767  021262                  TST     TMPRIO                  ;IS PSW = 0?
014076  001014                          BNE     XJ2
014100                                  ERROR   \N              ;ERROR:NO INTERRUPT FROM TRANSMITTER
014122                                  SCOPE   INTST
014130  026767  021234  021222  XJ2:    CMP     XPRIO,TMPRIO            ;HAVE WE REACHED EXPECTED PRIORITY?
014136  001414                          BEQ     XJ3
014140                                  ERROR   \N              ;ERROR:DEVICE NOT JUMPERED TO EXPECTED PRIORITY
014162                                  SCOPE   INTST
014170  022767  000340  021162  XJ3:    CMP     #340,TMPRIO             ;IS PSW = 7?
014176  001426                          BEQ     XJ4
014200                                  BDINIT  XMTR
014206  062767  000040  021144          ADD     #40,TMPRIO
014214  012777  014326  021142  XJ3S:   MOV     #INTB,@TXVEC            ;SET VECTOR FOR ERROR INTR.
014222  052777  000100  021144          BIS     #B06,@TCR               ;ENABLE XMTR INTERRUPT
014230  052777  000200  021140          BIS     #B07,@TSR               ;FORCE INTERRUPT REQUEST
014236                                  MTPS    TMPRIO                  ;SET CP TO NEXT PRIORITY
014244  000240                          NOP
014246  000240                          NOP                             ;WAIT FOR POSSIBLE INTERRUPT
014250  000167  177714                  JMP     XJ3
014254                          XJ4:    BDINIT  XMTR                    ;CLEAR BOARD
014262  004767  015066                  JSR     PC,MONIT
014266  032777  010000  015454          BIT     #B12,@SR                ;SW 12 = 1?
014274  001402                          BEQ     XJRT
014276  000167  177376                  JMP     INTST                   ;YES, DO TEST OVER
014302  000207                  XJRT:   RTS     PC                      ;NO, LEAVE THIS TEST

014304                          INTA:   BDINIT  XMTR                    ;CLR INTERRUPT ETC
014312  062767  000040  021040          ADD     #40,TMPRIO              ;INCR TEMP PRIORITY
014320  022626                          CMP     (SP)+,(SP)+             ;CORRECT STACK POINTER
014322  000167  177510                  JMP     XJ1                     ;TRY AGAIN
```

```
 1610
 1611  014326  022626                  INTB:   CMP     (SP)+,(SP)+             ;CORRECT STACK
 1612  014330                                  ERROR   \N              ;ERROR:GOT INTR WHEN C.P. AT HIGHER PRIORITY
 1613  014352                                  SCOPE   XJ3S
 1614  014360  000167  177604                 JMP     XJ3
```

```
                                        .SBTTL  C.R.C. CHECK

                                        ;CYCLIC REDUNDANCY CHECK CHARACTER TEST

014364                          CRCTST: BDINIT  XMTR                    ;CLEAR BOARD
014372  012777  177600  021002        MOV     #-128.,@TSBC            ;SET UP BYTE COUNT TO FILL SILO
014400  012777  033026  020776        MOV     #SILDAT,@TSBA
014406  052777  040000  020760        BIS     #B14,@TCR               ;START NPR
014414  005777  020762          XK1:  TST     @TSBC                   ;IS BYTE COUNT 0?
014420  001375                        BNE     XK1                     ;WAIT FOR NPR TO FINISH
014422  032777  040000  020744        BIT     #B14,@TCR               ;NOW CHECK      TX NPR BIT
014430  001414                        BEQ     XK2
014432                                ERROR   \N              ;ERROR:TX NPR NOT CLR'D BY TSBC OFL
014454                                SCOPE   CRCTST
014462  052777  000200  020704  XK2:  BIS     #B07,@TCR               ;SET RD SILO BIT
014470  012767  177700  020656        MOV     #-64.,COUNT             ;COUNT READS
014476  012704  033226                MOV     #SILCRC,R4              ;R4 POINTS TO GOOD CRC'S
014502  000240          XK3:  NOP
014504  017767  020702  015472        MOV     @TSCRC,BAD              ;GET CRC CHAR FOR LAST SILO WORD
014512  017703  020662                MOV     @TSDB,R3                ;R3 HOLDS SILO DATA WORD
014516  011467  015464                MOV     (R4),GOOD               ;GET GOOD CRC FROM BUFFER
014522  026767  015460  015454        CMP     GOOD,BAD                ;IS CRC OK?
014530  001423                        BEQ     XK4
014532                                PNTM    SLOWD                   ;PRINT 'SILO OUTPUT WORD WAS ''
014542  010300                        MOV     R3,R0
014544  004767  015756                JSR     PC,OCTPNT               ;PRINT SILO DATA WORD
014550                                DATERR  \N              ;ERROR:BAD CRC FOR ABOVE WORD
014572                                SCOPE   CRCTST
014600  062704  000002          XK4:  ADD     #2,R4                   ;UPDATE CRC POINTER
014604  005267  020544                INC     COUNT                   ;HAVE WE CHECKED 64 WORDS?
014610  001334                        BNE     XK3                     ;NO, CONTINUE
014612  004767  014536                JSR     PC,MONIT
014616  032777  010000  015124        BIT     #B12,@SR                ;CHECK SW 12
014624  001402                        BEQ     XKRT                    ;IF CLR, EXIT
014626  000167  177532                JMP     CRCTST                  ;IF SET STAY
014632                          XKRT: BDINIT  XMTR
014640  000207                        RTS     PC
```

```
                                        .SBTTL RECEIVER TESTS

                                        ;TEST 2: RECEIVER TESTS
                                        ;   (00) RESET TEST
                                        ;   (01) RCR REG TEST
                                        ;   (02) RDBC REG TEST
                                        ;   (03) RDBA REG TEST
                                        ;   (04) DATA SILO TESTS
                                        ;   (05) RSR & ERRORS TESTS
                                        ;   (06) INTERRUPT TEST
                                        ;   (07) C.R.C. TEST

 000200                                 N       =       200                     ;RECEIVER ERRORS START AT 200

014642                                  TEST2:  MTPS    #P7
014650  012767  000010  020444                  MOV     #10,ITER                ;INITIAL ITERATION OF 10 PER PASS
014656  004767  014472                          JSR     PC,MONIT
014662  032777  002000  015060                  BIT     #B10,@SR                ;CHECK SW 10
014670  001420                                  BEQ     LOOPR                   ;IF 0, RUN SEQUENTIALLY
014672  017767  015052  020424                  MOV     @SR,SWI         ;IF SET, GET TEST # FROM SWR
014700  042767  177770  020416                  BIC     #-10,SWI                ;MASK LOW DIGIT
014706  000241                                  CLC                             ;CLR C BIT BEFORE ROTATE
014710  006167  020410                          ROL     SWI
014714  006167  020404                          ROL     SWI                     ;MULTIPLY BY 4
014720  062767  014732  020376                  ADD     #LOOPR,SWI              ;GENERATE OFFSET
014726  000177  020372                          JMP     @SWI                    ;GO TO SELECTED TEST
014732  004767  000142                  LOOPR:  JSR     PC,RINIT                ;DO INITIAL CLEAR TEST
014736  004767  000476                          JSR     PC,RCRTST               ;DO RCR REG TEST
014742  004767  001176                          JSR     PC,RBCTST               ;DO BYTE COUNT REG TEST
014746  004767  001346                          JSR     PC,RBATST               ;DO BYTE ADDR REG TEST
014752  004767  001516                          JSR     PC,SLOTST               ;DO RECVR DATA SILO TEST
014756  004767  003042                          JSR     PC,RSRTST               ;DO RSR REG & ERRORS TEST
014762  004767  004632                          JSR     PC,RINTST               ;DO INTERRUPT TEST
014766  004767  005344                          JSR     PC,RCRCTS               ;DO RCVR CRC GENERATION TEST
014772  032777  004000  014750                  BIT     #B11,@SR                ;CHECK SW 11
015000  001003                                  BNE     REND                    ;PRINT END IF SET
015002  005367  020314                          DEC     ITER                    ;OTHERWISE, REITERATE
015006  001351                                  BNE     LOOPR
015010  005767  020332                  REND:   TST     $4FLAG                  ;CAN WE PRINT END PASS?
015014  001030                                  BNE     REPEET                  ;NO, LEAVE
015016  005267  020312                          INC     PSNO2                   ;UPDATE PASS NO.
015022                                          PNTM    PEND                    ;PRINT 'END PASS # ''
015032  016700  020276                          MOV     PSNO2,R0
015036  004767  015540                          JSR     PC,DECPNT               ;PRINT PASS NO.
015042  012700  000040                          MOV     #40,R0
015046  004767  015720                          JSR     PC,TTO                  ;PRINT A SPACE
015052  012700  000101                          MOV     #101,R0
015056  004767  015710                          JSR     PC,TTO                  ;PRINT ''A'' (TO INDICATE RCVR TST)
015062  005000                                  CLR     R0
015064  004767  015702                          JSR     PC,TTO
015070  005000                                  CLR     R0
015072  004767  015674                          JSR     PC,TTO                  ;NULLS IN CASE RESET FOLLOWS
015076  000207                  REPEET: RTS     PC                              ;RETURN
```

```
                                        .SBTTL  INITIALIZE TEST

                                        ;CHECK INITIAL CONDITIONS AFTER RESET

015100  000005                  RINIT:  RESET                           ;CLEAR THE WORLD
015102  017767  020314  015074          MOV     @RDBC,BAD               ;GET BYTE COUNT REG
015110  005067  015072                  CLR     GOOD
015114  005767  015064                  TST     BAD                     ;WAS RDBC 0?
015120  001414                          BEQ     RA1
015122                                  DATERR  \N              ;ERROR:RDBC NOT CLR'D BY RESET
015144                                  SCOPE   RINIT
015152  017767  020246  015024  RA1:    MOV     @RDBA,BAD               ;GET BYTE ADDRESS REG
015160  005067  015022                  CLR     GOOD
015164  005767  015014                  TST     BAD                     ;WAS RDBA 0?
015170  001414                          BEQ     RA2
015172                                  DATERR  \N              ;ERROR:RDBA NOT CLR'D BY RESET
015214                                  SCOPE   RINIT
015222  017767  020166  014754  RA2:    MOV     @RCR,BAD                ;GET RCR REGISTER
015230  012767  000010  014750          MOV     #10,GOOD                ;SET UP GOOD FOR COMPARE
015236  026767  014744  014740          CMP     GOOD,BAD
015244  001414                          BEQ     RA3
015246                                  DATERR  \N              ;ERROR:RCR NOT INITIALIZED BY RESET
015270                                  SCOPE   RINIT
015276  017767  020124  014700  RA3:    MOV     @RDCRC,BAD              ;GET CRC REG
015304  005067  014676                  CLR     GOOD
015310  005767  014670                  TST     BAD                     ;IS CRC REG 0?
015314  001414                          BEQ     RA4
015316                                  DATERR  \N              ;ERROR:RCVR CRC NOT CLR'D BY RESET
015340                                  SCOPE   RINIT
015346  017767  020044  014630  RA4:    MOV     @RSR,BAD                ;GET RSR REG
015354  005067  014626                  CLR     GOOD
015360  005767  014620                  TST     BAD                     ;IS RSR REG 0?
015364  001414                          BEQ     RA5
015366                                  DATERR  \N              ;ERROR:RSR REG NOT CLR'D BY RESET
015410                                  SCOPE   RINIT
015416  004767  013732          RA5:    JSR     PC,MONIT
015422  032777  010000  014320          BIT     #B12,@SR                ;CHK SW 12 FOR EXIT VISA
015430  001402                          BEQ     RART
015432  000167  177442                  JMP     RINIT                   ;IF SET,STAY IN THIS TEST
015436  000207                  RART:   RTS     PC                      ;OTHERWISE, EXIT
```

```
                                        .SBTTL  RCR TEST

                                        ;RECEIVER COMMAND REGISTER TEST

015440  005077  017750          RCRTST: CLR     @RCR                    ;CLEAR RCR REGISTER
015444  012767  160375  014534  RD1:    MOV     #160375,GOOD            ;SET ALL S ;TABLE BITS IN RCR
015452  016777  014530  017734          MOV     GOOD,@RCR
015460  017767  017730  014516          MOV     @RCR,BAD                ;AND READ THEM BACK
015466  026767  014514  014510          CMP     GOOD,BAD                ;ALL BITS SET?
015474  001414                          BEQ     RD2
015476                                  DATERR  \N              ;ERROR:CANNOT SET ALL SETTABLE RCR BITS
015520                                  SCOPE   RD1
015526  005067  014454          RD2:    CLR     GOOD                    ;NOW CLR BITS AFTER SETTING THEM
015532  005077  017656                  CLR     @RCR
015536  017767  017652  014440          MOV     @RCR,BAD                ;READ THEM BACK
015544  042767  017412  014432          BIC     #17412,BAD              ;IGNORE R/O BITS
015552  026767  014430  014424          CMP     GOOD,BAD                ;ALL CLR?
015560  001414                          BEQ     RD3
015562                                  DATERR  \N              ;ERROR:CANNOT CLR ALL RCR BITS
015604                                  SCOPE   RD2
015612  012777  160375  017574  RD3:    MOV     #160375,@RCR            ;SET ALL SETTABLE BITS IN RCR
015620  012777  177777  017574          MOV     #-1,@RDBC               ;AND IN RDBC
015626  012777  177777  017570          MOV     #-1,@RDBA               ;AND IN RDBA
015634  012777  037200  017554          MOV     #37200,@RSR             ;AND IN RSR
015642  052777  000002  017544          BIS     #B01,@RCR               ;B O A R D  I N I T
015650  017767  017540  014326          MOV     @RCR,BAD                ;CHECK RCR
015656  012767  000010  014322          MOV     #10,GOOD                ;SEE IF RCR = 10
015664  026767  014316  014312          CMP     GOOD,BAD
015672  001414                          BEQ     RD4
015674                                  DATERR  \N              ;ERROR:RCR NOT INIT'D BY BD INIT
015716                                  SCOPE   RD3
015724  017767  017466  014252  RD4:    MOV     @RSR,BAD                ;CHECK RSR
015732  005067  014250                  CLR     GOOD
015736  026767  014244  014240          CMP     GOOD,BAD                ;RSR = 0?
015744  001414                          BEQ     RD5
015746                                  DATERR  \N              ;ERROR:RSR NOT CLR'D BY BD INIT
015770                                  SCOPE   RD3
015776  017767  017420  014200  RD5:    MOV     @RDBC,BAD               ;CHECK RDBC
016004  005067  014176                  CLR     GOOD
016010  026767  014172  014166          CMP     GOOD,BAD                ;RDBC = 0?
016016  001414                          BEQ     RD6
016020                                  DATERR  \N              ;ERROR:RDBC NOT CLR'D BY BD INIT
016042                                  SCOPE   RD3
016050  017767  017350  014126  RD6:    MOV     @RDBA,BAD               ;CHECK RDBA
016056  005067  014124                  CLR     GOOD
016062  026767  014120  014114          CMP     GOOD,BAD                ;RDBA = 0?
016070  001414                          BEQ     RD7
016072                                  DATERR  \N              ;ERROR:RDBA NOT CLR'D BY BD INIT
016114                                  SCOPE   RD3
016122  004767  013226          RD7:    JSR     PC,MONIT
016126  032777  010000  013614          BIT     #B12,@SR                ;CHECK SW 12
016134  001402                          BEQ     RDRT
016136  000167  177276                  JMP     RCRTST                  ;STAY IN THIS LOOP IF SW 12 = 1
016142  000207                  RDRT:   RTS     PC
```

```
1806                                            .SBTTL  RDBC TEST
1807
1808                                    ;BYTE COUNT REG DATA TEST
1809
1810  016144                            RBCTST: BDINIT  RCVR                    ;INIT RCVR MODULE
1811  016152  012767  177777  017146             MOV     #-1,PAT               ;SET PATTERN
1812  016160  012767  000001  017142             MOV     #B00,MASK             ;SET BIT MASK
1813  016166  016767  017134  014012  RB1:      MOV     PAT,GOOD              ;LOAD "GOOD" WITH PATTERN
1814  016174  016777  014006  017220             MOV     GOOD,@RDBC            ;LOAD PATTERN INTO RDBC
1815  016202  017767  017214  013774             MOV     @RDBC,BAD             ;READ RDBC
1816  016210  026767  013772  013766             CMP     GOOD,BAD              ;DATA OK?
1817  016216  001414                             BEQ     RB2
1818  016220                                     DATERR  \N              ;ERROR:BAD DATA IN RDBC
1819  016242                                     SCOPE   RB1
1820  016250  032767  100000  017050  RB2:      BIT     #B15,PAT              ;DONE WHOLE REGISTER?
1821  016256  001407                             BEQ     RB3                   ;IF YES, DONE
1822  016260  046767  017044  017040             BIC     MASK,PAT              ;NO, PREPARE FOR NEXT BIT
1823  016266  006367  017036                     ASL     MASK                  ;ROTATE MASK
1824  016272  000167  177670                     JMP     RB1                   ;AND CONTINUE
1825  016276  004767  013052  RB3:      JSR     PC,MONIT
1826  016302  032777  010000  013440             BIT     #B12,@SR              ;IF SO, CONSIDER LEAVING
1827  016310  001402                             BEQ     RBRT                  ;EXIT IF SW 12 = 0
1828  016312  000167  177626                     JMP     RBCTST                ;STAY HERE IF SW 12 = 1
1829  016316  000207                    RBRT:   RTS     PC
```

```
1831                                        .SBTTL  RDBA TEST
1832
1833                                        ;BYTE ADDRESS REG DATA TEST
1834
1835  016320                                RBATST: BDINIT  RCVR                    ;INIT RECEIVER MODULE
1836  016326  012767  177777  016772                MOV     #-1,PAT                 ;SET PATTERN
1837  016334  012767  000001  016766                MOV     #B00,MASK               ;SET BIT MASK
1838  016342  016767  016760  013636  RC1:         MOV     PAT,GOOD                ;LOAD "GOOD" WITH PATTERN
1839  016350  016777  013632  017046                MOV     GOOD,@RDBA              ;LOAD PATTERN INTO RDBA
1840  016356  017767  017042  013620                MOV     @RDBA,BAD               ;READ RDBA
1841  016364  026767  013616  013612                CMP     GOOD,BAD
1842  016372  001414                               BEQ     RC2
1843  016374                                        DATERR  \N              ;ERROR:BAD DATA IN RDBA REG
1844  016416                                        SCOPE   RC1
1845  016424  032767  100000  016674  RC2:         BIT     #B15,PAT                ;DONE WHOLE REGISTER?
1846  016432  001407                               BEQ     RC3                     ;IF YES, DONE
1847  016434  046767  016670  016664                BIC     MASK,PAT                ;NO, PREPARE FOR NEXT BIT
1848  016442  006367  016662                       ASL     MASK                    ;ROTATE MASK
1849  016446  000167  177670                       JMP     RC1                     ;AND CONTINUE
1850  016452  004767  012676  RC3:                 JSR     PC,MONIT
1851  016456  032777  010000  013264                BIT     #B12,@SR                ;EXIT IF SW 12 = 0
1852  016464  001402                               BEQ     RCRT
1853  016466  000167  177626                       JMP     RBATST                  ;STAY HERE IF SW 12 = 1
1854  016472  000207                       RCRT:   RTS     PC
```

```
1856                                            .SBTTL  DATA SILO TEST
1857
1858                                            ;RECEIVER DATA SILO TEST
1859
1860  016474                                    SLOTST: BDINIT  RCVR                    ;CLEAR RCVR MODULE
1861  016502  004567  165624                            JSR     R5,DELAY
1862  016506  000010                                    .WORD   10
1863  016510  032777  000400  016700                    BIT     #B08,@RSR               ;SILO OUTPUT READY?
1864  016516  001414                                    BEQ     RE1
1865  016520                                            ERROR   \N              ;ERROR:BD INIT DID NOT CLR SILO
1866  016542                                            SCOPE   SLOTST
1867  016550  032777  000010  016636  RE1:     BIT     #B03,@RCR               ;SILO INPUT RDY?
1868  016556  001014                                    BNE     RE2
1869  016560                                            ERROR   \N              ;ERROR:BD INIT DID NOT SET SILO INPUT RDY
1870  016602                                            SCOPE   SLOTST
1871  016610  052777  000200  016576  RE2:     BIS     #B07,@RCR               ;SET LD SILO BIT
1872  016616  012777  177777  016574                    MOV     #-1,@RDDB               ;LOAD 177777 INTO DATA SILO
1873  016624  042777  000200  016562                    BIC     #B07,@RCR               ;CLR LD SILO BIT
1874  016632  004567  165474                            JSR     R5,DELAY
1875  016636  000010                                    .WORD   10
1876  016640  032777  000400  016550                    BIT     #B08,@RSR               ;SILO OUTPUT RDY NOW?
1877  016646  001017                                    BNE     RE3
1878  016650                                            ERROR   \N              ;ERROR:NO SILO OUTPUT  AFTER LOAD
1879  016672                                            BDINIT  RCVR                    ;CLR SILO
1880  016700                                            SCOPE   RE2
1881  016706  017767  016506  013270  RE3:     MOV     @RDDB,BAD               ;POP WORD FROM SILO
1882  016714  012767  177777  013264                    MOV     #-1,GOOD
1883  016722  026767  013260  013254                    CMP     GOOD,BAD                ;SILO OUTPUT = 177777
1884  016730  001417                                    BEQ     RE4
1885  016732                                            DATERR  \N              ;ERROR:DROPPED BITS IN DATA SILO
1886  016754                                            BDINIT  RCVR
1887  016762                                            SCOPE   RE2
1888  016770  032777  000400  016420  RE4:     BIT     #B08,@RSR               ;SILO OUTPUT RDY?
1889  016776  001414                                    BEQ     RE5
1890  017000                                            ERROR   \N              ;ERROR:WORD DID NOT GET POPPED FROM SILO
1891  017022                                            SCOPE   RE3
1892  017030  032777  000010  016356  RE5:     BIT     #B03,@RCR               ;SILO INPUT RDY?
1893  017036  001014                                    BNE     RE6
1894  017040                                            ERROR   \N              ;ERROR:SILO INPUT NOT READY
1895  017062                                            SCOPE   RE5
1896  017070  052777  000200  016316  RE6:     BIS     #B07,@RCR               ;SET LD SILO BIT
1897  017076  005077  016316                            CLR     @RDDB                   ;LOAD 0'S INTO SILO
1898  017102  042777  000200  016304                    BIC     #B07,@RCR               ;CLR LD SILO BIT
1899  017110  032777  000400  016300  RE7:     BIT     #B08,@RSR               ;SILO OUTPUT RDY?
1900  017116  001774                                    BEQ     RE7                     ;WAIT FOR IT
1901  017120  017767  016274  013056                    MOV     @RDDB,BAD               ;READ SILO OUTPUT
1902  017126  005067  013054                            CLR     GOOD
1903  017132  026767  013050  013044                    CMP     GOOD,BAD                ;SILO OUTPUT = 0?
1904  017140  001417                                    BEQ     RE7A
1905  017142                                            DATERR  \N              ;ERROR:PICKED UP BITS IN DATA SILO
1906  017164                                            BDINIT  RCVR                    ;CLR SILO
1907  017172                                            SCOPE   RE6
1908  017200  004767  000476          RE7A:   JSR     PC,CLRCBF               ;MAKE SURE BUFF IS CLR
1909  017204                           RE8:    BLINIT  RCVR                    ;CLR RCVR BOARD
1910  017212  052777  000200  016174                    BIS     #B07,@RCR               ;SET LD SILO BIT
1911  017220  012704  033026                            MOV     #SILDAT,R4              ;R4 POINTS TO DATA FOR SILO
```

```
1912  017224  012703  177700            MOV     #-64.,R3                ;R3 COUNTS WORDS
1913  017230  012477  016164     RE9:   MOV     (R4)+,@RDDB             ;LOAD DATA INTO SILO
1914  017234  005203                    INC     R3
1915  017236  001374                    BNE     RE9                     ;KEEP LOADING FOR 64 WORDS
1916  017240  032777  000010  016146    BIT     #B03,@RCR               ;FULL...IS SILO INPUT RDY?
1917  017246  001414                    BEQ     RE10
1918  017250                            ERROR   \N              ;ERROR:FULL SILO STILL RDY FOR INPUT
1919  017272                            SCOPE   RE8
1920  017300  042777  000200  016106 RE10:   BIC     #B07,@RCR               ;CLR LD SILO BIT
1921  017306  012777  177600  016106        MOV     #-128.,@RDBC            ;SET UP BYTE COUNT FOR 64 WORDS
1922  017314  012777  033426  016102        MOV     #CMPBUF,@RDBA           ;POINT INTERF AT 64 WD BUFFER
1923  017322  052777  040000  016064        BIS     #B14,@RCR               ;SET RC NPR
1924  017330  016704  012416               MOV     DLCON,R4
1925  017334  012703  177500     RE10A: MOV     #177500,R3              ;SET UP FOR 2 MS DELAY
1926  017340  005777  016056     RE11:  TST     @RDBC                   ;IS BYTE COUNT 0?
1927  017344  001420                    BEQ     RE12
1928  017346  005203                    INC     R3                      ;WAITED 2 MS ?
1929  017350  001373                    BNE     RE11                    ;NO, KEEP LOOKING
1930  017352  005304                    DEC     R4
1931  017354  001367                    BNE     RE10A
1932  017356                            ERROR   \N              ;ERROR:NPR NOT COMPLETE AFTER 2 MS
1933  017400                            SCOPE   RE8
1934  017406  042777  040000  016000 RE12:   BIC     #B14,@RCR               ;CLEAR RC NPR
1935  017414  012702  033026               MOV     #SILDAT,R2              ;SET UP TO CHECK SILO OUTPUT
1936  017420  012703  033426               MOV     #CMPBUF,R3              ;R2 & R3 ARE DATA POINTERS
1937  017424  012704  177700               MOV     #-64.,R4                ;R4 IS COUNTER
1938  017430  012267  012552     RE13:  MOV     (R2)+,GOOD              ;GET GOOD DATA
1939  017434  012367  012544               MOV     (R3)+,BAD               ;GET SILO DATA
1940  017440  026767  012542  012536        CMP     GOOD,BAD                ;COMPARE MEM BUFFERS
1941  017446  001414                    BEQ     RE14
1942  017450                            DATERR  \N              ;ERROR:DATA FROM SILO IS WRONG
1943  017472                            SCOPE   RE8
1944  017500  005204            RE14:   INC     R4                      ;DONE COMPARE?
1945  017502  001352                    BNE     RE13
1946  017504  032777  000400  015704        BIT     #B08,@RSR               ;YES,SEE IF SILO WAS EMPTIED
1947  017512  001414                    BEQ     RE15
1948  017514                            ERROR   \N              ;ERROR:SILO OUT RDY, BUT SILO SHD BE EMPTY
1949  017536                            SCOPE   RE8
```

```
                                        .SBTTL  DATA SILO BLOCK COUNTER TEST

                                ;THIS TESTS THAT, AFTER PUTTING 200 (OCTAL) WORDS INTO THE DATA SILO
                                ;THE BLOCK COUNTER COUNTS THE 200 WORDS AND HOLDS SILO INPUT READY
                                ;IN THE FALSE STATE.

017544                          RE15:   BDINIT  RCVR                    ;CLEAR THE BOARD
017552  012702  000100                  MOV     #64.,R2
017556  004767  000140                  JSR     PC,RESR                 ;PUT 100 (OCTAL) WORDS INTO SILO
017562  004767  000166                  JSR     PC,REEMT                ;EMPTY IT VIA NPR
017566  012702  000020                  MOV     #20,R2
017572  004767  000124                  JSR     PC,RESR                 ;PUT 20 (OCTAL) WORDS INTO SILO
017576  004767  000152                  JSR     PC,REEMT                ;EMPTY IT AGAIN
017602  012702  000060                  MOV     #60,R2
017606  004767  000110                  JSR     PC,RESR                 ;PUT 60 (OCTAL) WORDS INTO SILO
                                                                        ;  MAKING A TOTAL OF 200 IN WHILE
                                                                        ;  THERE IS ROOM FOR 20 MORE.
017612  032777  000010  015574          BIT     #B03,@RCR               ;IS SILO INPUT READY?
017620  001414                          BEQ     RE16                    ;IF NOT, OKAY
017622                                  ERROR   \N              ;ERROR:INPUT READY AFTER A 200 WORD BLOCK
017644                                  SCOPE   RE15
017652                          RE16:   BDINIT  RCVR
017660  004767  011470                  JSR     PC,MONIT
017664  032777  010000  012056          BIT     #B12,@SR                ;CHECK SW 12
017672  001402                          BEQ     RERT
017674  000167  176574                  JMP     SLOTST                  ;STAY IN THIS TEST IF SW 12 = 1
017700  000207                  RERT:   RTS     PC
017702  012703  177700          CLRCBF: MOV     #-64.,R3                ;ROUTINE TO CLR BUFFER AREA
017706  012704  033426                  MOV     #CMPBUF,R4
017712  005024                  RECB:   CLR     (R4)+
017714  005203                          INC     R3
017716  001375                          BNE     RECB
017720  000207                          RTS     PC

                                ;ROUTINE TO FILL DATA SILO WITH (R2) NUMBER OF WORDS

017722  052777  000200  015464  RESR:   BIS     #B07,@RCR               ;SET LOAD SILO
017730  010203                          MOV     R2,R3
017732  012777  012345  015460  RESRW:  MOV     #12345,@RDDB            ;LOAD A WORD
017740  005303                          DEC     R3                      ;KEEP TRACK OF # OF WORDS
017742  001373                          BNE     RESRW
017744  042777  000200  015442          BIC     #B07,@RCR               ;LEAVE WITH LD SILO CLR
017752  000207                          RTS     PC

                                ;ROUTINE TO EMPTY DATA SILO VIA RC NPR

017754  012777  177600  015440  REEMT:  MOV     #-128.,@RDBC            ;SET BYTE COUNT TO EMPTY SILO
017762  012777  033426  015434          MOV     #CMPBUF,@RDBA           ;POINT SILO AT DAT BUFFER
017770  052777  040000  015416          BIS     #B14,@RCR               ;START NPR
017776  016704  011750                  MOV     DLCON,R4
020002  012703  175000          REEMT1: MOV     #175000,R3              ;SET UP TO WAIT FOR COMPL
020006  005203                  REMTW:  INC     R3
020010  001376                          BNE     REMTW                   ;WAIT FOR NPR COMPLETION
020012  005077  015376                  CLR     @RCR                    ;CLEAR RC NPR
020016  005304                          DEC     R4
020020  001370                          BNE     REEMT1
```

```
  2007  020022  000207                    RTS     PC                  ;RETURN WITH SILO EMPTY
```

```
                                        .SBTTL  RSR TEST

                                ;RCVR STATUS REG & ERRORS TEST

020024                          RSRTST: BDINIT  RCVR                    ;CLEAR THE BOARD
020032  052777  020000  015354          BIS     #B13,@RCR               ;SET RCV WD
020040  032777  000100  015350          BIT     #B06,@RSR               ;IS BUSY SET?
020046  001014                          BNE     RF1
020050                                  ERROR   \N              ;ERROR:RCV WD DID NOT SET BUSY
020072                                  SCOPE   RSRTST
020100  052777  000200  015310  RF1:    BIS     #B07,@RSR               ;SET SUC XFR
020106  032777  000200  015302          BIT     #B07,@RSR               ;IS SUC XFR SET?
020114  001014                          BNE     RF2
020116                                  ERROR   \N              ;ERROR:CANNOT SET RSR BIT 07
020140                                  SCOPE   RF1
020146  032777  020000  015240  RF2:    BIT     #B13,@RCR               ;IS RCV WD CLR?
020154  001414                          BEQ     RF3
020156                                  ERROR   \N              ;ERROR:SUC XFR DID NOT CLR RCV WD
020200                                  SCOPE   RSRTST
020206  042777  000200  015202  RF3:    BIC     #B07,@RSR               ;CLR SUC XFR
020214  032777  000200  015174          BIT     #B07,@RSR               ;SEE IF IT CLR'D
020222  001414                          BEQ     RF4
020224                                  ERROR   \N              ;ERROR:CANNOT CLR SUC XFR
020246                                  SCOPE   RF3
020254                          RF4:    BDINIT  RCVR                    ;CLEAR THE BOARD
020262  052777  020200  015124          BIS     #20200,@RCR             ;SET LD SILO & RCV WD
020270  012703  177774                  MOV     #-4,R3
020274  012777  177777  015116  RF5:    MOV     #-1,@RDDB               ;MOVE 4 -1'S INTO SILO
020302  000240                          NOP
020304  000240                          NOP
020306  005203                          INC     R3
020310  001371                          BNE     RF5
020312  012777  177776  015102  RF6:    MOV     #-2,@RDBC               ;SET BYTE COUNT FOR 1 WORD
020320  052777  000004  015066          BIS     #B02,@RCR               ;SET INH ADDR INC
020326  012777  033426  015070          MOV     #CMPBUF,@RDBA           ;POINT NPR TO MEM BUFF.
02^334  052777  040000  015052          BIS     #B14,@RCR               ;START NPR
020342  005777  015054          RF7:    TST     @RDBC                   ;BYTE COUNT = 0?
020346  001375                          BNE     RF7
020350  032777  000400  015040          BIT     #B08,@RSR               ;SILO OUTPUT RDY?
020356  001014                          BNE     RF8
020360                                  ERROR   \N              ;ERROR:SILO SHOULD NOT BE EMPTY
020402                                  SCOPE   RF4
020410  012767  033426  011570  RF8:    MOV     #CMPBUF,GOOD            ;BYTE ADDRESS SHD NOT INCREMENT
020416  017767  015002  011560          MOV     @RDBA,BAD               ;READ BYTE ADDRESS
020424  026767  011556  011552          CMP     GOOD,BAD                ;SAME AS BEFORE?
020432  001414                          BEQ     RF9
020434                                  DATERR  \N              ;ERROR:RCR BIT 2 DID NOT INH ADR INCREMENT
020456                                  SCOPE   RF4
020464  032777  001000  014724  RF9:    BIT     #B09,@RSR               ;IS BYTE COUNT OFL SET?
020472  001014                          BNE     RF9A
020474                                  ERROR   \N              ;ERROR:RDBC =0, SILO NOT EMPTY, BUT BC OFL   0
020516                                  SCOPE   RF4
020524  032777  100000  014664  RF9A:   BIT     #B15,@RSR               ;IS RSR BIT 15 SET?
020532  001014                          BNE     RF10                    ;IF YES, CHECK FOR INTR REQ
020534                                  ERROR   \N              ;ERROR:BYTE COUNT OFL DID NOT SET RSR BIT 15
020556                                  SCOPE   RF4
```

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2065  020564  032777  020000  014622  RF10:  BIT     #B13,@RCR               ;IS RCV WD   0?
2066  020572  001414                         BEQ     RF11
2067  020574                               ERROR   \N              ;ERROR:BC OFL DID NOT REQUEST INTERRUPT
2068  020616                               SCOPE   RF4
2069  020624                         RF11: BDINIT  RCVR
2070  020632  052777  020000  014554         BIS     #B13,@RCR               ;SET RCV WD
2071  020640  052777  002000  014550         BIS     #B10,@RSR               ;SET TIMEOUT
2072  020646  032777  002000  014542         BIT     #B10,@RSR               ;IS TIMEOUT SET?
2073  020654  001014                         BNE     RF12
2074  020656                               ERROR   \N              ;ERROR:CANNOT SET RSR BIT 10
2075  020700                               SCOPE   RF11
2076  020706  032777  100000  014502  RF12:  BIT     #B15,@RSR               ;IS ERROR BIT SET?
2077  020714  001014                         BNE     RF13
2078  020716                               ERROR   \N              ;ERROR:TIMEOUT DIDN'T SET RSR BIT 15
2079  020740                               SCOPE   RF11
2080  020746  032777  020000  014440  RF13:  BIT     #B13,@RCR               ;IS RCV WD CLR?
2081  020754  001414                         BEQ     RF14
2082  020756                               ERROR   \N              ;ERROR:RSR BIT 15 DIDN'T REQUEST INTERRUPT
2083  021000                               SCOPE   RF11
2084  021006  005077  014404         RF14:  CLR     @RSR                    ;CLEAR RSR
2085  021012  052777  004000  014376         BIS     #B11,@RSR               ;SET PAR (PARITY ERROR) BIT
2086  021020  032777  004000  014370         BIT     #B11,@RSR               ;IS IT SET?
2087  021026  001014                         BNE     RF15
2088  021030                               ERROR   \N              ;ERROR:CANNOT SET RSR BIT 11
2089  021052                               SCOPE   RF14
2090  021060  032777  100000  014330  RF15:  BIT     #B15,@RSR               ;IS ERROR BIT SET?
2091  021066  001014                         BNE     RF16
2092  021070                               ERROR   \N              ;ERROR:PAR ERR DIDN'T SET RSR BIT 15
2093  021112                               SCOPE   RF14
2094  021120  005077  014272         RF16:  CLR     @RSR                    ;CLEAR RSR
2095  021124  052777  010000  014264         BIS     #B12,@RSR               ;SET TXM ERR
2096  021132  032777  010000  014256         BIT     #B12,@RSR               ;IS IT SET?
2097  021140  001014                         BNE     RF17
2098  021142                               ERROR   \N              ;ERROR:CANNOT SET RSR BIT 12
2099  021164                               SCOPE   RF16
2100  021172  032777  100000  014216  RF17:  BIT     #B15,@RSR               ;IS ERROR BIT SET?
2101  021200  001014                         BNE     RF18
2102  021202                               ERROR   \N              ;ERROR:TXM ERR DIDN'T SET RSR BIT 15
2103  021224                               SCOPE   RF16
2104  021232  005077  014160         RF18:  CLR     @RSR                    ;CLEAR RSR
2105  021236  052777  020000  014152         BIS     #B13,@RSR               ;SET MEM OFL
2106  021244  032777  020000  014144         BIT     #B13,@RSR               ;IS IT SET?
2107  021252  001014                         BNE     RF19
2108  021254                               ERROR   \N              ;ERROR:CANNOT SET RSR BIT 13
2109  021276                               SCOPE   RF18
2110  021304  032777  100000  014104  RF19:  BIT     #B15,@RSR               ;IS ERROR BIT SET?
2111  021312  001014                         BNE     RF20
2112  021314                               ERROR   \N              ;ERROR:MEM OFL DIDN'T SET RSR BIT 15
2113  021336                               SCOPE   RF18
```

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2115                                    ;ERROR GENERATION TESTS
2116
2117  021344                            RF20:   BDINIT  RCVR                    ;CLEAR THE BOARD
2118  021352  052777  000200  014034            BIS     #B07,@RCR               ;SET LD SILO BIT
2119  021360  012777  177777  014032            MOV     #-1,@RDDB               ;LOAD A WORD INTO SILO
2120  021366  032777  000400  014022  RF21:     BIT     #B08,@RSR               ;SILO OUTPUT RDY?
2121  021374  001774                            BEQ     RF21                    ;WAIT FOR IT
2122  021376  042777  000200  014010            BIC     #B07,@RCR               ;CLEAR LD SILO BIT
2123  021404  012777  177774  014010            MOV     #-4,@RDBC               ;SET BYTE COUNT FOR 1 WD XFER
2124  021412  012777  164176  014004            MOV     #164176,@RDBA           ;PUT NON-EXST LOC IN RDBA
2125  021420  052777  040060  013766            BIS     #40060,@RCR             ;START NPR AND SET EXT ADD BITS
2126  021426  000240                            NOP
2127  021430  000240                            NOP
2128  021432  005777  013764                    TST     @RDBC                   ;IS BYTE COUNT 0?
2129  021436  001014                            BNE     RF22
2130  021440                                    ERROR   \N              ;ERROR:REPLACE #764176 (ABOVE) WITH NON-EXST LOC
2131  021462                                    SCOPE   RF20
2132  021470  032777  040000  013720  RF22:     BIT     #B14,@RSR               ;IS NON EXST LOC SET?
2133  021476  001014                            BNE     RF23
2134  021500                                    ERROR   \N              ;ERROR:NPR TO NXM DIDN'T SET NON-EXST LOC
2135  021522                                    SCOPE   RF20
2136  021530  032777  100000  013660  RF23:     BIT     #B15,@RSR               ;IS ERROR BIT SET?
2137  021536  001014                            BNE     RF24
2138  021540                                    ERROR   \N              ;ERROR:NON-EXST LOC DIDN'T SET RSR BIT 15
2139  021562                                    SCOPE   RF20
2140  021570                            RF24:   BDINIT  RCVR                    ;CLR BOARD BEFORE LEAVING
2141  021576  004767  007552                    JSR     PC,MONIT
2142  021602  032777  010000  010140            BIT     #B12,@SR                ;IS SW 12 SET?
2143  021610  001402                            BEQ     RFRT
2144  021612  000167  176206                    JMP     RSRTST                  ;YES,REPEAT THIS TEST
2145  021616  000207                    RFRT:   RTS     PC
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                                        .SBTTL  INTERRUPT TEST

                                        ;RECEIVER INTERRUPT TEST

021620                          RINTST: MTPS    #P7                     ;DIS-ALLOW INTERRUPT
021626                                  BDINIT  RCVR                    ;CLEAR THE BOARD
021634  016700  013526                  MOV     RCVEC,R0
021640  012760  000340  000002          MOV     #340,2(R0)              ;SET NEW PS = P7
021646  012777  021676  013512          MOV     #EROINT,@RCVEC          ;SET-UP FOR ERROR INTERRUPT
021654  052777  000100  013532          BIS     #B06,@RCR               ;SET INTERRUPT ENABLE
021662                                  MTPS    #0                      ;ALLOW INTERRUPT
021670  000240                          NOP
021672  000167  000046                  JMP     RH0                     ;SKIP ERROR IF NO INTERRUPT
021676                          EROINT: MTPS    #P7                     ;INTERRUPT OFF
021704  022626                          CMP     (SP)+,(SP)+             ;CORRECT STACK
021706  042777  000100  013500          BIC     #B06,@RCR               ;CLR INTERRUPT ENABLE
021714                                  ERROR   \N              ;ERROR:ERRONEOUS INTERRUPT;NO FLAGS SET
021736                                  SCOPE   RINTST
021744  005067  013410          RH0:    CLR     TMPRIO                  ;START WITH CP AT PRIORITY 0
021750  012777  022250  013410          MOV     #INTRA,@RCVEC           ;SET VECTOR FOR GOOD INTERRUPT
021756                          RH1:    MTPS    #P7                     ;INTERRUPT OFF
021764  052777  000100  013422          BIS     #B06,@RCR               ;ENABLE RCVR INTERRUPT
021772  052777  000200  013414          BIS     #B07,@RCR               ;SET LD SILO BIT
022000  012777  177777  013412          MOV     #-1,@RDDB               ;PUT A WORD INTO RCVR SILO
022006  042777  000200  013400          BIC     #B07,@RCR               ;CLR LD SILO BIT
022014  032777  000400  013374  RH1A:   BIT     #B08,@RSR               ;SILO OUTPUT READY?
022022  001774                          BEQ     RH1A                    ;WAIT FOR IT
022024                                  MTPS    TMPRIO                  ,ALLOW INTERRUPT
022032  000240                          NOP
022034  000240                          NOP
022036  005767  013316                  TST     TMPRIO                  ;NO INTERRUPT;IS PSW = 0?
022042  001014                          BNE     RH2
022044                                  ERROR   \N              ;ERROR:NO INTERRUPT FROM RECEIVER
022066                                  SCOPE   RINTST
022074  026767  013272  013256  RH2:    CMP     RPRIO,TMPRIO            ;HAVE WE REACHED EXPECTED PRIORITY?
022102  001414                          BEQ     RH3
022104                                  ERROR   \N              ;ERROR:DEVICE NOT JUMPERED TO EXPECTED PRIORITY
022126                                  SCOPE   RINTST
022134  022767  000340  013216  RH3:    CMP     #340,TMPRIO             ;IS PSW = 7?
022142  001426                          BEQ     RH4
022144                                  BDINIT  RCVR
022152  062767  000040  013200          ADD     #40,TMPRIO
022160  012777  022272  013200  RH3S:   MOV     #INTRB,@RCVEC           ;SET VECTOR FOR ERROR INTERRUPT
022166  052777  000100  013220          BIS     #B06,@RCR               ;ENABLE RCVR INTERRUPT
022174  052777  000200  013214          BIS     #B07,@RSR               ;FORCE INTERRUPT REQUEST
022202                                  MTPS    TMPRIO                  ;SET CP TO NEXT PRIORITY
022210  000240                          NOP
022212  000240                          NOP
022214  000167  177714                  JMP     RH3
022220                          RH4:    BDINIT  RCVR                    ;CLEAR THE BOARD
022226  004767  007122                  JSR     PC,MONIT
022232  032777  010000  007510          BIT     #B12,@SR                ;SW 12 = 1?
022240  001402                          BEQ     RHRT
022242  000167  177352                  JMP     RINTST                  ;YES,DO THIS TEST OVER
022246  000207                  RHRT:   RTS     PC                      ;NO,EXIT
```

```
 2203  022250                          INTRA:  BDINIT  RCVR                    ;CLR INTERRUPT ETC.
 2204  022256  062767  000040  013074          ADD     #40,TMPRIO              ;INCR TEMP PRIORITY
 2205  022264  022626                          CMP     (SP)+,(SP)+             ;CORRECT STACK POINTER
 2206  022266  000167  177464                  JMP     RH1                     ;TRY AGAIN
 2207
 2208  022272  022626                  INTRB:  CMP     (SP)+,(SP)+             ;POP THE STACK
 2209  022274                          BDINIT  RCVR                    ;CLR EVRYTHING
 2210  022302                          ERROR   \N              ;ERROR:GOT INTR WHITH CP AT HIGHER PRIORITY
 2211  022324                          SCOPE   RH3S
 2212  022332  000167  177576          JMP     RH3
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                                        .SBTTL  C.R.C. CHECK

                                        ;CYCLIC REDUNDANCY CHECK CHARACTER TEST

022336                                  RCRCTS: BDINIT  RCVR                    ;CLR THE BOARD
022344  052777  000200  013042                BIS     #B07,@RCR               ;SET LD SILO BIT
022352  012702  033226                        MOV     #SILCRC,R2              ;R2 POINTS TO GOOD CRC'S
022356  012703  033026                        MOV     #SILDAT,R3              ;R3 POINTS TO MEM DATA
022362  012704  177700                        MOV     #-64.,R4                ;R4 IS WORD COUNTER
022366  011367  012764                RJ1:    MOV     (R3),DATWD              ;SAVE INPUT WORD
022372  016777  012760  013020              MOV     DATWD,@RDDB             ;LOAD SILO
022400  011267  007602                        MOV     (R2),GOOD               ;GET GOOD CRC FOR COMPARISON
022404  017767  013016  007572              MOV     @RDCRC,BAD              ;GET GENERATED CRC
022412  026767  007570  007564              CMP     GOOD,BAD                ;IS CRC OK?
022420  001424                              BEQ     RJ2
022422                                      PNTM    SLIWD                   ;PRINT ''SILO INPUT WORD WAS ''
022432  016700  012720                      MOV     DATWD,R0
022436  004767  010064                      JSR     PC,OCTPNT               ;PRINT SILO INPUT WORD
022442                                      DATERR  \N              ;ERROR:BAD CRC FOR ABOVE WORD
022464                                      SCOPE   RCRCTS
022472  062702  000002                RJ2:    ADD     #2,R2                   ;UPDATE CRC POINTER
022476  062703  000002                        ADD     #2,R3                   ;UPDATE DATA POINTER
022502  005204                              INC     R4                      ;HAVE WE CHECKED 64 WDS?
022504  001330                              BNE     RJ1
022506  004767  006642                      JSR     PC,MONIT
022512  032777  010000  007230              BIT     #B12,@SR                ;CHECK SW 12
022520  001402                              BEQ     RJRT                    ;IF 0, EXIT
022522  000167  177610                      JMP     RCRCTS                  ;IF 1, STAY
022526                                  RJRT:   BDINIT  RCVR                    ;CLR BOARD BEFORE EXIT
022534  000207                              RTS     PC
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                                        .SBTTL XMTR-RCVR LOOP TESTS

                                ;TEST 3 - XMTR - RCVR LOOP TESTS
                                ;  (00) NPR TESTS SILO TO SILO
                                ;  (01) DATA LOOPS TESTS
                                ;  (02) TXM ERRORS TESTS
                                ;  (03) REJECT & TRUNCATE TESTS

 000300                         N       =       300                     ;LOOP TEST ERRORS START AT 300

 022536                         TEST3:  MTPS    #P7
 022544 012767 000010 012550            MOV     #10,ITER                ;INITIAL ITERATION OF 10 PER PASS
 022552 004767 006576                   JSR     PC,MONIT
 022556 032777 002000 007164            BIT     #B10,@SR                ;CHECK SW 10
 022564 001424                          BEQ     LOOPL                   ;IF CLR, RUN ALL TESTS
 022566 017767 007156 012530            MOV     @SR,SWI         ;IF SET, START AT TEST # IN SW'S <1:0>
 022574 042767 177770 012522            BIC     #-10,SWI
 022602 026727 012516 000003            CMP     SWI,#3                  ;DON'T ALLOW SWI > 3
 022610 003012                          BGT     LOOPL
 022612 000241                          CLC                             ;CLR C-BIT BEFORE ROTATE
 022614 006167 012504                   ROL     SWI
 022620 006167 012500                   ROL     SWI
 022624 062767 022636 012472            ADD     #LOOPL,SWI              ;GENERATE CORRECT OFFSET
 022632 000177 012466                   JMP     @SWI                    ;GO TO SELECTED TEST
 022636 004767 000120           LOOPL:  JSP     PC,NPRTST               ;CHECK NPR ..SILO TO SILO
 022642 004767 000710                   JSR     PC,DATLPS               ;DO DATA LOOPS TEST
 022646 004767 003236                   JSR     PC,TXMERS               ;CHECK TXM ERRORS
 022652 004767 005520                   JSR     PC,XRC20                ;DO REJECT AND TRUNCATE TEST
 022656 032777 004000 007064            BIT     #B11,@SR                ;CHECK SW 11
 022664 001003                          BNE     TREND                   ;PRINT END IF SET
 022666 005367 012430                   DEC     ITER                    ;OTHERWISE, RE-ITERATE
 022672 001361                          BNE     LOOPL
 022674 005767 012446           TREND:  TST     $4FLAG                  ;TEST END PASS INHIBIT FLAG
 022700 001027                          BNE     REPETL                  ;CAN'T PRINT, EXIT.
 022702 005267 012430                   INC     PSNO3                   ;UPDATE PASS NO.
 022706                                 PNTM    PEND                    ;PRINT 'END PASS # ''
 022716 016700 012414                   MOV     PSNO3,R0
 022722 004767 007654                   JSR     PC,DECPNT               ;PRINT PASS NO.
 022726 012700 000040                   MOV     #40,R0
 022732 004767 010034                   JSR     PC,TTO                  ;PRINT A SPACE
 022736 012700 000102                   MOV     #'B,R0
 022742 004767 010024                   JSR     PC,TTO                  ;PRINT 'B'' (TO INDICATE 'LOOP TEST)
 022746 005000                          CLR     R0
 022750 004767 010016                   JSR     PC,TTO                  ;PRINT NULLS TO ALLOW PRINT
 022754 004767 010012                   JSR     PC,TTO                  ;OF PASS NO. IN CASE RESET FOLLOWS
 022760 000207                  REPETL: RTS     PC                      ;RETURN
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                                                .SBTTL  NPR TESTS

                                        NPRTST: BDINIT  RCVR                    ;CLEAR RECEIVER
                                                BDINIT  XMTR                    ;CLEAR XMTR
022776  012777  010400  012402                  MOV     #10400,@TMMR            ;SET MASTER AND AUTO ADDR
023004  004767  000424                          JSR     PC,FILRCV               ;FILL RCVR SILO
023010  012777  177600  012404                  MOV     #-128.,@RDBC            ;SET UP RCVR TO INITIATE
023016  016777  012356  012400                  MOV     TSDB,@RDBA              ;NPR TO XMTR SILO
023024  012777  040064  012362                  MOV     #40064,@RCR             ;START NPR, INHIB ADDR INCR
023032  016702  006714                          MOV     DLCON,R2
023036  005003                          NPTST1: CLR     R3
023040  012704  177777                          MOV     #-1,R4                  ;SET UP FOR  DELAY
023044  022777  000200  012330          XRA1:   CMP     #128.,@TSBC             ;TRANSFERRED 64 WORDS?
023052  001422                                  BEQ     XRA2                    ;NO, KEEP LOOKING FOR A SECOND
023054  005203                                  INC     R3
023056  001372                                  BNE     XRA1
023060  005204                                  INC     R4
023062  001370                                  BNE     XRA1
023064  005302                                  DEC     R2
023066  001363                                  BNE     NPTST1
023070                                          ERROR   \N              ;ERROR:RCVR NPR NOT COMPLETE IN TIME
023112                                          SCOPE   NPRTST
023120  004767  000352                  XRA2:   JSR     PC,CHXDAT               ;CHECK DATA IN XMTR SILO
023124  000414                                  BR      XRA2A                   ;DATA O.K. , CONTINUE
023126                                          DATERR  \N              ;ERROR:BAD DATA NPR'D TO XMTR SILO
023150                                          SCOPE   NPRTST
023156  005777  012240                  XRA2A:  TST     @RDBC                   ;CHECK THAT RDBC = 0
023162  001421                                  BEQ     XRA3
023164  005067  007016                          CLR     GOOD
023170  017767  012226  007006                  MOV     @RDBC,BAD
023176                                          DATERR  \N              ;ERROR:RCV BYTE COUNT SHD BE 0 AT END OF NPR
023220                                          SCOPE   NPRTST
023226                                  XRA3:   BDINIT  XMTR                    ;CLR    XMTR
023234                                          BDINIT  RCVR                    ;CLR RCVR
023242  004767  000166                          JSR     PC,FILRCV               ;FILL RECEIVER SILO
023246  012777  177600  012126                  MOV     #-128.,@TSBC            ;SET UP FOR XMTR TO INITIATE
023254  016777  012140  012122                  MOV     RDDB,@TSBA              ;NPR FROM RCVR SILO
023262  012777  040064  012104                  MOV     #40064,@TCR             ;SET TX NPR, INHIB ADR INC
023270  016702  006456                          MOV     DLCON,R2
023274  005003                          XRA3A:  CLR     R3
023276  012704  177777                          MOV     #-1,R4                  ;SET UP FOR 1 SEC DELAY
023302  005777  012074                  XRA4:   TST     @TSBC                   ;TRANSFERRED 64 WORDS?
023306  001422                                  BEQ     XRA5
023310  005203                                  INC     R3                      ;IF NOT, WATCH FOR A SECOND
023312  001373                                  BNE     XRA4
023314  005204                                  INC     R4
023316  001371                                  BNE     XRA4
023320  005302                                  DEC     R2
023322  001364                                  BNE     XRA3A
023324                                          ERROR   \N              ;ERROR:XMTR NPR NOT COMPLETE IN 1 SEC
023346                                          SCOPE   XRA3
023354  004767  000116                  XRA5:   JSR     PC,CHXDAT               ;CHK DATA IN XMTR SILO
023360  000414                                  BR      XRA6
023362                                          DATERR  \N              ;ERROR:BAD DATA NPR'D TO XMTR SILO
023404                                          SCOPE   XRA3
023412  004767  005736                  XRA6:   JSR     PC,MONIT
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2348  023416  032777  010000  006324          BIT     #B12,@SR                ;SW 12 = 1?
2349  023424  001402                          BEQ     XRART                   ;NO, EXIT
2350  023426  000167  177330                  JMP     NPRTST                  ;YES, STAY HERE
2351  023432  000207                  XRART:  RTS     PC
2352  023434  012700  033026          FILRCV: MOV     #SILDAT,R0              ;R0 IS DATA POINTER
2353  023440  012777  000200  011746          MOV     #B07,@RCR               ;SET RCVR 'LD SILO''
2354  023446  012701  000100                  MOV     #64.,R1                 ;R1 IS WORD COUNTER
2355  023452  012077  011742          LDLP:   MOV     (R0)+,@RDDB             ;MOVE WORDS INTO SILO
2356  023456  004567  160650                  JSR     R5,DELAY                ;WAIT FOR INPUT RDY
2357  023462  000005                          .WORD   5
2358  023464  005301                          DEC     R1                      ;LOADED ALL 64 WORDS?
2359  023466  001371                          BNE     LDLP                    ;IF NOT, CONTINUE LOADING
2360  023470  005077  011720                  CLR     @RCR                    ;CLR RCR AND EXIT
2361  023474  000207                          RTS     PC
2362
2363  023476  012702  000100          CHXDAT: MOV     #64.,R2                 ;R2 IS WORD COUNTER
2364  023502  012701  033026                  MOV     #SILDAT,R1              ;R1 POINTS TO GOOD DATA
2365  023506  052777  000200  011660          BIS     #B07,@TCR               ;SET 'RD SILO'' IN XMTR
2366  023514  017767  011660  006462  XRCNT:  MOV     @TSDB,BAD               ;POP SILO WORD INTO BAD
2367  023522  012167  006460                  MOV     (R1)+,GOOD              ;POP LIST WORD INTO GOOD
2368  023526  026767  006454  006450          CMP     GOOD,BAD
2369  023534  001005                          BNE     XRERXT                  ;IF DATA BAD, ERROR EXIT
2370  023536  005302                          DEC     R2                      ;DONE CHECKING SILO?
2371  023540  001365                          BNE     XRCNT                   ;NO, CONTINUE
2372  023542  005077  011626          XRLV:   CLR     @TCR                    ;CLR COMMAND REG
2373  023546  000207                          RTS     PC                      ;EXIT
2374  023550  062716  000002          XRERXT: ADD     #2,(SP)                 ;FIX PC FOR ERROR RETURN
2375  023554  000772                          BR      XRLV
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2377                                        .SBTTL  DATA LOOPS TESTS
2378
2379  023556                          DATLPS: BDINIT  XMTR                    ;CLR XMTR
2380  023564                                  BDINIT  RCVR                    ;CLR RCVR
2381  023572  012777  177777  011600          MOV     #-1,@TSDB               ;LOAD A WORD INTO TXM SILO
2382  023600  012777  010400  011600          MOV     #10400,@TMMR            ;SET MASTER FLOP & SET AUTO ADDR
2383  023606  012777  177776  011606          MOV     #-2,@RDBC               ;SET BYTE COUNT FOR 1 WORD
2384  023614  016777  011530  011552          MOV     RCAD,@TCR               ;LOAD DESTINATION CODE
2385  023622  052777  020000  011564          BIS     #B13,@RCR               ;SET RCV WD
2386  023630  012777  177776  011544          MOV     #-2,@TSBC               ;SET XMTR BYTE CNT FOR 1 WORD
2387  023636  052777  020000  011530          BIS     #B13,@TCR               ;SET SEND WORD
2388  023644  016704  006102                  MOV     DLCON,R4
2389  023650  012703  177500          DTLPS1: MOV     #177500,R3              ;SET UP 2 MS DELAY
2390  023654  005777  011536          XRB1:   TST     @RSR                    ;ANY ERRORS?
2391  023660  100427                          BMI     2$                      ;YES
2392  023662  032777  000400  011526          BIT     #B08,@RSR               ;IS DAT OUTP RDY SET IN RCVR?
2393  023670  001020                          BNE     1$
2394  023672  005203                          INC     R3                      ;WAIT A COUPLE OF MS FOR IT
2395  023674  001367                          BNE     XRB1
2396  023676  005304                          DEC     R4
2397  023700  001363                          BNE     DTLPS1
2398  023702                                  ERROR   \N              ;ERROR:DAT OUTP RDY IN RCVR NOT SET IN 2 MS.
2399  023724                                  SCOPE   DATLPS
2400  023732  005777  011460          1$:     TST     @RSR                    ;ANY HARD ERRORS?
2401  023736  100030                          BPL     XRB2
2402  023740                          2$:     ERROP   \N              ;ERROR; HARD ERROR ON 1 WD XFER
2403  023762  032777  040000  005760          BIT     #B14,@SR                ;CHECK FOR PRINT INHIBIT
2404  023770  001013                          BNE     XRB2                    ;SKIP EXT PRINTOUT IF SW 14=1
2405  023772                                  PNTM    RCSTAT                  ;ELSE PRINT 'RECEIVER STATUS - ''
2406  024002  017700  011410                  MOV     @RSR,R0
2407  024006  004767  006514                  JSR     PC,OCTPNT               ;PRINT CONTENTS OF RSR
2408  024012                                  SCOPE   DATLPS
2409  024020  105777  011352          XRB2:   TSTB    @TSR                    ;IS SUC TXF SET IN XMTR?
2410  024024  100433                          BMI     XRB3
2411  024026                                  ERROR   \N              ;ERROR:SUC TXF IN XMTR NOT SET IN 2 MS.
2412  024050  005777  011322                  TST     @TSR                    ;ANY HARD ERRORS?
2413  024054  100014                          BPL     XRBS2
2414  024056  032777  040000  005664          BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2415  024064  001010                          BNE     XRBS2                   ;IF NOT, SKIP IT.
2416  024066                                  PNTM    TXSTAT                  ;IF SO, PRINT 'TRANSMITTER STATUS - ''
2417  024076  017700  011274                  MOV     @TSR,R0
2418  024102  004767  006420                  JSR     PC,OCTPNT               ;PRINT CONTENTS OF TSR
2419  024106                          XRBS2:  SCOPE   DATLPS
2420  024114  012767  177777  006064  XRB3:   MOV     #-1,GOOD
2421  024122  017767  011272  006054          MOV     @RDDB,BAD               ;CHECK DATA RECEIVED
2422  024130  026767  006052  006046          CMP     GOOD,BAD                ;IS IT O.K. ?
2423  024136  001414                          BEQ     XRB4
2424  024140                                  DATERR  \N              ;ERROR:DATA RECEIVED IS WRONG (DROPPED BITS)
2425  024162                                  SCOPE DATLPS
2426  024170  016767  011156  006010  XRB4:   MOV     TRAD,GOOD               ;GET TRANSMITTER TDM BUS ADDRESS
2427  024176  017767  011212  006000          MOV     @RCR,BAD                ;READ IDENT BITS IN RCR
2428  024204  042767  160377  005772          BIC     #160377,BAD             ;IGNORE ALL OTHER BITS
2429  024212  026767  005770  005764          CMP     GOOD,BAD                ;D.C. RECEIVED OK?
2430  024220  001414                          BEQ     XRB4C
2431  024222                                  DATERR  \N              ;ERROR:XMTR IDENT BITS NOT REC'D BY RCVR
2432  024244                                  SCOPE   DATLPS
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2433  024252                          XRB4C:  BDINIT  XMTR                    ;CLR XMTR
2434  024260                                  BDINIT  RCVR                    ;CLR RCVR
2435  024266  012777  000000  011104          MOV     #0,@TSDB                ;LOAD A WORD OF 0'S INTO SILO
2436  024274  012777  177776  011100          MOV     #-2,@TSBC               ;SET BYTE CNT FOR 1 WORD
2437  024302  012777  177776  011112          MOV     #-2,@RDBC
2438  024310  016777  011034  011056          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
2439  024316  052777  020000  011070          BIS     #B13,@RCR               ;SET RCV WD
2440  024324  052777  020000  011042          BIS     #B13,@TCR               ;SET SND WD
2441  024332  016704  005414                  MOV     DLCON,R4
2442  024336  012703  177570          XRB4D:  MOV     #177570,R3              ;SET UP 2 MS DELAY
2443  024342  005777  011050          XRB5:   TST     @RSR                    ;ANY ERRORS?
2444  024346  100427                          BMI     2$                      ;YES, ERROR
2445  024350  032777  000400  011040          BIT     #B08,@RSR               ;DATA OUTPUT READY YET?
2446  024356  001020                          BNE     1$
2447  024360  005203                          INC     R3                      ;WAIT A COUPLE OF MS FOR IT
2448  024362  001367                          BNE     XRB5
2449  024364  005304                          DEC     R4
2450  024366  001363                          BNE     XRB4D
2451  024370                                  ERROR   \N              ;ERROR:DAT OUTP RDY IN RCVR NOT SET IN 2 MS.
2452  024412                                  SCOPE   XRB4C
2453  024420  005777  010772          1$:     TST     @RSR                    ;ANY HARD ERRORS IN RCVR?
2454  024424  100030                          BPL     XRB6
2455  024426                          2$:     ERROR   \N              ;ERROR:HARD ERROR ON 1 WD XFER
2456  024450  032777  040000  005272          BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2457  024456  001013                          BNE     XRB6                    ;IF NOT, SKIP IT.
2458  024460                                  PNTM    RCSTAT                  ;IF SO, PRINT 'RECEIVER STATUS = ''
2459  024470  017700  010722                  MOV     @RSR,R0
2460  024474  004767  006026                  JSR     PC,OCTPNT               ;PRINT CONTENTS OF RSR
2461  024500                                  SCOPE   XRB4C
2462  024506  105777  010664          XRB6:   TSTB    @TSR                    ;IS SUC TXF SET IN XMTR?
2463  024512  100433                          BMI     XRB7
2464  024514                                  ERROR   \N              ;ERROR:SUC TXF IN XMTR NOT SET IN 2 MS.
2465  024536  005777  010634                  TST     @TSR                    ;ANY HARD ERRORS IN XMTR?
2466  024542  100014                          BPL     XRB6S
2467  024544  032777  040000  005176          BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2468  024552  001010                          BNE     XRB6S                   ;IF NOT, SKIP IT
2469  024554                                  PNTM    TXSTAT                  ;IF SO, PRINT 'TRANSMITTER STATUS = ''
2470  024564  017700  010606                  MOV     @TSR,R0
2471  024570  004767  005732                  JSR     PC,OCTPNT               ;PRINT CONTENTS OF TSR
2472  024574                          XRB6S:  SCOPE   XRB4C
2473  024602  005067  005400          XRB7:   CLR     GOOD
2474  024606  017767  010606  005370          MOV     @RDDB,BAD               ;CHECK DATA RECEIVED
2475  024614  026767  005366  005362          CMP     GOOD,BAD                ;IS IT O.K.?
2476  024622  001414                          BEQ     XRB8
2477  024624                                  DATERR  \N              ;ERROR:DATA RECEIVED IS WRONG (PICKED UP BITS)
2478  024646                                  SCOPE   XRB4C
2479  024654  004767  173022          XRB8:   JSR     PC,CLRCBF               ;MAKE SURE CMPBUF IS CLEAR
2480  024660                                  BDINIT  XMTR                    ;CLR XMTR
2481  024666                                  BDINIT  RCVR                    ;CLR RCVR
2482  024674  012777  033026  010502          MOV     #SILDAT,@TSBA           ;GET XMTR DATA FROM SILDAT
2483  024702  012777  033426  010514          MOV     #CMPBUF,@RDBA           ;PUT RCV'D DATA IN CMPBUF
2484  024710  012777  177600  010464          MOV     #-128.,@TSBC            ;SET UP TO SEND 64 WORDS
2485  024716  012777  177600  010476          MOV     #-128.,@RDBC            ;SET UP TO RECEIVE 64 WORDS
2486  024724  016777  010420  010442          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
2487  024732  052777  060001  010454          BIS     #60001,@RCR             ;SET RC NPR, RCV WD, & ST TXF IN RCVR
2488  024740  052777  060001  010426          BIS     #60001,@TCR             ;AND IN XMTR
                          ;
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2489  024746  016702  005000                  MOV     DLCON,R2
2490  024752  005003                  XRB8A:  CLR     R3
2491  024754  012704  177777                  MOV     #-1,R4                  ;SET UP 1 SEC DELAY
2492  024760  105777  010412          XRB9:   TSTB    @TSR                    ;IS SUC TXF SET IN XMTR?
2493  024764  100447                          BMI     XRB10                   ;YES, GO CHECK RECEIVER
2494  024766  005777  010404                  TST     @TSR                    ;ERROR BIT SET?
2495  024772  100411                          BMI     $2$
2496  024774  005777  010416                  TST     @RSR                    ;RCVR ERROR BIT SET?
2497  025000  100444                          BMI     $3$
2498  025002  005203                          INC     R3                      ;NO, WATCH FOR A SECOND
2499  025004  001365                          BNE     XRB9
2500  025006  005204                          INC     R4
2501  025010  001363                          BNE     XRB9
2502  025012  005302                          DEC     R2
2503  025014  001356                          BNE     XRB8A
2504  025016                          $2$:    ERROR   \N              ;ERROR:NO SUC TXF IN XMTR IN 1 SEC
2505  025040  005777  010332                  TST     @TSR                    ;ANY HARD ERRORS IN XMTR?
2506  025044  100014                          BPL     XRB9S
2507  025046  032777  040000  004674          BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2508  025054  001010                          BNE     XRB9S                   ;IF NOT, SKIP IT
2509  025056                                  PNTM    TXSTAT                  ;IF SO, PRINT 'TRANSMITTER STATUS - ''
2510  025066  017700  010304                  MOV     @TSR,R0
2511  025072  004767  005430                  JSR     PC,OCTPNT               ;PRINT CONTENTS OF TSR
2512  025076                          XRB9S:  SCOPE   XRB8
2513  025104  105777  010306          XRB10:  TSTB    @RSR                    ;IS SUC TXF SET IN RCVR?
2514  025110  100433                          BMI     XRB11                   ;YES, GO CHECK DATA
2515  025112                          $3$:    ERROR   \N              ;ERROR:NO SUC TXF IN RCVR IN 1 SEC
2516  025134  005777  010256                  TST     @RSR                    ;ANY HARD ERRORS IN RCVR?
2517  025140  100014                          BPL     XRB10S
2518  025142  032777  040000  004600          BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2519  025150  001010                          BNE     XRB10S                  ;IF NOT, SKIP IT
2520  025152                                  PNTM    RCSTAT                  ;IF SO, PRINT 'RECEIVER STATUS = ''
2521  025162  017700  010230                  MOV     @RSR,R0
2522  025166  004767  005334                  JSR     PC,OCTPNT               ;PRINT CONTENTS OF RSR
2523  025172                          XRB10S: SCOPE   XRB8
2524  025200  012703  000100          XRB11:  MOV     #64.,R3                 ;R3 IS WORD COUNTER
2525  025204  012701  033026                  MOV     #SILDAT,R1              ;R1 IS GOOD DATA POINTER
2526  025210  012702  033426                  MOV     #CMPBUF,R2              ;R2 IS 'BAD' DATA POINTER
2527  025214  012167  004766          XRB11L: MOV     (R1)+,GOOD
2528  025220  012267  004760                  MOV     (R2)+,BAD
2529  025224  026767  004756  004752          CMP     GOOD,BAD                ;DATA WORD OK?
2530  025232  001420                          BEQ     XRB11C                  ;IF SO, CONTINUE
2531  025234                                  DATERR  \N              ;ERROR:BAD DATA RECEIVED FROM XMTR
2532  025256  005303                          DEC     R3                      ;CHECKED ALL WORDS?
2533  025260  001355                          BNE     XRB11L
2534  025262                                  SCOPE   XRB8                    ;RE-TRY BECAUSE OF ERROR
2535  025270  000167  000004                  JMP     XRB12
2536  025274  005303          XRB11C: DEC     R3                      ;CHECKED ALL WORDS?
2537  025276  001346                          BNE     XRB11L
2538  025300                          XRB12:  BDINIT  XMTR                    ;CLR XMTR
2539  025306                                  BDINIT  RCVR                    ;CLR RCVR
2540  025314  012777  035442  010062          MOV     #TSTWRD,@TSBA           ;POINT XMTR AT LOC WITH TEST WORD
2541  025322  012777  177200  010052          MOV     #-600,@TSBC             ;SET UP FOR 300 WORD XFR
2542  025330  016777  010014  010036          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
2543  025336  012777  020001  010050          MOV     #20001,@RCR             ;SET RCV WD, RCV DAT, IN RCVR
2544  025344  052777  060005  010022          BIS     #60005,@TCR             ;SET TX NPR, INH ADR INC, ST TXM,&SND WD
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2545  025352  012701  000300                 MOV     #300,R1                 ;R1 COUNTS WORDS RECEIVED
2546  025356  016704  004370       XRB12L:   MOV     DLCON,R4
2547  025362  012703  177700       XRB12K:   MOV     #-100,R3                ;SET UP 10 MS COUNTER
2548  025366  032777  000400 010022 XRB12M:  BIT     #B08,@RSR               ;RCVR SILO RDY FOR OUTPUT?
2549  025374  001063                 BNE     XRB13                   ;YES, LOOK AT WORD
2550  025376  005203                 INC     R3
2551  025400  001372                 BNE     XRB12M                  ;IF NOT, WAIT 10 MS.
2552  025402  005304                 DEC     R4
2553  025404  001366                 BNE     XRB12K
2554  025406                         ERROR   \N              ;ERROR:NO DATA WORD IN RCVR SILO IN 10 MS.
2555  025430  005777  007742         TST     @TSR                    ;ANY HARD ERRORS IN XMTR?
2556  025434  100014                 BPL     XRB12R
2557  025436  032777  040000 004304         BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2558  025444  001034                 BNE     XRB12S                  ;IF NOT, SKIP IT
2559  025446                         PNTM    TXSTAT                  ;IF SO, PRINT 'TRANSMITTER STATUS = ''
2560  025456  017700  007714         MOV     @TSR,R0
2561  025462  004767  005040         JSR     PC,OCTPNT               ;PRINT CONTENTS OF TSR
2562  025466  005777  007724 XRB12R:  TST     @RSR                    ;ANY HARD ERRORS IN RCVR?
2563  025472  100010                 BPL     XRB12T
2564  025474                         PNTM    RCSTAT                  ;IF SO, PRINT 'RECEIVER STATUS = ''
2565  025504  017700  007706         MOV     @RSR,R0
2566  025510  004767  005012         JSR     PC,OCTPNT               ;PRINT CONTENTS OF RSR
2567  025514                 XRB12T:  PNTM    RCBTCN                  ;PRINT 'NO. OF WORDS RECEIVED = ''
2568  025524  012700  000300         MOV     #300,R0
2569  025530  160100                 SUB     R1,R0                   ;CALCULATE WORDS RECV'D
2570  025532  004767  004770         JSR     PC,OCTPNT               ;PRINT RESULT
2571  025536                 XRB12S:  SCOPE   XRB12                   ;START ALL OVER
2572  025544  016767  007672 004434 XRB13:   MOV     TSTWRD,GOOD
2573  025552  017767  007642 004424         MOV     @RDDB,BAD               ;GET WORD FROM SILO
2574  025560  026767  004422 004416         CMP     GOOD,BAD                ;WAS IT = TEST WORD?
2575  025566  001431                 BEQ     XRB13C
2576  025570                         DATERR  \N              ;ERROR:DATA WORD IN RCVR SILO WRONG
2577  025612  032777  040000 004130         BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2578  025620  001011                 BNE     XRB13L                  ;IF NOT, SKIP IT.
2579  025622                         PNTM    RCBTCN                  ;PRINT 'NO. OF WORDS RECEIVED - ''
2580  025632  012700  000301         MOV     #301,R0
2581  025636  160100                 SUB     R1,R0                   ;CALCULATE WORDS RECV'D
2582  025640  004767  004662         JSR     PC,OCTPNT               ;PRINT RESULT
2583  025644                 XRB13L:  SCOPE   XRB12                   ;START ALL OVER
2584  025652  005301         XRB13C:  DEC     R1                      ;UPDATE RCVR WORD COUNT
2585  025654  001240                 BNE     XRB12L                  ;GET ANOTHER WORD
2586  025656  016704  004070         MOV     DLCON,R4
2587  025662  012703  177000 XRB13E:  MOV     #177000,R3              ;SET UP TO WAIT FOR TXFR
2588  025666  005203         XRB13D:  INC     R3
2589  025670  001376                 BNE     XRB13D                  ;WAIT FOR LATEST POSSIBLE TIMSL
2590  025672  105777  007500         TSTB    @TSR                    ;XMTR SUC TXF SET?
2591  025676  100435                 BMI     XRB14                   ;YES,GO CHECK RCVR
2592  025700  005304                 DEC     R4
2593  025702  001367                 BNE     XRB13E
2594  025704                         ERROR   \N              ;ERROR:XMTR SUC TXF NOT SET
2595  025726  005777  007444         TST     @TSR                    ;ANY HARD ERRORS IN XMTR?
2596  025732  100014                 BPL     XRB13S
2597  025734  032777  040000 004006         BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
2598  025742  001010                 BNE     XRB13S                  ;IF NOT, SKIP IT.
2599  025744                         PNTM    TXSTAT                  ;IF SO, PRINT 'TRANSMITTER STATUS = ''
2600  025754  017700  007416         MOV     @TSR,R0
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 2601  025760  004767  004542            JSR     PC,OCTPNT               ;PRINT CONTENTS OF TSR
 2602  025764                    XRB13S: SCOPE   XRB12                   ;START OVER
 2603  025772  105777  007420    XRB14:  TSTB    @RSR                    ;RCVR SUC TXF SET?
 2604  025776  100433                    BMI     XRB15                   ;YES, ALL DONE
 2605  026000                            ERROR   \N              ;ERROR:RCVR SUC TXF NOT SET
 2606  026022  005777  007370            TST     @RSR                    ;ANY HARD ERRORS IN RCVR?
 2607  026026  100014                    BPL     XRB14S
 2608  026030  032777  040000  003712    BIT     #B14,@SR                ;CHECK IF PRINT ALLOWED
 2609  026036  001010                    BNE     XRB14S                  ;IF NOT, SKIP IT.
 2610  026040                            PNTM    RCSTAT                  ;IF SO, PRINT 'RECEIVER STATUS - ''
 2611  026050  017700  007342            MOV     @RSR,R0
 2612  026054  004767  004446            JSR     PC,OCTPNT               ;PRINT CONTENTS OF RSR
 2613  026060                    XRB14S: SCOPE   XRB12                   ;START OVER
 2614  026066  004767  003262    XRB15:  JSR     PC,MONIT
 2615  026072  032777  010000  003650    BIT     #B12,@SR                ;SW 12 = 1?
 2616  026100  001402                    BEQ     XRBRT                   ;NO, EXIT
 2617  026102  000167  175450            JMP     DATLPS                  ;YES, DON'T EXIT
 2618  026106  000207            XRBRT:  RTS     PC
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2620                                        .SBTTL  TRANSMISSION ERRORS TESTS
2621
2622                                    ;TEST TO CHECK FOR RCVR TIMEOUT.
2623                                    ;OPEN CHANNEL, THEN DON'T SEND ANY DATA FOR
2624                                    ; 3 SECONDS.
2625
2626
2627  026110                            TXMERS: BDINIT  XMTR                    ;CLR XMTR
2628  026116                                    BDINIT  RCVR                    ;CLR RCVR
2629  026124  052777  010400  007254           BIS     #10400,@TMMR            ;SET MASTER & AUTO ADDR
2630  026132  012777  177774  007242           MOV     #-4,@TSBC               ;INDICATE 2 WD XFR
2631  026140  012777  177777  007232           MOV     #-1,@TSDB               ;PUT 1 WD IN XMTR SILO
2632  026146  016777  007176  007220           MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
2633  026154  052777  020000  007232           BIS     #B13,@RCR               ;SET RCV WD
2634  026162  052777  020000  007204           BIS     #B13,@TCR               ;SET SND WD
2635  026170  016702  003556                   MOV     DLCON,R2
2636  026174  005003                   TXMR1:  CLR     R3
2637  026176  012704  177775                   MOV     #-3,R4                  ;SET UP 1 SEC DELAY
2638  026202  032777  002000  007206   XRC1:   BIT     #B10,@RSR               ;IS RCVR TIMEOUT SET?
2639  026210  001022                           BNE     XRC2
2640  026212  005203                           INC     R3                      ;IF NOT, WAIT 3 SEC FOR IT
2641  026214  001372                           BNE     XRC1
2642  026216  005204                           INC     R4
2643  026220  001370                           BNE     XRC1
2644  026222  005302                           DEC     R2
2645  026224  001363                           BNE     TXMR1
2646  026226                                   ERROR   \N              ;ERROR:NO TIMEOUT IN 3 SEC WITH NULL ON INPUT
2647  026250                                   SCOPE   TXMERS
2648
2649                                    ;TEST TO DETERMINE THAT ADDRESSING RCVR AND GENERATING A NULL
2650                                    ;CYCLE FIRST PROPERLY GENERATES CORRECT RESPONSE CODES
2651                                    ;AND THAT THE RECEIVER DOES NOT RESPOND.
2652                                    ;CHANNEL IS OPENED BY POPPING A WORD FROM XMTR SILO.
2653
2654  026256                            XRC2:   BDINIT  XMTR                    ;CLR XMTR
2655  026264                                    BDINIT  RCVR                    ;CLR RCVR
2656  026272  012777  177774  007102           MOV     #-4,@TSBC               ;SET UP FOR 1 WD XFR
2657  026300  016777  007044  007066           MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
2658  026306  012777  177777  007064           MOV     #-1,@TSDB               ;PUT 1 WD INTO TXM SILO
2659  026314  052777  000200  007052           BIS     #B07,@TCR               ;SET RD SILO
2660  026322  052777  020001  007064           BIS     #B13+B00,@RCR           ;SET RCV WD AND RCV DATA
2661  026330  004567  155776                   JSR     R5,DELAY                ;WAIT FOR WORD TO HIT BOTTOM
2662  026334  000010                           .WORD   10
2663  026336  005777  007036                   TST     @TSDB                   ;POP WORD OUT
2664  026342  042777  000200  007024           BIC     #B07,@TCR               ;CLR RD SILO
2665  026350  016704  003376                   MOV     DLCON,R4
2666  026354  012703  177757           XRC2D:  MOV     #177757,R3              ;SET UP TO STALL 100 US.
2667  026360  005203                   XRC2A:  INC     R3
2668  026362  001376                           BNE     XRC2A                   ;STALL (WAIT FOR TIME SLICE
2669  026364  005304                           DEC     R4
2670  026366  001372                           BNE     XRC2D
2671  026370  012767  000000  003610           MOV     #0,GOOD
2672  026376  017767  007014  003600           MOV     @RSR,BAD                ;CHK RESPONSE CODES IN RCVR
2673  026404  042767  177760  003572           BIC     #177760,BAD
2674  026412  026767  003570  003564           CMP     GOOD,BAD                ;RSP CODES = 00 & 00 ?
2675  026420  001414                           BEQ     XRC3
```

```
2676  026422                                        DATERR  \N              ;ERROR:RESPONSE CODES AT RECEIVER WRONG
2677  026444                                        SCOPE   XRC2
2678  026452  012767  000001  003526  XRC3:       MOV     #1,GOOD
2679  026460  017767  006712  003516              MOV     @TSR,BAD                ;CHECK RESPONSE CODES IN XMTR
2680  026466  042767  177760  003510              BIC     #177760,BAD
2681  026474  026767  003506  003502              CMP     GOOD,BAD                ;RSP CODES = 00 & 01 ?
2682  026502  001414                              BEQ     XRC4
2683  026504                                        DATERR  \N              ;ERROR:RSP CODES AT XMTR WRONG
2684  026526                                        SCOPE   XRC2
2685  026534  032777  010000  006654  XRC4:       BIT     #B12,@RSR               ;IS RSR BIT 12 (TXM ERR) SET?
2686  026542  001414                              BEQ     XRC5            ;ERROR:RCVR SHOULD NOT BE ADDRESSED
2687  026544                                        ERROR   \N              ;UPON OPENING A CHANNEL WITH INVALID WORD
2688  026566                                        SCOPE   XRC2
2689
2690                                        ;TEST TO DETERMINE THAT CHANNEL OPEN CAN BE ACHEIVED LEGALLY
2691                                        ;AND THAT, ONCE ACHIEVED, KNOCKING DOWN THE TRANSMITTER BY
2692                                        ;FAKING A XMTR TXM ERROR CAUSES THE CORRECT RESPONSES AND
2693                                        ;CAUSES A RECVR TXM ERROR.
2694
2695  026574                                XRC5:   BDINIT  XMTR                    ;CLR XMTR
2696  026602                                        BDINIT  RCVR                    ;CLR RCVR
2697  026610  012777  177774  006564              MOV     #-4,@TSBC               ;SET UP FOR 2 WD XFR
2698  026616  012777  177777  006554              MOV     #-1,@TSDB               ;LOAD A WORD INTO XMTR SILO
2699  026624  016777  006520  006542              MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
2700  026632  012777  177777  006540              MOV     #-1,@TSDB               ;LOAD 2ND WORD
2701  026640  052777  020000  006546              BIS     #B13,@RCR               ;SET RCV WORD
2702  026646  052777  020000  006520              BIS     #B13,@TCR               ;SET SND WORD
2703  026654  016704  003072                      MOV     DLCON,R4
2704  026660  012703  177500              XRC5A:  MOV     #177500,R3              ;SET UP FOR DELAY
2705  026664  132777  000010  006516      XRC6:   BITB    #B03,@TMMRH             ;CHECK FOR CHANNEL OPEN
2706  026672  001020                              BNE     XRC6A
2707  026674  005203                              INC     R3                      ;WAIT A BIT
2708  026676  001372                              BNE     XRC6
2709  026700  005304                              DEC     R4
2710  026702  001366                              BNE     XRC5A
2711  026704                                        ERROR   \N              ;ERROR:CANNOT GET ''CHAN OPEN'' IN XMTR
2712  026726                                        SCOPE   XRC5
2713  026734  132777  000020  006454  XRC6A:      BITB    #B04,@RSR               ;CHECK FOR CHANNEL OPEN IN RCVR
2714  026742  001014                              BNE     XRC7
2715  026744                                        ERROR   \N              ;ERROR:CANNOT GET ''CHANNEL OPEN'' IN RCVR
2716  026766                                        SCOPE   XRC5
2717
2718  026774  052777  010000  006374  XRC7:       BIS     #B12,@TSR               ;KNOCK DOWN THE XMTR
2719  027002  016704  002744                      MOV     DLCON,R4
2720  027006  012703  177757              XRC7D:  MOV     #177757,R3              ;SET UP TO STALL 100 US,
2721  027012  005203                      XRC7A:  INC     R3
2722  027014  001376                              BNE     XRC7A                   ;STALL (WAIT FOR TIME SLICE)
2723  027016  005304                              DEC     R4
2724  027020  001372                              BNE     XRC7D
2725  027022  012767  000004  003156              MOV     #4,GOOD
2726  027030  017767  006362  003146              MOV     @RSR,BAD
2727  027036  042767  177760  003140              BIC     #177760,BAD             ;ARE RESPONSE CODES = 01 & 00 ?
2728  027044  026767  003136  003132              CMP     GOOD,BAD
2729  027052  001414                              BEQ     XRC8
2730  027054                                        DATERR  \N              ;ERROR:RCVR RSP CODES WRONG
2731  027076                                        SCOPE   XRC5
```

```
 2732  027104  032777  010000  006304  XRC8:   BIT     #B12,@RSR               ;IS RSR BIT 12 (TXM ERR) SET?
 2733  027112  001014                          BNE     XRC9            ;ERROR:XMTR OFF LINE WHILE CHAN OPEN
 2734  027114                                  ERROR   \N                      ;DIDN'T SET RCVR TXM ERR
 2735  027136                                  SCOPE   XRC5
 2736
 2737                                  ;TEST TO DETERMINE IF INCORRECT CRC WILL CAUSE A CHECK-FAIL
 2738                                  ;AND GENERATE CORRECT RESPONSES IN RCVR AND XMTR THEREBY CAUSING
 2739                                  ;TRANSMISSION ERRORS IN BOTH.
 2740
 2741  027144                          XRC9:   BDINIT  XMTR                    ;CLR XMTR
 2742  027152                                  BDINIT  RCVR                    ;CLR RCVR
 2743  027160  012777  177772  006214          MOV     #-6,@TSBC               ;SET UP FOR 3 WD XFR
 2744  027166  012777  177777  006204          MOV     #-1,@TSDB               ;LOAD A WORD INTO XMTR SILO
 2745  027174  012777  000002  006176          MOV     #2,@TSDB                ;LOAD 2ND WORD INTO XMTR SILO
 2746  027202  012777  177772  006212          MOV     #-6,@RDBC
 2747  027210  012777  177775  006162          MOV     #-3,@TSDB               ;LOAD 3RD WORD INTO XMTR SILO
 2748  027216  016777  006126  006150          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
 2749  027224  052777  020000  006162          BIS     #B13,@RCR               ;SET RCV WD
 2750  027232  052777  020000  006134          BIS     #B13,@TCR               ;SET SND WD
 2751  027240  105777  006132          XRC10:  TSTB    @TSR                    ;WAIT FOR SUC TXF
 2752  027244  100375                          BPL     XRC10
 2753  027246  052777  000200  006120          BIS     #B07,@TCR               ;SET XMTR RD SILO
 2754  027254  005777  006120                  TST     @TSDB                   ;POP A WORD FROM SILO
 2755  027260  042777  000200  006106          BIC     #B07,@TCR               ;CLR RD SILO
 2756  027266  052777  000200  006120          BIS     #B07,@RCR               ;SET RCVR LD SILO
 2757  027274  012777  000014  006116          MOV     #14,@RDDB               ;LOAD DIFFERENT 2ND WORD
 2758  027302  042777  000200  006104          BIC     #B07,@RCR               ;CLR LD SILO
 2759  027310  042777  000200  006060          BIC     #B07,@TSR               ;CLR SUC TXF
 2760  027316  042777  000200  006072          BIC     #B07,@RSR
 2761  027324  052777  000001  006062          BIS     #B00,@RCR               ;SET RCV DATA
 2762  027332  052777  000001  006034          BIS     #B00,@TCR               ;SET ST TXM
 2763  027340  016704  002406                  MOV     DLCON,R4
 2764  027344  012703  177000          XRC10B: MOV     #177000,R3              ;SET UP TO STALL
 2765  027350  005203                  XRC10A: INC     R3
 2766  027352  001376                          BNE     XRC10A                  ;STALL (WAIT FOR LAST 2 WORDS)
 2767  027354  005304                          DEC     R4
 2768  027356  001372                          BNE     XRC10B
 2769  027360  012767  000013  002620          MOV     #13,GOOD
 2770  027366  017767  006024  002610          MOV     @RSR,BAD                ;CHECK RCVR RSP CODES
 2771  027374  042767  177760  002602          BIC     #177760,BAD
 2772  027402  026767  002600  002574          CMP     GOOD,BAD                ;ARE RSP CODES = 10 & 11 ?
 2773  027410  001414                          BEQ     XRC11
 2774  027412                                  DATERR  \N              ;ERROR:RCVR RSP CODES WRONG
 2775  027434                                  SCOPE   XRC9
 2776  027442  017767  005730  002534  XRC11:  MOV     @TSR,BAD
 2777  027450  042767  177760  002526          BIC     #177760,BAD             ;CHK XMTR RSP CODES
 2778  027456  026767  002524  002520          CMP     GOOD,BAD                ;ARE THEY 10 & 11 ?
 2779  027464  001414                          BEQ     XRC12
 2780  027466                                  DATERR  \N              ;ERROR:XMTR RSP CODES WRONG
 2781  027510                                  SCOPE   XRC9
 2782  027516  032777  010000  005652  XRC12:  BIT     #B12,@TSR               ;IS TXM ERR SET IN THE XMTR ?
 2783  027524  001014                          BNE     XRC13
 2784  027526                                  ERROR   \N              ;ERROR:XMTR TXM ERR NOT SET WITH INVALID DATA
 2785  027550                                  SCOPE   XRC9
 2786  027556  032777  010000  005632  XRC13:  BIT     #B12,@RSR               ;IS TXM ERR SET IN THE RCVR?
 2787  027564  001014                          BNE     XRC14
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                                        ERROR   \N              ;ERROR:RCVR TXM ERR NOT SET WITH INVALID DATA
                                        SCOPE   XRC9

                                ;TEST THAT IF THE CHANNEL IS OPENED AND THE RECEIVER RESPONDS
                                ;TO THE FIRST VALID WORD WITH A NULL, A XMTR TXM ERR RESULTS
                                ;  NULL ON FIRST WORD IS ACHEIVED BY MANUALLY FILLING UP THE
                                ;RECVR SILO, THEN TRYING TO SEND A WORD FROM XMTR TO RCVR.

027616                          XRC14:  BDINIT  XMTR
027624                                  BDINIT  RCVR
027632  052777  000200  005554          BIS     #B07,@RCR               ;SET LD SILO IN RCVR
027640  012703  000100                  MOV     #64.,R3                 ;R3 IS WORD COUNTER
027644  012704  033026                  MOV     #SILDAT,R4              ;R4 IS CURRENT ADDRESS
027650  012477  005544          XRC15:  MOV     (R4)+,@RDDB             ;FILL UP RCVR SILO
027654  005303                          DEC     R3                      ;FULL?
027656  001374                          BNE     XRC15
027660  016777  005464  005506          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
027666  042777  000200  005520          BIC     #B07,@RCR               ;CLR LD SILO IN RCVR
027674  012777  177777  005476          MOV     #-1,@TSDB               ;LOAD A WORD INTO XMTR SILO
027702  012777  177774  005472          MOV     #-4,@TSBC               ;SET UP TO XFR 2 WDS
027710  012777  177777  005462          MOV     #-1,@TSDB               ;LOAD 2ND WORD INTO XMTR SILO
027716  052777  020001  005470          BIS     #B13+B00,@RCR           ;SET RCV WD & RCV DATA
027724  052777  020001  005442          BIS     #B13+B00,@TCR           ;SET SND WD & ST TXM
027732  016704  002014                  MOV     DLCON,R4
027736  012703  177000          XRC15B: MOV     #177000,R3              ;SET UP TO STALL
027742  005203                  XRC15A: INC     R3
027744  001376                          BNE     XRC15A                  ;STALL (WAIT FOR TIME SLICE)
027746  005304                          DEC     R4
027750  001372                          BNE     XRC15B
027752  012767  000006  002226          MOV     #6,GOOD                 ;CHK TXM RSP CODES
027760  017767  005412  002216          MOV     @TSR,BAD
027766  042767  177760  002210          BIC     #177760,BAD
027774  026767  002206  002202          CMP     GOOD,BAD                ;ARE THEY 01 & 10 ?
030002  001414                          BEQ     XRC16
030004                                  DATERR  \N              ;ERROR:XMTR RSP CODES WRONG
030026                                  SCOPE   XRC14
030034  032777  010000  005334  XRC16:  BIT     #B12,@TSR               ;IS XMTR TXM ERR SET?
030042  001014                          BNE     XRC17           ;ERROR:XMISSION TO FULL RCVR SILO
030044                                  ERROR   \N                      ;DID NOT SET TXM ERR IN XMTR
030066                                  SCOPE   XRC14

                                ;TEST TO DETERMINE IF , WITH CHANNEL OPEN, THE RECVR IS KNOCKED DOWN
                                ;THE CORRECT RESPONSE CODES ARE GENERATED AND THE XMTR
                                ;GETS A TXM ERROR.
                                ;  THE RECVR IS KNOCKED DOWN VIA FORCING A TIMEOUT IN THE RCVR.

030074                          XRC17:  BDINIT  XMTR
030102                                  BDINIT  RCVR
030110  012777  177777  005262          MOV     #-1,@TSDB               ;LOAD A WORD INTO XMTR SILO
030116  012777  177774  005256          MOV     #-4,@TSBC               ;SETUP FOR 2 WD XFR
030124  012777  177777  005246          MOV     #-1,@TSDB               ;LOAD 2ND WD INTO XMTR SILO
030132  016777  005212  005234          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
030140  052777  020000  005246          BIS     #B13,@RCR               ;SET RCV WD
030146  052777  020000  005220          BIS     #B13,@TCR               ;SET SND WD
030154  132777  000010  005226  XRC18:  BITB    #B03,@TMMRH             ;IS CHANNEL OPEN SET?
030162  001774                          BEQ     XRC18                   ;WAIT FOR IT
```

```
 2844  030164  016704  001562                    MOV     DLCON,R4
 2845  030170  012703  177000          XRC18X:   MOV     #17700C,R3          ;DELAY FOR SYNC
 2846  030174  005203                  XRC18L:   INC     R3
 2847  030176  001376                            BNE     XRC18L
 2848  030200  005304                            DEC     R4
 2849  030202  001372                            BNE     XRC18X
 2850  030204  052777  002000  005204            BIS     #B10,@RSR           ;KNOCK DOWN RCVR WITH TIMEOUT
 2851  030212  016704  001534                    MOV     DLCON,R4
 2852  030216  012703  177000          XRC18Y:   MOV     #177000,R3          ;SET UP FOR STALL
 2853  030222  005203                  XRC18A:   INC     R3
 2854  030224  001376                            BNE     XRC18A              ;STALL (WAIT FOR T'ME SLICE)
 2855  030226  005304                            DEC     R4
 2856  030230  001372                            BNE     XRC18Y
 2857  030232  012767  000001  001746            MOV     #1,GOOD
 2858  030240  017767  005132  001736            MOV     @TSR,BAD            ;CHECK TXM RESP CODES
 2859  030246  042767  177760  001730            BIC     #177760,BAD
 2860  030254  026767  001726  001722            CMP     GOOD,BAD            ;ARE THEY 00 & 01 ?
 2861  030262  001414                            BEQ     XRC19
 2862  030264                                    DATERR  \N          ;ERROR:XMTR RSP CODES WRONG
 2863  030306                                    SCOPE   XRC17
 2864  030314  032777  010000  005054  XRC19:    BIT     #B12,@TSR           ;IS TX ERR SET IN XMTR
 2865  030322  001014                            BNE     XRC19A      ;ERROR:XMIT TO OFFLINE RCVR DIDN'T
 2866  030324                                    ERROR   \N                  ;CAUSE TXM ERR IN XMTR
 2867  030346                                    SCOPE   XRC17
 2868  030354  004767  000774          XRC19A:   JSR     PC,MONIT
 2869  030360  032777  010000  001362            BIT     #B12,@SR            ;IS SW 12 SET?
 2870  030366  001402                            BEQ     XRCRET              ;NO, EXIT
 2871  030370  000167  175514                    JMP     TXMERS              ;YES, STAY HERE
 2872  030374  000207                  XRCRET:   RTS     PC
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                                        .SBTTL  REJECT TEST


                                ;TEST OF THE REJECT-RELATED HARDWARE
                                ; CAUSE A REJECT IN THE RECVR AND CHECK ALL RELATED
                                ;RESPONSES IN RCVR AND XMTR

030376                          XRC20:  BDINIT  XMTR                    ;CLR XMTR
030404                                  BDINIT  RCVR                    ;CLR RCVR
030412  012777  177777  004760          MOV     #-1,@TSDB               ;LOAD A WORD INTO SILO
030420  012777  177774  004754          MOV     #-4,@TSBC               ;BYTE COUNT FOR 2 WD XFR
030426  012777  177777  004744          MOV     #-1,@TSDB               ;LOAD 2ND WD INTO SILO
030434  012777  177774  004760          MOV     #-4,@RDBC
030442  016777  004702  004724          MOV     RCAD,@TCR               ;POINT XMTR AT RCVR
030450  052777  020000  004736          BIS     #B13,@RCR               ;SET RCV WD
030456  052777  020001  004710          BIS     #B13+B00,@TCR           ;SET SND WD & ST TXM
030464  032777  000400  004724  XRC21:  BIT     #B08,@RSR               ;DAT OUTP RDY IN XMTR?
030472  001774                        BEQ     XRC21
030474  052777  100000  004712          BIS     #B15,@RCR               ;SET R E J E C T
030502  016704  001244                  MOV     DLCON,R4
030506  012703  177500          XRC21A: MOV     #177500,R3
030512  032777  000040  004676  XRC22:  BIT     #B05,@RSR               ;CHECK FOR RECOM IN RCVR
030520  001020                        BNE     XRC23
030522  005203                        INC     R3
030524  001372                        BNE     XRC22                   ;WAIT A COUPLE OF MS FOR IT
030526  005304                        DEC     R4
030530  001366                        BNE     XRC21A
030532                                ERROR   \N              ;ERROR:REJECT DID NOT RESULT IN SETTING RSR-05
030554                                SCOPE   XRC20
030562  032777  000001  004604  XRC23:  BIT     #B00,@TCR               ;IS ST TXM CLR (CLR'D BY INTR REQ)?
030570  001414                        BEQ     XRC24
030572                                ERROR   \N              ;ERROR: SORE DID NOT INTERRUPT XMTR
030614                                SCOPE   XRC20
030622  032777  100000  004564  XRC24:  BIT     #B15,@RCR               ;CHECK IF REJECT GOT CLR'D
030630  001414                        BEQ     XRC25
030632                                ERROR   \N              ;ERROR:RECOM DID NOT CLR REJECT
030654                                SCOPE   XRC20
030662  032777  000040  004506  XRC25:  BIT     #B05,@TSR               ;CHECK IF REJECT SET SORE IN XMTR
030670  001014                        BNE     XRC26
030672                                ERROR   \N              ;ERROR:REJECT DID NOT SET SORE IN XMTR
030714                                SCOPE   XRC20
030722                          XRC26:  BDINIT  RCVR
030730                                  BDINIT  XMTR
030736  052777  020000  004450          BIS     #B13,@RCR               ;SET RCV WD IN RCVR
030744  052777  000040  004444          BIS     #B05,@RSR               ;SET RECOM
030752  032777  020000  004434          BIT     #B13,@RCR               ;CHECK IF RCV WD GOT CLR'D
030760  001414                        BEQ     XRC27
030762                                ERROR   \N              ;ERROR:RECOM DID NOT INTERRUPT RCVR
031004                                SCOPE   XRC26
```

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                                        .SBTTL  TRUNCATION TEST


                                ;TEST OF THE TRUNCATE-RELATED HARDWARE
                                ; CAUSE A TRUNCATE IN THE RECVR AND CHECK ALL RELATED
                                ;RESPONSES IN RCVR AND XMTR.

031012                          XRC27:  BDINIT  XMTR                    ;CLR XMTR
031020                                  BDINIT  RCVR                    ;CLR RCVR
031026  012777  177754  004346          MOV     #-20.,@TSBC             ;SET TXM BYTE CNT FOR 10 WORD XFR
031034  012777  177770  004360          MOV     #-8.,@RDBC              ;SET RCVR BYTE CNT FOR 4 WORDS
031042  012777  033026  004334          MOV     #SILDAT,@TSBA           ;POINT XMTR SILO AT DATA BUFFER
031050  012777  033426  004346          MOV     #CMFBUF,@RDBA           ;POINT RCVR SILO TO DATA BUFFER
031056  016777  004266  004310          MOV     RCVD,@TCR               ;POINT XMTR AT RCVR
031064  052777  060001  004322          BIS     #B14+B13+B00,@RCR       ;SET RCV WD & RCV DATA &START NPR
031072  052777  060001  004274          BIS     #B14+B13+B00,@TCR       ;SET SND WD & ST TXM & START NPR
031100  032777  001000  004310  XRC29:  BIT     #B09,@RSR
031106  001774                          BEQ     XRC29                   ;WAIT FOR BYTE COUNT OVERFLOW
031110  052777  100000  004276          BIS     #B15,@RCR               ;SET REJECT (TRUNCATE MESSAGE)
031116  016704  000630                  MOV     DLCON,R4
031122  012703  175000          XRC29A: MOV     #175000,R3
031126  105777  004244          XRC30:  TSTB    @TSR                    ;LOOK FOR XMTR SUC TXF
031132  100420                          BMI     XRC31
031134  005203                          INC     R3
031136  001373                          BNE     XRC30                   ;WAIT ABOUT 20 MS
031140  005304                          DEC     R4
031142  001367                          BNE     XRC29A
031144                                  ERROR   \N              ;ERROR:NO SUC TXF AFTER TRUNCATION
031166                                  SCOPE   XRC27
031174  032777  000040  004174  XRC31:  BIT     #B05,@TSR               ;IS SORE SET?
031202  001014                          BNE     XRC32
031204                                  ERROR   \N              ;ERROR:SORE NOT SET BY TRUNCATION
031226                                  SCOPE   XRC27
031234  105777  004156          XRC32:  TSTB    @RSR                    ;IS RCVR SUC TXF SET?
031240  100414                          BMI     XRC33
031242                                  ERROR   \N              ;ERROR:NO RCVR SUC TXF AFTER TRUNCATION
031264                                  SCOPE   XRC27
031272  032777  000040  004116  XRC33:  BIT     #B05,@RSR               ;IS RECOM SET?
031300  001014                          BNE     XRC34
031302                                  ERROR   \N              ;ERROR:RECOM NOT SET BY TRUNCATION
031324                                  SCOPE   XRC27
031332  004767  000016          XRC34:  JSR     PC,MONIT
031336  032777  010000  000404          BIT     #B12,@SR                ;IS SW 12 SET?
031344  001402                          BEQ     XRCRT                   ;NO, EXIT
031346  000167  177024                  JMP     XRC20                   ;YES, STAY HERE
031352  000207                  XRCRT:  RTS     PC
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                        .SBTTL  "SWITCH" MONITOR ROUTINE

                ;ENTER AT MONIT FROM EVERY SUB-TEST TO SEE IF CNTRL-S OR CNTRL-C WAS TYPED
                ;ENTER AT SWDMP FROM ERROR HALTS IF SW 15 = 0
                ;ALSO MONITORS THE FOLLOWING CONTROL FUNCTIONS:
                ;       CNTRL-T RESTART TEST SELECTOR
                ;       CNTRL-D ALLOW CHANGING OF DELAY
                ;       CNTRL-P CONTINUE (PROCEED)

031354  005000          MONIT:  CLR     R0
031356  105777  004046          TSTB    @KBS                    ;CHECK KEYBOARD FLAG
031362  100402                  BMI     MONIC                   ;IF SET, CHECK WHAT CHAR.
031364  000167  000270          JMP     EX5                     ;OTHERWISE, EXIT
031370  017700  004036  MONIC:  MOV     @KBD,R0
031374  042700  177600  MONCH:  BIC     #177600,R0              ;TRIM OFF PARITY BIT
031400  020027  000023          CMP     R0,#23                  ;WAS IT ^S?
031404  001056                  BNE     EX1                     ;NO, EXIT
031406                  SWDMP:  PNTM    SWRMSG                  ;PRINT "SWR = "
031416  017700  000326          MOV     @SR,R0                  ;GET CONTENTS OF SR
031422  004767  001100          JSR     PC,OCTPNT               ;PRINT IT
031426                          PNTM    TWOSP                   ;SPACE AND PROMPT (:)
031436  017767  000306  001060  MOV     @SR,KBBUF               ;LOAD OLD SWITCHES
031444  004767  000602          JSR     PC,INPKB                ;GET KBD INPUT
031450  016777  001050  000272  MOV     KBBUF,@SR               ;LOAD NEW SWITCHES
031456                  CCRTN:  PNTM    TYPCTP                  ;PRINT "CNTRL-P TO CONTINUE"
031466  105777  003736  CONTW1: TSTB    @KBS
031472  100375                  BPL     CONTW1
031474  017700  003732          MOV     @KBD,R0
031500  042700  177600          BIC     #177600,R0              ;TRIM OFF PARITY BIT
031504  020027  000023          CMP     R0,#23                  ;^S?
031510  001736                  BEQ     SWDMP                   ;YES, GET SWR AGAIN
031512  020027  000020          CMP     R0,#20                  ;^P?
031516  001363                  BNE     CONTW1                  ;NO, KEEP LOOKING
031520  012700  000015          MOV     #15,R0                  ;RETURN LINE
031524  004767  001242          JSR     PC,TTO
031530  005000                  CLR     R0                      ;FILL CHARACTERS
031532  004767  001234          JSR     PC,TTO
031536  004767  001230          JSR     PC,TTO
031542  020027  000024  EX1:    CMP     R0,#24                  ;WAS A ^T TYPED?
031546  001004                  BNE     EX2                     ;NO, EXIT
031550  012706  002000          MOV     #ISP,SP                 ;YES,  RENEW STACK
031554  000167  151352          JMP     BCONT                   ;BACK TO DISPATCHER
031560  020027  000004  EX2:    CMP     R0,#4                   ;CNTRL-D TYPED?
031564  001026                  BNE     EX3                     ;NO, KEEP LOOKING
031566                  EX2A:   PNTM    DELYMG                  ;PRINT "DELAY CONSTANT = "
031576  016767  000150  000720  MOV     DLCON,KBBUF             ;DEFAULT OLD VALUE
031604  016700  000142          MOV     DLCON,R0                ;GET CONSTANT
031610  004767  000712          JSR     PC,OCTPNT               ;PRINT IT
031614                          PNTM    TWOSP                   ;SPACE AND PROMPT
031624  004767  000422          JSR     PC,INPKB                ;GET KBD INPUT
031630  016767  000670  000114  EX2B:   MOV     KBBUF,DLCON     ;LOAD NEW CONSTANT
031636  000167  177614          JMP     CCRTN                   ;NOW WAIT FOR CNTRL-P

031642  020027  000003  EX3:    CMP     R0,#3                   ;WAS CNTRL-C TYPED?
031646  001004                  BNE     EX5                     ;NO, EXIT
```

```
3027  031650  012706  002000              MOV     #ISP,SP                 ;YES, REFRESH STACK
3028  031654  000167  151036              JMP     RESTRT                  ;AND RESTART
3029
3030  031660  000207                EX5:  RTS     PC
3031
3032
3033
3034                                ;ASSOCIATED ASCII FOR THIS MODULE:
3035
3036  031662  051446  051127  036440 SWRMSG: .ASCII  /CSWR = @/
      031670  040040
3037  031672  042046  046105  054501 DELYMG: .ASCII  /&DELAY CONSTANT = @/
      031700  041440  047117  052123
      031706  047101  020124  020075
      031714     100
3038  031715     046  047103  051124 TYPCTP: .ASCII  /&CNTRL-P TO CONTINUE@/
      031722  026514  020120  047524
      031730  041440  047117  044524
      031736  052516  040105
3039  031742  020040  040072        TWOSP:  .ASCII  /  :@/
3040
3041
3042                                        .EVEN
3043                                ;OTHER VARIABLES:
3044
3045  031746  000000                SWREG:  .WORD   0                       ; SOFTWARE SWITCH REGISTER
3046
3047  031750  000000                SR:     .WORD   0                       ; SWITCH REGISTER POINTER
3048
3049  031752  000006                DLCON:  .WORD   6                       ;DELAY CONSTANT
```

```
                                        .SBTTL COMMON SUBROUTINES

                                ;ERROR ROUTINE

031754  011667  000220        ERR:    MOV     (SP),ERRAD          ;GET ADDRESS OF ERROR CALL
031760  162767  000022  000212        SUB     #22,ERRAD           ;OFFSET IT
031766                        ERR1:   PNTM    ERRM                ;PRINT ''**ERROR ''
031776  016700  000200                MOV     ERRNUM,R0
032002  004767  000520                JSR     PC,OCTPNT           ;PRINT ERROR NUMBER (P)
032006                                PNTM    WDAT                ;PRINT ''AT LOCATION ''
032016  016700  000156                MOV     ERRAD,R0
032022  004767  000500                JSR     PC,OCTPNT           ;PRINT ADDRESS OF ERROR
032026  004767  177322                JSR     PC,MONIT
032032  004767  000602                JSR     PC,NULLS            ;PRINT NULLS IN CASE OF 'RESET''
032036  000207                        RTS     PC                  ;RETURN

                                ;DATA ERROR ROUTINE

032040  011667  000134        DERR:   MOV     (SP),ERRAD          ;GET ADDRESS OF ERROR CALL
032044  162767  000022  000126        SUB     #22,ERRAD           ;OFFSET IT
032052  004767  177710                JSR     PC,ERR1             ;PRINT ''**ERROR (P) AT LOCATION XXX
032056                                PNTM    WDSDB               ;PRINT ''SHOULD BE ''
032066  016700  000114                MOV     GOOD,R0
032072  004767  000430                JSR     PC,OCTPNT           ;PRINT GOOD DATA
032076                                PNTM    WDWAS               ;PRINT '', WAS ''
032106  016700  000072                MOV     BAD,R0
032112  004767  000410                JSR     PC,OCTPNT           ;PRINT BAD DATA
032116  004767  000516                JSR     PC,NULLS            ;PRINT NULLS IN CASE OF 'RESET''
032122  000207                        RTS     PC


                                ;ASSOCIOATED ASCII FOR THIS MODULE:

032124  023046  025052  051105  ERRM:   .ASCII  /&&**ERROP @/
032132  047522  020122     100
032137     040  052101  046040  WDAT:   .ASCII  / AT LOCATION @/
032144  041517  052101  047511
032152  020116     100
032155     046  044123  052517  WDSDB:  .ASCII  /&SHOULD BE @/
032162  042114  041040  020105
032170     100
032171     054  053440  051501  WDWAS:  .ASCII  /, WAS @/
032176  040040


                                        .EVEN
                                ;OTHER VARIABLES:

032200  000000                  ERRAD:  .WORD   0
032202  000000                  ERRNUM: .WORD   0
032204  000000                  BAD:    .WORD   0
032206  000000                  GOOD:   .WORD   0
```

```
3099                                    .SBTTL  MESSAGE PRINT ROUTINE
3100
3101                                    ;MESSAGE TYPOUT ROUTINE (CALLED BY MACRO PNTM A)
3102                                    ;MESSAGES ARE IN THE FORMAT:
3103                                    ;   MESG:     .ASCII     /&MESSAGE&@/
3104                                    ;
3105                                    ;WHERE: & IS TRANSLATED INTO CR. AND LF.
3106                                    ;
3107                                    ;USES THE SUBROUTINE 'TTO''
3108                                    ;WHICH PRINTS CR. & LF. UPON SEEING A CR. CODE.
3109                                    ;AND    @ IS MESSAGE TERMINATOR
3110                                    ;
3111                                    ;ENTER WITH ADDRESS OF MESSAGE IN R0
3112
3113  032210  010046                    TYPOUT: MOV     R0,-(SP)            ;STACK ADDRESS OF MESSAGE
3114  032212  117600  000000            TPOFCH: MOVB    @(SP),R0            ;FETCH ASCII BYTE
3115  032216  022700  000100                    CMP     #100,R0             ;IS IT @ (TERMINATOR)?
3116  032222  001411                            BEQ     TPOUTX              ;YES-EXIT
3117  032224  022700  000046                    CMP     #46,R0              ;IS IT CRLF FLAG?
3118  032230  001002                            BNE     TPCONT              ;NO-TYPE CHARACTER
3119  032232  012700  000015                    MOV     #15,R0              ;YES, CHANGE DATA TO CR
3120  032236  004767  000530            TPCONT: JSR     PC,TTO              ;TYPE IT
3121  032242  005216                            INC     (SP)                ;MOVE POINTER TO NEXT BYTE
3122  032244  000762                            BR      TPOFCH              ;FETCH NEXT CHARACTER
3123  032246  005726                    TPOUTX: TST     (SP)+               ;POP STACK TO REACH RETURN VECTOR
3124  032250  000207                            RTS     PC
3125
```

```
                        .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

032252  005067  000244  INPKB:  CLR     NOKEFL          ;CLEAR NO NUMBER FLAG
032256  010146          GETCHR: MOV     R1,-(SP)        ;STACK OLD R1
032260  016746  000240          MOV     KBBUF,-(SP)     ;STACK 'OLD CONTENTS'
032264  005067  000234          CLR     KBBUF           ;CLEAR INPUT BUFFER
032270  004767  000206          JSR     PC,KBRD         ;FETCH A CHARACTER IN R0
032274  004767  000472          JSR     PC,TTO          ;ECHO IT
032300  020027  000012          CMP     R0,#12          ;WAS IT A <CR> OR <LF>?
032304  001002                  BNE     1$              ;NO
032306  000167  000144          JMP     NRTRN           ;YES, RETURN WITH PROPER KBBUF
032312  010001          1$:     MOV     R0,R1           ;SET UP TO CHECK FOR A NUMBER
032314  042701  177407          BIC     #177407,R1      ;MASK ALL BUT # CODE
032320  020127  000060          CMP     R1,#60          ;IS IT A # FROM 0-7?
032324  001435                  BEQ     3$              ;YES, PACK IT
032326  020027  000177          CMP     R0,#177         ;WAS IT A DELETE/RUBOUT?
032332  001024                  BNE     2$              ;NO, MUST BE GARBAGE
032334  012700  000057          MOV     #57,R0          ;YES, BUT PRINT '\'
032340  004767  000426          JSR     PC,TTO
032344  000241                  CLC                     ;CLEAR THE C-BIT
032346  006067  000152          ROR     KBBUF           ;DELETE LAST DIGIT
032352  000241                  CLC
032354  006067  000144          ROR     KBBUF           ;  THAT WAS STUFFED
032360  000241                  CLC
032362  006067  000136          ROR     KBBUF           ;  INTO KBBUF
032366  005767  000132          TST     KBBUF           ;HAVE WE DELETED EVERYTHING?
032372  001002                  BNE     11$             ;NO
032374  005067  000122          CLR     NOKEFL          ;YES, BACK TO NO NUMBER INPUT
032400  000167  177664  11$:    JMP     GETCHR          ;GO FOR MORE INPUT
032404  012700  000077  2$:     MOV     #77,R0          ;ECHO '?' FOR ERRONEOUS INPUT
032410  004767  000356          JSR     PC,TTO
032414  000167  177650          JMP     GETCHR          ;AND GET ANOTHER CHARACTER
032420  012767  177777  000074  3$:     MOV     #-1,NOKEFL      ;GOT A DIGIT. SET FLAG
032426  042700  177770          BIC     #177770,R0      ;GET THE DIGIT PART OF THE CHARACTER
032432  006367  000066          ASL     KBBUF           ;SHIFT KBBUF BUFFER
032436  006367  000062          ASL     KBBUF           ;  TO ACCEPT THE
032442  006367  000056          ASL     KBBUF           ;  NEW DIGIT.
032446  050067  000052          BIS     R0,KBBUF        ;ADD THE NEW DIGIT
032452  000167  177612          JMP     GETCHR          ;GO FOR MORE INPUT

032456  005767  000040  NRTRN:  TST     NOKEFL          ;WAS THERE NEW DATA?
032462  001004                  BNE     NEK             ;YES, GO BACK WITH IT
032464  012667  000034          MOV     (SP)+,KBBUF     ;NO, RETRIEVE OLD DATA
032470  012601                  MOV     (SP)+,R1        ;RESTORE R1
032472  000207                  RTS     PC              ;AND RETURN
032474  005726          NEK:    TST     (SP)+           ;DUMP OLD DATA
032476  012601                  MOV     (SP)+,R1        ;RESTORE R1
032500  000207                  RTS     PC              ;AND RETURN

032502  105777  002722  KBRD:   TSTB    @KBS            ;WAIT FOR INPUT FROM CONSOLE
032506  100375                  BPL     KBRD
```

```
 3183  032510  017700  002716          MOV     @KRD,R0                 ;PUT THE CHAR INTO R0
 3184  032514  042700  177600  KBRET:  BIC     #177760,R0              ;TRIM PARITY
 3185  032520  000207                  RTS     PC
```

```
                                ;ASSOCIATED VARIABLE STORAGE:
                                
032522  000000                  NOKEFL: .WORD   0
032524  000000                  KBBUF:  .WORD   0
```

```
                                        .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:

032526  005067  000270          OCTPNT: CLR     RJFLG                   ;CLEAR RIGHT JUSTIFY FLAG
032532  012701  000010                  MOV     #10,R1                  ;SET RADIX FOR OCTAL
032536  004767  000122                  JSR     PC,NUMPNT               ;CONVERT & PRINT
032542  000207                          RTS     PC                      ;RETURN

                                ;BIN-OCTAL JUSTIFIED:

032544  012767  177777  000250  OCTJSP: MOV     #-1,RJFLG               ;SET RIGHT JUSTIFY FLAG
032552  012701  000010                  MOV     #10,R1                  ;SET RADIX FOR OCTAL
032556  004767  000102                  JSR     PC,NUMPNT               ;CONVERT & PRINT
032562  000207                          RTS     PC

                                ;BIN-BIN

032564  005067  000232          BINPNT: CLR     RJFLG                   ;CLEAR RIGHT JUSTIFY FLAG
032570  012701  000002                  MOV     #2,R1                   ;SET RADIX FOR BINARY
032574  004767  000064                  JSR     PC,NUMPNT               ;CONVERT & PRINT
032600  000207                          RTS     PC

                                ;BIN-DECIMAL UNJUSTIFIED:

032602  005067  000214          DECPNT: CLR     RJFLG                   ;CLEAR RIGHT JUSTIFY FLAG
032606  012701  000012                  MOV     #12,R1                  ;SET RADIX FOR DECIMAL
032612  004767  000046                  JSR     PC,NUMPNT               ;CONVERT & PRINT
032616  000207                          RTS     PC

                                ;BIN-DECIMAL JUSTIFIED (6 PLACES)

032620  012767  177777  000174  DECJSP: MOV     #-1,RJFLG               ;SET RIGHT JUSTIFY FLAG
032626  012701  000012                  MOV     #12,R1                  ;SET RADIX FOR DECIMAL
032632  004767  000026                  JSR     PC,NUMPNT               ;CONVERT & PRINT
032636  000207                          RTS     PC


032640  032777  040000  177102  NULLS:  BIT     #B14,@SR                ;O.K. TO PRINT?
032646  001005                          BNE     NULOUT                  ;NO, FORGET IT
032650  005000                  NULL1:  CLR     R0
032652  004767  000114                  JSR     PC,TTO
032656  004767  000110                  JSR     PC,TTO
032662  000207                  NULOUT: RTS     PC
```

```
3244                                    ;UNSIGNED CONVERT-PRINT ROUTINE (BIN - ASCII)
3245
3246  032664  010167  000134    NUMPNT: MOV     R1,RADIX                ;SAVE RADIX
3247  032670  005002                    CLR     R2                      ;CLEAR TAB COUNTER
3248  032672  005001            DIVSET: CLR     R1                      ;CLEAR WORK REGISTER
3249  032674  020067  000124    DIVID:  CMP     R0,RADIX                ;IS NUMBER BELOW RADIX?
3250  032700  103404                    BLO     GETDG                   ;IF YES, STORE DIGIT
3251  032702  166700  000116            SUB     RADIX,R0                ;ELSE, KEEP SUBTRACTING
3252  032706  005201                    INC     R1                      ;AND KEEP COUNT
3253  032710  000771                    BR      DIVID
3254  032712  010046            GETDG:  MOV     R0,-(SP)                ;STACK REMAINDER
3255  032714  010100                    MOV     R1,R0
3256  032716  001403                    BEQ     PNTEXT                  ;PRINT IF HIGHEST ORDER STACKED
3257  032720  005202                    INC     R2                      ;ELSE COUNT DIGITS FOR R. JUSTIFY
3258  032722  004767  177744            JSR     PC,DIVSET
3259
3260  032726  012703  000006    PNTEXT: MOV     #6,R3                   ;GET DIGIT COUNT CONSTANT
3261  032732  160203                    SUB     R2,R3                   ;HAVE WE PRODUCED 6 DIGITS?
3262  032734  003413                    BLE     PNT                     ;YES, JUSTIFICATION UNNECESSARY
3263  032736  005767  000060            TST     RJFLG                   ;IS THE JUSTIFY FLAG SET?
3264  032742  001410                    BEQ     PNT                     ;NO-DON'T JUSTIFY
3265  032744  012700  000040    JUST:   MOV     #40,R0                  ;YES, PRINT LEADING SPACES
3266  032750  004767  000016            JSR     PC,TTO
3267  032754  005303                    DEC     R3
3268  032756  001372                    BNE     JUST
3269  032760  005067  000036            CLR     RJFLG                   ;CLEAR JUSTIFY FLG WHEN DONE
3270  032764  012600            PNT:    MOV     (SP)+,R0                ;GET REST OF DIGITS OFF STACK
3271  032766  052700  000060            BIS     #'0,R0                  ;MAKE THEM ASCII
3272                                    ;TYPE OUT ROUTINE
3273                                    ;PRINTS A CHARACTER WHICH IS IN R0
3274                                    ;IF THE CHARACTER IS ''CR.'', ALSO PRINT A 'LF.'.
3275
3276
3277  032772  010077  002440    TTO:    MOV     R0,@TTB                 ;PRINT CONTENTS OF R0
3278  032776  105777  002432    TTOLP:  TSTB    @TTS                    ;WAIT TILL PRINT DONE
3279  033002  100375                    BPL     TTOLP
3280  033004  022700  000015            CMP     #15,R0                  ;WAS IT A <CR>?
3281  033010  001401                    BEQ     TTOLF                   ;YES, ECHO A LF AS WELL
3282  033012  000207                    RTS     PC                      ;NO, JUST RETURN
3283  033014  012700  000012    TTOLF:  MOV     #12,R0
3284  033020  000764                    BR      TTO
3285
3286
3287                                    ;ASSOCIATED VARIABLE STORAGE:
3288
3289  033022  000000            RJFLG:  .WORD   0
3290  033024  000000            RADIX:  .WORD   0
```

```
                        .SBTTL TEST BUFFERS

                        ;DATA SILO  DATA-BUFFER

033026  125252          SILDAT: 125252
033030  052525                  052525
033032  125252                  125252
033034  052525                  052525
033036  125252                  125252
033040  052525                  052525
033042  125252                  125252
033044  052525                  052525
033046  125252                  125252
033050  052525                  052525

033052  177400                  177400
033054  000377                  000377
033056  177400                  177400
033060  000377                  000377
033062  177400                  177400
033064  000377                  000377
033066  177400                  177400
033070  000377                  000377
033072  177400                  177400
033074  000377                  000377

033076  000000                  000000
033100  177777                  177777
033102  000000                  000000
033104  177777                  177777
033106  000000                  000000
033110  177777                  177777
033112  000000                  000000
033114  177777                  177777
033116  000000                  000000
033120  177777                  177777

033122  010421                  010421
033124  021042                  021042
033126  031463                  031463
033130  042104                  042104
033132  052525                  052525
033134  063146                  063146
033136  076567                  076567
033140  104210                  104210
033142  114631                  114631
033144  125252                  125252

033146  000001                  000001
033150  177776                  177776
033152  000002                  000002
033154  177775                  177775
033156  000003                  000003
033160  177774                  177774
033162  000004                  000004
033164  177773                  177773
```

```
 3348  033166  000005                    000005
 3349  033170  177772                    177772
 3350
 3351  033172  000000                    000000
 3352  033174  000000                    000000
 3353  033176  000000                    000000
 3354  033200  000000                    000000
 3355  033202  000000                    000000
 3356  033204  111111                    111111
 3357  033206  111111                    111111
 3358  033210  111111                    111111
 3359  033212  111111                    111111
 3360  033214  111111                    111111
 3361
 3362  033216  125252                    125252
 3363  033220  052525                    052525
 3364  033222  177777                    177777
 3365  033224  000000                    000000
```

```
3367                                    ;CRC TEST BUFFER
3368
3369  033226  125252                    SILCRC: 125252
3370  033230  050521                            050521
3371  033232  124200                            124200
3372  033234  000665                            000665
3373  033236  141436                            141436
3374  033240  164003                            164003
3375  033242  075106                            075106
3376  033244  027371                            027371
3377  033246  002562                            002562
3378  033250  135105                            135105
3379
3380  033252  002640                            002640
3381  033254  045405                            045405
3382  033256  060152                            060152
3383  033260  013403                            013403
3384  033262  153756                            153756
3385  033264  072577                            072577
3386  033266  164176                            164176
3387  033270  025435                            025435
3388  033272  111272                            111272
3389  033274  052673                            052673
3390
3391  033276  157140                            157140
3392  033300  102461                            102461
3393  033302  066234                            066234
3394  033304  016141                            016141
3395  033306  175726                            175726
3396  033310  121477                            121477
3397  033312  036420                            036420
3398  033314  122203                            122203
3399  033316  045272                            045272
3400  033320  016435                            016435
3401
3402  033322  010703                            010703
3403  033324  103142                            103142
3404  033326  177121                            177121
3405  033330  016654                            016654
3406  033332  033047                            033047
3407  033334  042734                            042734
3408  033336  046205                            046205
3409  033340  014300                            014300
3410  033342  024677                            024677
3411  033344  103302                            103302
3412
3413  033346  106245                            106245
3414  033350  124160                            124160
3415  033352  132304                            132304
3416  033354  015025                            015025
3417  033356  017305                            017305
3418  033360  044754                            044754
3419  033362  044406                            044406
3420  033364  061203                            061203
3421  033366  140621                            140621
3422  033370  054620                            054620
```

```
3423
3424  033372  110312                    110312
3425  033374  130174                    130174
3426  033376  116116                    116116
3427  033400  120462                    120462
3428  033402  021446                    021446
3429  033404  114411                    114411
3430  033406  133325                    133325
3431  033410  050737                    050737
3432  033412  106501                    106501
3433  033414  007625                    007625
3434
3435  033416  117626                    117626
3436  033420  041245                    041245
3437  033422  031477                    031477
3438  033424  014726                    014726
```

```
                                ;RECEIVER DATA COMPARE BUFFER
                                        .EVEN
3442  033426  000100            CMPBUF: .BLKW   64.
```

```
3444                                            .SBTTL ASCII STORAGE
3445
3446  033626 023046 044523 047514  SLOWD:  .ASCII  /&&SILO OUTPUT WORD WAS @/
      033634 047440 052125 052520
      033642 020124 047527 042122
      033650 053440 051501 040040
3447  033656 023046 044523 047514  SLIWD:  .ASCII  /&&SILO INPUT WORD WAS @/
      033664 044440 050116 052125
      033672 053440 051117 020104
      033700 040527 020123    100
3448  033705    046 047105 020104  PEND:   .ASCII  /&END PASS #@/
      033712 040520 051523 021440
      033720    100
3449  033721    046 041523 050117  SCSEC:  .ASCII  /&SCOPE SECTION FOR SLICE TIMING&SET SW 09 TO EXIT THIS LOOP.@/
      033726 020105 042523 052103
      033734 047511 020116 047506
      033742 020122 046123 041511
      033750 020105 044524 044515
      033756 043516 051446 052105
      033764 051440 020127 034460
      033772 052040 020117 054105
      034000 052111 052040 044510
      034006 020123 047514 050117
      034014 040056
3450  034016 052046 040522 051516  TXSTAT: .ASCII  /&TRANSMITTER STATUS REG = @/
      034024 044515 052124 051105
      034032 051440 040524 052524
      034040 020123 042522 020107
      034046 020075    100
3451  034051    046 042522 042503  RCSTAT: .ASCII  /&RECEIVER STATUS REG = @/
      034056 053111 051105 051440
      034064 040524 052524 020123
      034072 042522 020107 020075
      034100    100
3452  034101    046 047516 020056  RCBTCN: .ASCII  /&NO. OF WORDS RECEIVED = @/
      034106 043117 053440 051117
      034114 051504 051040 041505
      034122 044505 042526 020104
      034130 020075    100
3453  034133    046 041520 030514  TXHDR:  .ASCII  /&PCL11 TRANSMITTER TEST &  @/
      034140 020061 051124 047101
      034146 046523 052111 042524
      034154 020122 042524 052123
      034162 023040 020040    100
3454  034167    046 041520 030514  RCHDR:  .ASCII  /&PCL11 RECEIVER TEST&   @/
      034174 020061 042522 042503
      034202 053111 051105 052040
      034210 051505 023124 020040
      034216 040040
3455  034220 052046 040522 051516  XRHDR:  .ASCII  /&TRANSMITTER - RECEIVER LOOP TESTS&   @/
      034226 044515 052124 051105
      034234 026440 051040 041505
      034242 044505 042526 020122
      034250 047514 050117 052040
      034256 051505 051524 020046
      034264 020040    100
```

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  3456  034267     046  041520  030514  ALTHDR: .ASCII  /&PCL11 TESTS 1 - 3 SEQUENCE&   @/
        034274  020061  042524  052123
        034302  020123  020061  020055
        034310  020063  042523  052521
        034316  047105  042503  020046
        034324  020040     100
  3457  034327     046  046530  051124  TMTR:   .ASCII  /&XMTR @/
        034334  040040
  3458  034336  051046  053103  020122  RECVR:  .ASCII  /&RCVR @/
        034344     100
  3459  034345     061  052123  052440  FRAD:   .ASCII  /1ST UNIBUS ADDR...@/
        034352  044516  052502  020123
        034360  042101  051104  027056
        034366  040056
  3460  034370  052046  040510  020124  TOOLOW: .ASCII  /&THAT WAS TOO LOW. I'LL GIVE YOU ANOTHER CHANCE...&@/
        034376  040527  020123  047524
        034404  020117  047514  020527
        034412  044440  046047  020114
        034420  044507  042526  054440
        034426  052517  040440  047516
        034434  044124  051105  041440
        034442  040510  041516  027105
        034450  027056  040046
  3461  034454  052046  040510  020124  AGAIN:  .ASCII  /&THAT WON'T DO. TRY AGAIN.&@/
        034462  047527  023516  020124
        034470  047504  020056  051124
        034476  020131  043501  044501
        034504  020516  040046
  3462  034510  042526  052103  051117  VCTR:   .ASCII  /VECTOR...@/
        034516  027056  040056
  3463  034522  051120  047511  044522  PRIOTY: .ASCII  /PRIORITY  (4-7)..@/
        034530  054524  020040  032050
        034536  033455  027051  040056
  3464  034544  042124  020115  052502  TDMAD:  .ASCII  /TDM BUS ADDR (1-37)..@/
        034552  020123  042101  051104
        034560  024040  026461  033463
        034566  027051  040056
  3465  034572  044446  053116  046101  INVLAD: .ASCII  /&INVALID DEVICE ADDRESS...(IT'S NOT THERE)@/
        034600  042111  042040  053105
        034606  041511  020105  042101
        034614  051104  051505  027123
        034622  027056  044450  023524
        034630  020123  047516  020124
        034636  044124  051105  024505
        034644     100
  3466  034645     046  051124  050101  TRAP4:  .ASCII  /&TRAPPED TO LOCATION 4 FROM LOCATION @/
        034652  042520  020104  047524
        034660  046040  041517  052101
        034666  047511  020116  020064
        034674  051106  046517  046040
        034702  041517  052101  047511
        034710  020116     100
  3467  034713     046  050046  046103  TSTHDR: .ASCII  /&&PCL11 STANDALONE TESTS V02A   CZPLBB0  8-SEP-78&@/
        034720  030461  051440  040524
        034726  042116  046101  047117
        034734  020105  042524  052123
```

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                034742  020123  030126  040462
                034750  020040  041440  050132
                034756  041114  030102  020040
                034764  026470  042523  026520
                034772  034067  040046
  3468          034776  051446  046105  041505  TSTSEL: .ASCII  /&SELECT TEST (<CR> - HELP)..@/
                035004  020124  042524  052123
                035012  024040  041474  037122
                035020  036440  044040  046105
                035026  024520  027056     100
  3469          035033     046  051046  051505  HLPMSG: .ASCII  /&&RESPOND WITH ONE OF THE FOLLOWING:/
                035040  047520  042116  053440
                035046  052111  020110  047117
                035054  020105  043117  052040
                035062  042510  043040  046117
                035070  047514  044527  043516
                035076     072
  3470          035077     046  020040  020040          .ASCII  /&     1 - RUN TRANSMITTER TEST/
                035104  030440  036440  051040
                035112  047125  052040  040522
                035120  051516  044515  052124
                035126  051105  052040  051505
                035134     124
  3471          035135     046  020040  020040          .ASCII  /&     2 - RUN RECEIVER TEST/
                035142  031040  036440  051040
                035150  047125  051040  041505
                035156  044505  042526  020122
                035164  042524  052123
  3472          035170  020046  020040  020040          .ASCII  /&     3 = RUN XMTR-RCVR LOOP TEST/
                035176  020063  020075  052522
                035204  020116  046530  051124
                035212  051055  053103  020122
                035220  047514  050117  052040
                035226  051505     124
  3473          035231     046  020040  020040          .ASCII  /&     4 = RUN TEST 1, THEN TEST 2, THEN TEST 3&@/
                035236  032040  036440  051040
                035244  047125  052040  051505
                035252  020124  026061  052040
                035260  042510  020116  042524
                035266  052123  031040  020054
                035274  044124  047105  052040
                035302  051505  020124  023063
                035310     100
```

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3475                                    .SBTTL CONSTANTS AND VARIABLE STORAGE
3476            035312                  .EVEN
3477
3478
3479                                    ;VARIABLES
3480
3481  035312  000000                    DILLY:  .WORD   0
3482  035314  000000                    DLY:    .WORD   0
3483  035316  000000                    SWRFLG: .WORD   0
3484  035320  000000                    PNTFLG: .WORD   0
3485  035322  000000                    ITER:   .WORD   0
3486  035324  000000                    SWI:    .WORD   0
3487  035326  000000                    PAT:    .WORD   0
3488  035330  000000                    MASK:   .WORD   0
3489  035332  000000                    PSNO1:  .WORD   0
3490  035334  000000                    PSNO2:  .WORD   0
3491  035336  000000                    PSNO3:  .WORD   0
3492  035340  000000                    PSNO4:  .WORD   0
3493  035342  000000                    TEMP:   .WORD   0
3494  035344  000000                    TESTNO: .WORD   0
3495  035346  000000                    $4FLAG: .WORD   0
3496  035350  000000                    RCAD:   .WORD   0                       ;RECEIVER ADDRESS
3497  035352  000000                    TRAD:   .WORD   0                       ;TRANSMITTER ADDRESS
3498  035354  000000                    COUNT:  .WORD   0
3499  035356  000000                    DATWD:  .WORD   0
3500  035360  000000                    TMPRIO: .WORD   0
3501
3502                                    ;CONSTANTS:
3503
3504
3505  035362  000005                    FKPRIO: .WORD   5
3506  035364  000170                    TXVEC:  .WORD   170
3507  035366  000174                    RCVEC:  .WORD   174
3508  035370  000240                    XPRIO:  .WORD   240
3509  035372  000240                    RPRIO:  .WORD   240
3510  035374  164200                    TCR:    .WORD   164200
3511  035376  164202                    TSR:    .WORD   164202
3512  035400  164204                    TSDB:   .WORD   164204
3513  035402  164206                    TSBC:   .WORD   164206
3514  035404  164210                    TSBA:   .WORD   164210
3515  035406  164212                    TMMR:   .WORD   164212
3516  035410  164213                    TMMRH:  .WORD   164213
3517  035412  164214                    TSCRC:  .WORD   164214
3518  035414  164220                    RCR:    .WORD   164220
3519  035416  164222                    RSR:    .WORD   164222
3520  035420  164224                    RDDB:   .WORD   164224
3521  035422  164226                    RDBC:   .WORD   164226
3522  035424  164230                    RDBA:   .WORD   164230
3523  035426  164234                    RDCRC:  .WORD   164234
3524  035430  177560                    KBS:    .WORD   177560
3525  035432  177562                    KBD:    .WORD   177562
3526  035434  177564                    TTS:    .WORD   177564
3527  035436  177566                    TTB:    .WORD   177566
3528  035440  035440                    MEM:    .WORD   MEM
3529  035442  177777                    TSTWRD: .WORD   177777
3530
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  3531
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3533  035444  000170                TXMVEC: .WORD   170                     ;170 IS XMTR DEFAULT VECTOR
3534  035446  000174                RCVVEC: .WORD   174                     ;174 IS RCVR DEFAULT VECTOR
3535  035450  164200                TXMADR: .WORD   164200                  ;164200 IS XMTR DEFAULT BASIC ADDR
3536  035452  164220                RCVADR: .WORD   164220                  ;164220 IS RCVR DEFAULT BASIC ADDR
3537          000001                        .END
```

ADGD	003016	660	663#											
ADOK	002772	656	659#											
ADRGD	003124	673	676#											
ADROK	003100	669	672#											
AGAIN	034454	603	612	620	624	638	642	657	661	670	674	3461#		
ALTHDR	034267	717	3456#											
BAD	032204	893*	895	899*	901	905*	906*	908	910	914*	916	920*	922	926*
		928	945*	946	952*	953*	954	962*	963	972*	974	978*	979	983*
		984	988*	990	1009*	1010	1034*	1035	1140*	1142*	1144	1168*	1200*	1201*
		1203	1246*	1248	1267*	1269	1303*	1305	1320*	1321	1376*	1634*	1637	1715*
		1717	1721*	1723	1727*	1729	1733*	1735	1739*	1741	1758*	1759	1765*	1766*
		1767	1776*	1778	1782*	1784	1788*	1790	1794*	1796	1815*	1816	1840*	1841
		1881*	1883	1901*	1903	1939*	1940	2052*	2053	2226*	2227	2321*	2366*	2368
		2421*	2422	2427*	2428*	2429	2474*	2475	2528*	2529	2573*	2574	2672*	2673*
		2674	2679*	2680*	2681	2726*	2727*	2728	2770*	2771*	2772	2776*	2777*	2778
		2818*	2819*	2820	2858*	2859*	2860	3076	3096#					
BATST	005772	765	1029#	1047										
BCONT	003132	561	677#	686	869	3013								
BCTST	005616	764	1004#	1022										
BEGIN	002000	468	554	565#										
BHLPMG	003176	681	683	685#										
BINPNT	032564	3217#												
B00 =	000001	464#	1006	1031	1334	1812	1837	2660	2761	2762	2809	2810	2889	2903
		2938	2939											
B01 -	000002	463#	1004	1029	1054	1227	1244	1251	1272	1274	1313	1324	1333	1350
		1386	1397	1442	1491	1509	1520	1535	1547	1559	1590	1599	1606	1620
		1651	1775	1810	1835	1860	1879	1886	1906	1909	1957	1972	2013	2033
		2069	2117	2140	2152	2187	2196	2203	2209	2218	2242	2294	2295	2324
		2325	2379	2380	2433	2434	2480	2481	2538	2539	2627	2628	2654	2655
		2695	2696	2741	2742	2796	2797	2834	2835	2881	2882	2915	2916	2931
		2932												
B02 =	000004	462#	2042											
B03 =	000010	461#	1230	1241	1255	1265	1296	1346	1399	1867	1892	1916	1968	2705
		2842												
B04 =	000020	460#	1405	2713										
B05 =	000040	459#	2895	2911	2918	2953	2961							
B06 =	000100	458#	1413	1423	1563	1569	1575	1593	2015	2156	2162	2168	2190	
B07 =	000200	457#	1139	1167	1199	1206	1213	1253	1263	1300	1308	1310	1374	1379
		1387	1388	1392	1393	1576	1594	1630	1871	1873	1896	1898	1910	1920
		1987	1992	2019	2020	2028	2029	2118	2122	2169	2171	2191	2219	2353
		2365	2659	2664	2753	2755	2756	2758	2759	2760	2798	2805		
B08 =	000400	456#	1234	1259	1292	1513	1863	1876	1888	1899	1946	2047	2120	2172
		2392	2445	2548	2890									
B09 =	001000	455#	1061	1070	1429	1430	1444	1516	2057	2940				
B10 =	002000	454#	751	1449	1450	1525	1673	2071	2072	2258	2638	2850		
B11 =	004000	453#	771	1459	1460	1543	1690	2085	2086	2273				
B12 =	010000	452#	933	995	1020	1045	1218	1353	1469	1470	1549	1601	1648	1746
		1801	1826	1851	1974	2095	2096	2142	2198	2239	2348	2615	2685	2718
		2732	2782	2786	2824	2864	2869	2966						
B13 =	020000	451#	808	1419	1438	1479	1480	2014	2024	2065	2070	2080	2105	2106
		2385	2387	2439	2440	2633	2634	2660	2701	2702	2749	2750	2809	2810
		2840	2841	2888	2889	2917	2919	2938	2939					
B14 =	040000	450#	897	903	912	918	924	930	948	956	965	976	981	986
		992	1012	1037	1058	1075	1080	1085	1091	1096	1101	1109	1113	1119
		1127	1131	1135	1146	1154	1158	1166	1173	1187	1194	1205	1212	1232
		1236	1243	1250	1257	1261	1271	1277	1278	1280	1290	1294	1298	1307

		1323	1348	1362	1390	1395	1411	1415	1421	1425	1432	1436	1440	1446
		1452	1456	1462	1466	1472	1476	1482	1486	1499	1501	1503	1507	1518
		1533	1545	1570	1582	1586	1612	1623	1626	1628	1642	1719	1725	1731
		1737	1743	1761	1769	1780	1786	1792	1798	1818	1843	1865	1869	1878
		1885	1890	1894	1905	1918	1923	1932	1934	1942	1948	1970	1999	2017
		2022	2026	2031	2044	2049	2055	2059	2063	2067	2074	2078	2082	2088
		2092	2098	2102	2108	2112	2130	2132	2134	2138	2163	2179	2183	2210
		2232	2312	2316	2322	2341	2345	2398	2402	2403	2411	2414	2424	2431
		2451	2455	2456	2464	2467	2477	2504	2507	2515	2518	2531	2554	2557
		2576	2577	2594	2597	2605	2608	2646	2676	2683	2687	2711	2715	2730
		2734	2774	2780	2784	2788	2822	2826	2862	2866	2901	2905	2909	2913
		2921	2938	2939	2951	2955	2959	2963	3237					
B15 = 100000		449#	1014	1039	1417	1434	1454	1464	1474	1484	1505	1820	1845	2061
		2076	2090	2100	2110	2136	2892	2907	2942					
CCRTN	031456	2996#	3023											
CHXDAT	023476	2314	2343	2363#										
CLRCBF	017702	1908	1978#	2479										
CMPBUF	033426	1922	1936	1979	1998	2043	2051	2483	2526	2936	3442#			
CONTW1	031466	2997#	2998	3004										
COUNT	035354	1631*	1645*	3498#										
CRCTST	014364	770	1620#	1629	1643	1650								
DATLPS	023556	2270	2379#	2399	2408	2419	2425	2432	2617					
DATWD	035356	2223*	2224	2230	3499#									
DECJSP	032620	3231#												
DECPNT	032602	724	780	1699	2282	3224#								
DELAY	004332	876#	1162	1190	1196	1208	1228	1239	1538	1541	1861	1874	2356	2661
DELYMG	031672	3016	3037#											
DERR	032040	897	903	912	918	924	930	948	956	965	976	981	986	992
		1012	1037	1146	1205	1250	1271	1307	1323	1642	1719	1725	1731	1737
		1743	1761	1769	1780	1786	1792	1798	1818	1843	1885	1905	1942	2055
		2232	2316	2322	2345	2424	2431	2477	2531	2576	2676	2683	2730	2774
		2780	2822	2862	306°#									
DEVGEN	004050	650	819#											
DILLY	035312	876*	883*	3481#										
DIVID	032674	3249#	3253											
DIVSET	032672	3248#	3258											
DLCON	031752	877	879*	880	1179	1282	1363	1403	1522	1924	2000	2301	2330	2388
		2441	2489	2546	2586	2635	2665	2703	2719	2763	2811	2844	2851	2893
		2943	3017	3018	3022*	3049#								
DLWT	004352	878	880#	884										
DLWT1	004360	881#	882											
DLY	035314	880*	881*	3482#										
DTLPS1	023650	2389#	2397											
DVATST	004242	583	854#											
EROINT	021676	2155	2160#											
ERR	031754	1058	1075	1080	1085	1091	1096	1101	1109	1113	1119	1127	1131	1135
		1154	1158	1166	1173	1187	1194	1212	1232	1236	1243	1257	1261	1280
		1290	1294	1298	1348	1390	1395	1411	1415	1421	1425	1432	1436	1440
		1446	1452	1456	1462	1466	1472	1476	1482	1486	1499	1503	1507	1518
		1533	1545	1570	1582	1586	1612	1628	1865	1869	1878	1890	1894	1918
		1932	1948	1970	2017	2022	2026	2031	2049	2059	2063	2067	2074	2078
		2082	2088	2092	2098	2102	2108	2112	2130	2134	2138	2163	2179	2183
		2210	2312	2341	2398	2402	2411	2451	2455	2464	2504	2515	2554	2594
		2605	2646	2687	2711	2715	2734	2784	2788	2826	2866	2901	2905	2909
		2913	2921	2951	2955	2959	2963	3055#						
ERRAD	032200	3055*	3056*	3061	3069*	3070*	3094#							

```
ERRINT  013756  1562  1567#
ERRM    032124  3057  3085#
ERRNUM  032202   897*  903*  912*  918*  924*  930*  948*  956*  965*  976*  981*  986*  992*
                1012* 1037* 1058* 1075* 1080* 1085* 1091* 1096* 1101* 1109* 1113* 1119* 1127*
                1131* 1135* 1146* 1154* 1158* 1166* 1173* 1187* 1194* 1205* 1212* 1232* 1236*
                1243* 1250* 1257* 1261* 1271* 1280* 1290* 1294* 1298* 1307* 1323* 1348* 1390*
                1395* 1411* 1415* 1421* 1425* 1432* 1436* 1440* 1446* 1452* 1456* 1462* 1466*
                1472* 1476* 1482* 1486* 1499* 1503* 1507* 1518* 1533* 1545* 1570* 1582* 1586*
                1612* 1628* 1642* 1719* 1725* 1731* 1737* 1743* 1761* 1769* 1780* 1786* 1792*
                1798* 1818* 1843* 1865* 1869* 1878* 1885* 1890* 1894* 1905* 1918* 1932* 1942*
                1948* 1970* 2017* 2022* 2026* 2031* 2049* 2055* 2059* 2063* 2067* 2074* 2078*
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FX2B    031630  3022#
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EX5     031660  2984  3026  3030#
FILRCV  023434  2297  2326  2352#
FKPRIO  035362   616   634  3505#
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GETDG   032712  3250  3254#
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                1321  1636* 1637  1716* 1722* 1728* 1729  1734* 1740* 1756* 1757  1759 1763*
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                1839  1841  1882* 1883  1902* 1903  1938* 1940  2051* 2053  2225* 2227 2320*
                2367* 2368  2420* 2422  2426* 2429  2473* 2475  2527* 2529  2572* 2574 2671*
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INTA    014304  1573  1606#
INTB    014326  1592  1611#
INTRA   022250  2166  2203#
INTRB   022272  2189  2208#
INTST   013700   769  1558# 1571  1583  1587  1603
INVLAD  034572   855  3465#
ISP = 002000   468#  555   559   566   854   864  3012  3027
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                 648*  649   653*  655   659   663   666*  668   672   676   678*  680  682
                 688  2993* 2995  3017* 3022  3136  3137* 3152* 3154* 3156* 3157  3166* 3167*
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KBD     035432  2985  2999  3183  3525#
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KBRET   032514  3184#
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LOOPL   022636  2259  2263   2267  2269#  2276
LOOPR   014732  1674  1680   1682#  1693
MASK    035330  1006*  1016  1017*  1031*  1041  1042*  1812*  1822  1823*  1837*  1847  1848*  3488#
MEM     035440  3528#
MONCH   031374  2986#
MONIC   031370  2983  2985#
MONIT   031354  750   802    932   994   1019  1044  1060  1069  1217  1352  1548  1600  1647
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PRMT10  003024  664#  671   675
PRMT2   002154  585#  593
PRMT3   002240  591   594#
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PRMT6   002422  611   614#  621  625
PRMT7   002500  619   622#
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PSNO1   035332          692*    777*    779     3489#
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PSNO3   035336          694*   2279*   2281     3491#
PSNO4   035340          695*    721*    723     3492#
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P2    = 000100          444#
P3    = 000140          443#
P4    = 000200          442#
P5    = 000240          441#
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P7    = 000340          439#    556     560     567     570     748     863     1558    1567    1574    1670    2151    2160
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RA1     015152          1718    1721#
RA2     015222          1724    1727#
RA3     015276          1730    1733#
RA4     015346          1736    1739#
RA5     015416          1742    1745#
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RBCTST  016144          1684    1810#   1828
RBRT    016316          1827    1829#
RB1     016166          1813#   1819    1824
RB2     016250          1817    1820#
RB3     016276          1821    1825#
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RCBTCN  034101          2567    2579    3452#
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                       2034*   2042*   2044*   2065    2069*   2070*   2080    2117*   2118*   2122*   2125*   2140*   2152*
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RD7	016122	1797	1800#											
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        1281  1291  1295  1299  1309  1325  1349  1391  1396  1412  1416  1422  1426  1433  1437
        1441  1447  1453  1457  1463  1467  1473  1477  1483  1487  1500  1504  1508  1519  1534
        1546  1571  1583  1587  1613  1629  1643  1720  1726  1732  1738  1744  1762  1770  1781
        1787  1793  1799  1819  1844  1866  1870  1880  1887  1891  1895  1907  1919  1933  1943
        1949  1971  2018  2023  2027  2032  2050  2056  2060  2064  2068  2075  2079  2083  2089
        2093  2099  2103  2109  2113  2131  2135  2139  2164  2180  2184  2211  2233  2313  2317
        2323  2342  2346  2399  2408  2419  2425  2432  2452  2461  2472  2478  2512  2523  2534
        2571  2583  2602  2613  2647  2677  2684  2688  2712  2716  2731  2735  2775  2781  2785
        2789  2823  2827  2863  2867  2902  2906  2910  2914  2922  2952  2956  2960  2964
```

. ABS. 035454 000

ERRORS DETECTED: 0

PCLTST,PCLTST/CR/NL:TTM:ME<PCLTST
RUN-TIME: 6 11 2 SECONDS
RUN-TIME RATIO: 75/19=3.8
CORE USED: 12K (23 PAGES)