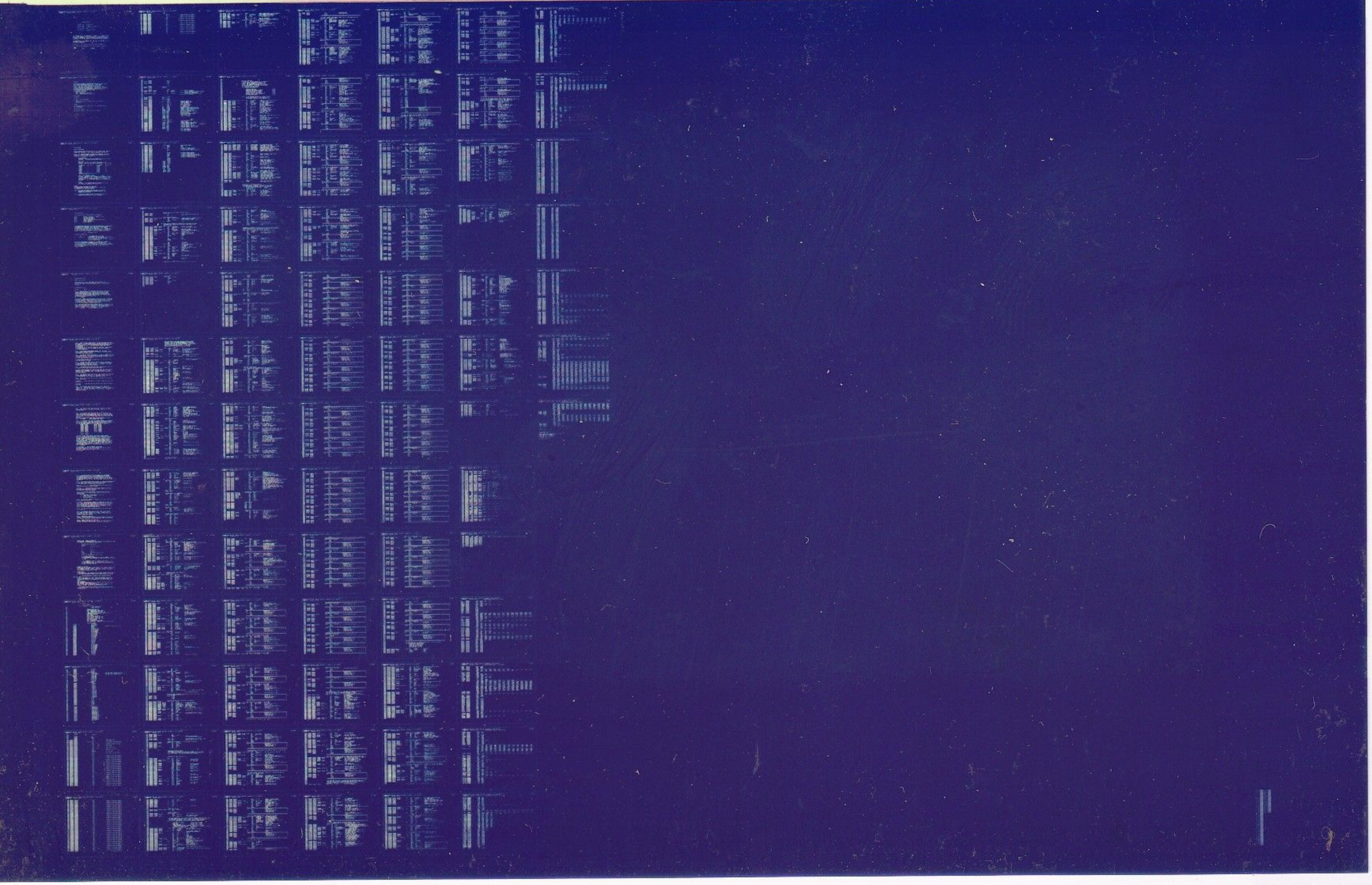
DM11A

LOGIC TEST
CZDMAD0

AH-8537D-MC

FICHE 1 OF 1

AUG 1978
digital
MADE IN USA



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IDENTIFICATION

PRODUCT CODE: AC-8536D-MC

PRODUCT NAME: CZDMADO DM11A LGC TST

DATE RELEASED. APRIL 1978

MAINTAINER: DIAGNOSTIC GROUP

1. ABSTRACT

THO SEPARATE DIAGNOSTIC PROGRAMS ARE PROVIDED FOR TESTING THE DM11A (ASYNCHRONOUS DATA MULTIPLEXER). CZDMA (DM11A LOGIC TESTS), AND CZDMB (DM11A MULTIPLE LINE DATA TESTS). THE LOGIC TESTS INDIVIDUALLY TEST EACH OF THE 16 DM11 LINES AND ALL COMMON LOGIC. THE MULTIPLE LINE DATA TESTS RUN SEVERAL LINES CONCURRENTLY AND ARE USED TO TEST LINE INTERACTION AND DATA TRANSMISSION/RECEPTION RELIABILITY
THIS DOCUMENT DESCRIBES THE LOGIC TESTS
THE AVAILABLE TESTS ARE:
    PRG0 - LOGIC TEST
    PRG1 - TRANSMITTER SCOPE LOOP
    PRG2 - TRANSMIT/RECEIVE SCOPE LOOP

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP 11 FAMILY PROCESSER
B. DM11
C. JUMPERS CONNECTING 16 TRANSMITTERS TO THEIR RESPECTIVE RECEIVERS.

2.2 STORAGE

THIS PROGRAM USES ALL OF CORE (8K) EXCEPT THAT AREA RESERVED FOR THE LOADERS.

3. LOADING PROCEEDURE

THE ABSOLUTE LOADER IS USED TO LOAD THE PROGRAM.

4. USE PROCEDURE

4 1 STARTING PROCEDURE

BEFORE STARTING MAKE SURE THAT THE TTY IS IN REMOTE MODE, AND THE JUMPERS ARE INSTALLED. THREE STARTING ADDRESSES ARE PROVIDED

0200 - THIS STARTING ADDRESS REQUESTS DM11 PARAMETERS, AND MUST BE USED TO INITIALLY START THE PROGRAM, AND WHENEVER ANY OF THE PARAMETERS LISTED BELOW IS CHANGED.

A. VECTOR ADDRESS ?
RESPONSE: TYPE IN THE VECTOR ADDRESS OF THE DM11 RECEIVER UNDER TEST. CARRIAGE RETURN SELECTS 0300

B. UNIT #(8)?
RESPONSE: THE DM11 UNIT NUMBER CORRESPONDS TO THE ADDRESS TO WHICH THE CONTROL STATUS REGISTER (CSR) RESPONDS.

CSR ADDRESS	DM11 UNIT #	CSR ADDRESS	DM11 UNIT #
175000	0	175100	10
175010	1	175110	11
175020	2	175120	12
175030	3	175130	13
175040	4	175140	14
175050	5	175150	15
175060	6	175160	16
175070	7	175170	17

CARRIAGE RETURN SELECTS UNIT # 0

C. WHAT IS THE CHARACTER LENGTH? ;;++D
RESPONSE: CHARACTER LENGTH REFERS TO THE NUMBER OF DATA BITS PER CHARACTER (5-8). CARRIAGE RETURN DEFAULTS A CHAR-LENGTH OF "8". IF A CHARACTER LENGTH 5-7 IS DESIRED, TYPE THE VALUE(5-7) OF THE DESIRED LENGTH AT THE KEYBOARD WHEN PROMPTED.

D. PRG #
RESPONSE: TYPE PROGRAM NUMBER OF PROGRAM YOU WISH TO RUN. CARRIAGE RETURN SELECTS PROGRAM # 0.

NOTES:
CARRIAGE RETURN TERMINATES ALL RESPONSES.
ANY UNACCEPTABLE RESPONSE WILL RESULT IN A ? TYPEOUT AND THE PARAMETER WILL AGAIN BE REQUESTED.

0204 - THIS STARTING ADDRESS USES PREVIOUSLY DEFINED DM11 PARAMETERS AND REQUESTS THE PROGRAM NUMBER OF THE PROGRAM YOU WISH TO RUN.

0210 - THIS STARTING ADDRESS STARTS THE PREVIOUSLY SELECTED PROGRAM USING PREVIOUSLY SELECTED PARAMETERS.

4.2 SWITCH SETTINGS

THE FOLLOWING SWITCH SETTINGS APPLY TO PROGRAM #0.

SR 0-6	ROUTINE TO BE RUN (IF ENABLED BY SR-9)
SR 8	RING BELL ON ERROR
SR 9	LOOP SELECTED ROUTINE
SR 11	INHIBIT ITERATION (DO EACH ROUTINE ONCE)
SR 13	INHIBIT PRINTOUT
SR 14	SCOPE (LOOP ROUTINE)
SR 15	HALT ON ERROR

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

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

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

5.0 PROGRAM DESCRIPTION

5 1 PRGO - LOGIC TESTS

PRGO CONSISTS OF 152(8) INDEPENDENT ROUTINES WHICH TEST VARIOUS FUNCTIONS OF THE DM11 HARDWARE ANY OF THESE ROUTINES MAY BE INDIVIDUALLY SELECTED AND RUN (SEE SEC 4.2 FOR SWITCH SETTING)

5.1.1 ROUTINE DESCRIPTION

ROUTINE TESTS

RT0 TESTS THE ABILITY TO REFERENCE THE FOUR DM11 REGISTERS CONTROL STATUS REGISTER (CSR), BUFFER ACTIVE REGISTER (BAR;, BREAK STATUS REGISTER (BKCSR), AND THE BASE REGISTER (BASREG) IF AN ILLEGAL REFERENCE OCCURS WHEN THE CSR IS REFERENCED THE PROGRAM WILL INDICATE AN ERROR, AND AUTOMATICALLY LOOP THE ERROR AS LONG AS THE ERROR CONDITION EXISTS.
RT0 PC=XXXXXX

RT1-RT10 BIT 'BANGS' THE CSR (BITS 0,1,2,4,5,6,12,13), TESTING THAT EACH BIT IN THE CSR CAN BE INDIVIDUALLY SET AND CLEARED TWO ERROR TYPES ARE DETECTED IN THESE TESTS, A BIT FAILED TO SET, AND/OR A BIT FAILED TO CLEAR. THE ERROR PRINTOUT SHOWS THE ROUTINE THAT FAILED AND THE PC WHERE THE ERROR WAS DETECTED.

RT11- TESTS THAT RESET AND CLEAR CLEAR ALL R/W BITS IN THE CSR TWO ERROR TYPES ARE DETECTED IN THIS ROUTINE SHOWING THE CONTENTS OF THE CSR AFTER THE RESET & CLEAR INSTRUCTION. THE PROGRAM AUTOMATICALLY LOOPS IF AN ERROR OCCURS. SHOWN BELOW IS THE ERROR TYPEOUT
RT11 PC=XXXXXX ERR S/B: 000000 WAS: XXXXXX

RT12 LOADS A BINARY COUNT PATTERN INTO THE BKCSR AND READS BACK THE RESULTS. IF THE DATA READ BACK IS INCORRECT AN ERROR IS INDICATED THE SCOPE SWITCH WILL CAUSE THE PROGRAM TO RELOAD THE BINARY NUMBER AND REPEAT THE TEST. THE ERROR TYPEOUT SHOWS CORRECT AND ACTUAL RESULTS.
THE SECOND PORTION OF THE TEST CLEARS THE PREVIOUSLY LOADED NUMBER IF THE SCOPE SWITCH IS SET THE PROGRAM LOOPS BACK AND REPEATS THE CLEAR INSTRUCTION.

RT13 THIS ROUTINE LOADS RANDOM NUMBERS INTO THE BKCSR. IF A RANDOM NUMBER IS LOADED INCORRECTLY AN ERROR IS INDICATED SHOWING THE CORRECT AND ACTUAL RESULTS.

RT14 THIS ROUTINE TESTS THAT RESET WILL CLEAR ALL BREAK STATUS REGISTER (BKCSR) BITS. IF ALL BITS DO NOT CLEAR WHEN THE RESET IS GIVEN AN ERROR IS INDICATED. THE ERROR TYPEOUT SHOWS THE CORRECT RESULT (ALL 0'S) AND THE ACTUAL RESULT.

RT15-RT16 THESE ROUTINES ARE THE SAME AS RT12 & RT13 EXCEPT THAT THE BASE REGISTER IS TESTED.

RT17 THIS ROUTINE TESTS THAT ALL BAR BITS CAN BE INDIVIDUALLY SET AND CLEARED. THE ROUTINE SHIFTS A '1' THROUGH THE BAR THEREBY SETTING EACH BAR BIT AND THEN THE BAR BIT IS CLEARED. THE ERROR TYPEOUTS SHOW CORRECT AND ACTUAL RESULTS.

RT20 THIS ROUTINE TESTS THAT RESET AND CLEAR CLEAR ALL BAR BITS THE ERROR TYPEOUT SHOWS CORRECT AND ACTUAL RESULTS.

RT21-RT23 THESE ROUTINES TEST THAT THE CSR, BAR, AND BKCSR RESPOND PROPERLY TO BYTE COMMANDS. BOTH BYTES ARE REFERENCED IN THESE ROUTINES USING CLRB INSTRUCTIONS. THE ERROR TYPEOUT SHOWS CORRECT AND ACTUAL RESULTS.

RT24 THIS ROUTINE TESTS THAT THE DM11 CAN INTERRUPT THE PROCESSOR VIA THE OVER RUN BIT (CSR BIT 13). THE ERROR TYPEOUT SHOWS THE ROUTINE NUMBER AND THE PC WHERE THE ERROR WAS DETECTED.

RT25 THIS ROUTINE TESTS THAT THE DM11 INTERRUPTS THE PROCESSER AT THE PROPER LEVEL.

RT26-RT45 THESE ROUTINES TEST THE BASIC TRANSMITTER FUNCTIONS ON EACH LINE

RT46-RT65 THESE ROUTINES TEST THE BASIC RECEIVER FUNCTIONS ON EACH LINE

RT66 THIS ROUTINE TESTS THAT THE DM11 WILL SET THE NEX BIT (CSR BIT 14). WHEN THE DM11 TRIES TO TRANSMIT FROM NON-EXISTANT MEMORY. ALL LINES ARE INDIVIDUALLY TRANSMITTED ON. THE ERROR TYPEOUT SHOWS THE FAILING LINE. ALSO TESTED IS THAT THE NEX BIT WHEN SET CAUSES AN INTERRUPT.

RT67 THIS ROUTINE TESTS THAT THE NEX BIT (CSR BIT 14) SETS WHEN THE DM11 TRIES TO REFERENCE THE TUMBLE TABLE THAT IS IN NON-EXISTANT MEMORY.

RT70 THIS ROUTINE TESTS THAT WHEN THE GO BIT (CSR BIT 0) IS CLEAR THAT NO DATA IS RECEIVED ON ANY LINE. ALL LINES ARE TRANSMITTED ON AND AFTER THE TRANSMISSION IS COMPLETE THE RECEIVER DONE FLAG IS TESTED. THE ERROR TYPEOUT SHOWS THE LINE ON WHICH DATA WAS RECEIVED.
THE TYPEOUT SHOWN BELOW SHOWS THAT DATA WAS RECEIVED ON LINE 0
RT70 PC=XXXXXX ERRS/B: 000001 WAS: 000001

RT71 THIS ROUTINE TESTS THAT THE CURRENT ADDRESS IS INCREMENTED PROPERLY BY THE DM11. THE TABLE BELOW SHOWS THE ADDRESS LOADED INTO IN THE CURRENT ADDRESS TABLE BEFORE 2 CHARACTERS ARE TRANSMITTED AND THE RESULTANT ADDRESS AFTER THE CHARACTER IS TRANSMITTED

BEFORE	AFTER	BEFORE	AFTER
000000	000001	000777	001000
000001	000002	001777	002000
000003	000004	003777	004000
000007	000010	007777	010000
000017	000020	017777	020000
000037	000040	037777	040000
000077	000100	077777	100000
000177	000200	177777	000000
000377	000400		

THE ERROR TYPEOUT SHOWS CORRECT AND ACTUAL CURRENT ADDRESS.

RT72 THIS ROUTINE TESTS THAT DATA CAN BE TRANSMITTED FROM ALL AVAILABLE CORE AND RECEIVED CORRECTLY. THIS IS DONE BY TRANSMITTING 1 CHARACTER FROM SEVERAL ADDRESSES IN EACH 4K BLOCK OF CORE ON LINE 0. THE ERROR TYPEOUT WILL SHOW TRANSMITTED AND ACTUAL RECEIVED DATA. IF A DATA ERROR RESULTED WHEN TRANSMITTING FROM THE FIRST 4K OF CORE EXAMINE THE CURRENT ADDRESS OF LINE 0 TO DETERMINE WHERE IN THE FIRST 4K OF CORE THE DM11 WAS TRANSMITTING FROM WHEN ERROR OCCURRED. FOR ERRORS IN OTHER 4K BLOCKS THE CORRECT RESULT CORRELATES TO THE ADDRESS WHERE THE ERROR OCCURRED. FOR EXAMPLE

RT72 PC=XXXXXX ERR S/B: 000001 WAS XXXXXX.
INDICATES THAT THE DM11 FAILED TO TRANSMIT AND RECEIVE CORRECT DATA WHEN TRANSMITTING FROM LOCATION 20000.
THE TEST IS ABORTED BEFORE TRANSMITTING IF THE CORE LOCATION IS NON-EXISTANT.

RT73 THIS ROUTINE TESTS THAT THE TRANSMITTER CAN TRANSMIT 100 CHARACTERS ON EACH LINE. THE ROUTINE TESTS THAT EXACTLY 100 CHARACTERS HAVE BEEN TRANSMITTED BEFORE READY (CSR BIT15) SETS AND THE BAR BIT CLEARS. THE ERROR TYPEOUT GIVES THE NUMBER OF CHARACTERS RECEIVED AT THE TIME OF AN ERROR, AND THE FAILING LINE NUMBER (X2).

RT74 THIS ROUTINE TESTS THAT THE DM11 WILL STORE DATA SEQUENTIALLY IN THE TUMBLE TABLE AND ALSO THAT THE POINTER RETURNS TO THE TOP OF THE TABLE WHEN 64 CHARACTERS HAVE BEEN RECEIVED.

RT75-114 THESE ROUTINES CHECK THAT A BREAK CAN BE TRANSMITTED AND RECEIVED ON ALL ALINES

R115-R134 THESE ROUTINES INDIVIDUALLY TRANSMIT, RECEIVE AND CHECK DATA PLUS PARITY ON EACH OF THE 16 DM11 LINES ONLY DATA AND PARITY ERRORS ARE REPORTED.

RT131 THIS ROUTINE SIMULTANEOUSLY TRANSMITS AND RECEIVES A CHARACTER (ALL 1'S) ON THE 16 DM11 LINES. THE FOLLOWING TESTS ARE PERFORMED:

- A: THERE ARE 16 DATA ENTRIES (1 PER LINE)
- B: THERE ISN'T A 17TH ENTRY
- C: DATA IS CORRECT
- D: ONE ENTRY FOR EACH LINE

RT136 THIS ROUTINE TRANSMITS A BREAK ON EACH LINE TESTS PERFORMED ARE THE SAME AS IN RT135.

RT137-RT144 THESE ROUTINES TRANSMIT 64 CHARACTERS ON EACH LINE WITH A DELAY BEFORE BEGINNING TRANSMISSION ON THE NEXT SUCCESSIVE LINE. THE DELAY BEFORE TRANSMITTING ON THE NEXT LINE IS HALVED BY SUCCESSIVE TESTS. NO DATA CHECKING IS PERFORMED BY THESE TESTS. TESTED ARE THAT OVER RUN (CSR BIT13) AND NEX (CSR BIT14) ARE NOT SET DURING TRANSMISSION/RECEPTION.

RT145 THIS ROUTINE TESTS PROPER OPERATION OF THE HALF DUPLEX BIT (CSR BIT1)

RT146 THIS ROUTINE TESTS THAT THE DM11 COMES TO AN 'ORDERLY HALT' WHEN THE RESET INSTRUCTION IS GIVEN. 'ORDERLY HALT' IS DEFINED AS CSR, BAR, AND BKCS CLEAR IMMEDIATLY AFTER THE RESET INSTRUCTION AND STAY CLEARED.

5.2 PRG1- TRANSMITTER SCOPE LOOP
PROGRAM 1 ALLOWS THE USER TO SCOPE THE DM11 TRANSMITTER FUNCTIONS WITH THE DM11 CONTINUOSLY RUNNING UNDER USER SUPPLIED PARAMETERS

5.3 PRG2- TRANSMITTER/RECEIVER SCOPE LOOP
PROGRAM 2 ALLOWS THE USER TO SCOPE THE DM11 RECEIVER FUNCTIONS WITH THE DM11 CONTINUOUSLY RUNNING UNDER USER SUPPLIED PARAMETERS

6.0 PROGRAM 1 AND PROGRAM 2 PARAMETERS
WHEN PROGRAM 1 OR PROGRAM 2 ARE SELECTED ADDITIONAL PARAMETERS WILL BE REQUESTED BY EACH PROGRAM AS SHOWN BELOW

A TYPE LINES TO BE TESTED
EXAMPLES·

TYPE	TO SELECT LINE(S)
1	0
3	1,0
10	3
17	3,2,1,0
50	5,3
3101	10,7,6,0
17770	14,13,12,11,10,7,6,5,4,3
177777	ALL

NOTE, LINE NUMBERS ARE GIVEN IN OCTAL.

B. HOW MANY CHARACTERS
TYPE THE NUMBER OF CHARACTERS YOU WISH TO TRANSMIT NOTE, THE NUMBER OF CHARACTERS MUST BE LESS THAN 200. AND IS TAKEN IN OCTAL.

C· PUT CHARACTER IN SR (0-7);DELAY IN SR (8-15)
SELF-EXPLANATORY. NOTE, THE DELAY REFERS TO A DELAY AFTER ALL THE CHARACTERS HAVE BEEN TRANSMITTED AND BEFORE A NEW TRANSMISSION PERIOD BEGINS.

7 0 PROGRAM LIMITATIONS
BECAUSE THE DM11 DIAGNOSTICS ARE INSENSITIVE TO 'REAL' ELAPSED TIME THE DIAGNOSTIC DOES NOT 'KNOW' IF THE DM11 IS OPERATING AT THE CORRECT FREQUENCY OR THAT THE STOP CODE SELECTION LOGIC IS CORRECT, THESE SHOULD BE CHECKED WITH A SCOPE.

8.0 PROGRAM NOTES
IF THE POWER FAILS THE PROGRAM TYPES AN ERROR MESSAGE INDICATING THE ROUTINE THAT WAS RUNNING (PROG #0 ONLY) AND RESTARTS THE PROGRAM.

********** IMPORTANT NOTE **********

POWER FAIL TEST
A TEST OF THE POWER FAIL LOGIC SHOULD BE PERFORMED ON EACH UNIT SELECT & RUN ROUTINE 144 (L.A. = 210 SR =5144 PRESS START). TURN THE POWER OFF THEN ON. THE PROGRAM WILL TYPE OUT THE POWER FAIL ERROR
R144 PC=003622
AND CONTINUE RUNNING ROUTINE 144. LOWER SR 9 AND WAIT FOR END OF TEST MESSAGE. 'TEST DZDMA COMPLETE'.
NOTE: IF THE POWER IS TURNED OFF DURING A RESET INSTRUCTION THE PROGRAM WILL HALT. PRESS CONTINUE AND REPEAT THE TEST

IF THE PROGRAM HANGS THE BUS EXAMINE THE CONTENTS OF RTNNO THE CONTENTS OF RTNNO IS THE ROUTINE NUMBER THAT WAS RUNNING AT THE TIME OF THE FAILURE.

```
                .TITLE  CZDMADO DM11A LGC TST
                        .LIST   ME,BIN,SEQ
                        .ENABLE ABS,AMA

                ;CZDMADO DM11A LGC TST
                ;PRG0- INPUT-OUTPUT LOGIC TESTS
                ;PRG1- TRANSMITTER SCOPE LOOP
                ;PRG2- TRANSMIT/RECEIVE SCOPE LOOP
                ;STANDARD SR SWITCH OPTIONS (SWITCH SET TO A 1 )
                ;SR15- HALT ON ERROR
                ;SR14- SCOPE.
                ;SR13- INHIBIT PRINTOUT
                ;SR12- INHIBIT TRACE (NOT USED)
                ;SR11- INHIBIT ITERATION
                ;SR10- LOOP PROGRAM  (NOT USED)
                ;SR9- LOOP ROUTINE.
                ;SR8-   RING BELL ON AN ERROR
                ;SR6 THROUGH SR0 - NUMBER OF ROUTINE TO BE LOOPED

                ;EQUATE STATEMENTS
177776                  CC=177776
177776                  PSW=177776
000004                  ERRVEC=4                ;ADDRESS OF ERROR TRAP VECTOR
000240                  NOP=240
000000                  OPEN=0
100000                  MANUAL=BIT15
100000                  LBIT17=100000
040000                  LBIT16=40000
020000                  LBIT15=20000
010000                  LBIT14=10000
004000                  LBIT13=4000
002000                  LBIT12=2000
001000                  LBIT11=1000
000400                  LBIT10=400
000200                  LBIT7=200
000100                  LBIT6=100
000040                  LBIT5=40
000020                  LBIT4=20
000010                  LBIT3=10
000004                  LBIT2=4
000002                  LBIT1=2
000001                  LBIT0=1
100000                  BIT15=100000
040000                  BIT14=40000
020000                  BIT13=20000
010000                  BIT12=10000
004000                  BIT11=4000
002000                  BIT10=2000
001000                  BIT9=1000
000400                  BIT8=400
000200                  BIT7=200
000100                  BIT6=100
000040                  BIT5=40
000020                  BIT4=20
```

```
000010                          BIT3=10
000004                          BIT2=4
000002                          BIT1=2
000001                          BIT0=1
005726                          POPSP=5726              ,POP THE STACK  SAME AS TST (6)+
022626                          POPSP2=022626           ,POP STACK TWICE  SAME AS CMP (6)+,(6)+
000340                          PRTY7=340               ;PRIORITY LEVEL DEFINITIONS
000300                          PRTY6=300
000240                          PRTY5=240
000200                          PRTY4=200
000140                          PRTY3=140
000100                          PRTY2=100
000040                          PRTY1=40
000000                          PRTY0=0
                        ;LINE NUMBERS
000000                          LINE0=0
000002                          LINE1=2
000004                          LINE2=4
000006                          LINE3=6
000010                          LINE4=10
000012                          LINE5=12
000014                          LINE6=14
000016                          LINE7=16
000020                          LINE10=20
000022                          LINE11=22
000024                          LINE12=24
000026                          LINE13=26
000030                          LINE14=30
000032                          LINE15=32
000034                          LINE16=34
000036                          LINE17=36
000000                          R0=%0
000001                          R1=%1
000002                          R2=%2
000003                          R3=%3
000004                          R4=%4
000005                          R5=%5
000006                          SP=%6
000007                          PC=%7
                        ;EMT CALLS
104000                          TYPE=EMT+0
104001                          ERROR=EMT+1
104002                          DATCHK=EMT+2
104003                          CHALT=EMT+3
104004                          EHALT=EMT+4
104005                          SRESET=EMT+5
104006                          SCOPE=EMT+6
104007                          SAVREG=EMT+7
104010                          RSTREG=EMT+10
104011                          ERROR1=EMT+11
104012                          INITIALIZE=EMT+12
104013                          SUSWR=EMT+13
104014                          KBDIN=EMT+14
104015                          CNTLU=EMT+15
104400                          DELAY=TRAP+0
000007                          BELL=007
```

```
                177777                          RTLAST=-1
                000000                          Y=0
                177777                          X=-1
                000000                          A=0
                000000                          .=0
000000  000002                                  .+2                     ;UNASSIGNED TRAP
000002  000000                                  HALT
000004  000006                  MACHER:         .+2                     ;SP OVERFLOW, BUS ERROR TRAP
000006  000000                                  HALT
000010  000012                                  .+2                     ;RESERVED INSTRUCTION TRAP
000012  000000                                  HALT
000014  000016                                  .+2                     ;TRACE TRAP
000016  000000                                  HALT
000020  000022                                  .+2                     ;TRAP TO CALL IOX
000022  000000                                  HALT
000024  000026                                  .+2                     ;POWER FAIL TRAP
000026  000000                                  HALT
000030  003100                                  EMTINT                  ;EMT TRAP
000032  000340                                  PRTY7
000034  006000                                  DLY                     ;TRAP TRAP. SIMILAR TO EMT
000036  000340                                  PRTY7
000040  000042                                  .+2
000042  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000044  000046                                  .+2
000046  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000050  000052                                  .+2
000052  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000054  000056                                  .+2
000056  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000060  000062                                  .+2
000062  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000064  000066                                  .+2
000066  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000070  000072                                  .+2
000072  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000074  000076                                  .+2
000076  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000100  000102                                  .+2
000102  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000104  000106                                  .+2
000106  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000110  000112                                  .+2
000112  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000114  000116                                  .+2
000116  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000120  000122                                  .+2
000122  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000124  000126                                  .+2
000126  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000130  000132                                  .+2
000132  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000134  000136                                  .+2
000136  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
000140  000142                                  .+2
000142  000000                                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS.
```

```
                                                    N 1
  578  000144  000146                .+2
  579  000146  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  580  000150  000152                .+2
  581  000152  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  582  000154  000156                .+2
  583  000156  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  584  000160  000162                .+2
  585  000162  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  586  000164  000166                .+2
  587  000166  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  588  000170  000172                .+2
  589  000172  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  590  000174  000176                .+2
  591  000176  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  592  000200  000202                +2
  593  000202  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  594  000204  000206                +2
  595  000206  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  596  000210  000212                .+2
  597  000212  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  598  000214  000216                +2
  599  000216  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  600  000220  000222                .+2
  601  000222  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  602  000224  000226                +2
  603  000226  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  604  000230  000232                .+2
  605  000232  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS
  606  000234  000236                .+2
  607  000236  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  608  000240  000242                .+2
  609  000242  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  610  000244  000246                .+2
  611  000246  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  612  000250  000252                .+2
  613  000252  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  614  000254  000256                .+2
  615  000256  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  616  000260  000262                .+2
  617  000262  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  618  000264  000266                .+2
  619  000266  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  620  000270  000272                .+2
  621  000272  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  622  000274  000276                .+2
  623  000276  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  624  000300  000302                .+2
  625  000302  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  626  000304  000306                .+2
  627  000306  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  628  000310  000312                .+2
  629  000312  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  630  000314  000316                .+2
  631  000316  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
  632  000320  000322                .+2
  633  000322  000000                HALT            ;TRAPPED TO PREVIOUS ADDRESS.
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634  000324  000326                +2
635  000326  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
636  000330  000332                +2
637  000332  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
638  000334  000336                +2
639  000336  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
640  000340  000342                +2
641  000342  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
642  000344  000346                +2
643  000346  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
644  000350  000352                +2
645  000352  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
646  000354  000356                +2
647  000356  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
648  000360  000362                +2
649  000362  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
650  000364  000366                +2
651  000366  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
652  000370  000372                +2
653  000372  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
654  000374  000376                +2
655  000376  000000                HALT          ;TRAPPED TO PREVIOUS ADDRESS
656
```

```
                    000046                          =46
000046  003036                          SENDAD
                    000052                          .=52
000052  060000                          60000


                    000174                          .=174
000174  000000              DISPREG:    0
000176  000000              SWREG:      0

                    000200              .=200
000200  000137  002360      JMP         @#START     ;GO TO START OF DIAGNOSTIC
000204  000137  002426      JMP         @#RSTAT1    ;GO GET PROGRAM # & RESTART PROGRAM
                                                    ;USING PREVIOUS DM11 PARAMETERS
000210  000137  002514      JMP         @#RSTAT2    ;RESTART PREVIOUS PROGRAM USING
                                                    ;PREVIOUS DM11 PARAMETERS

                    001200              .=1200                                  ;;+D
001200  000000              SPBOT:      0
001202  177570              SWR         177570
001204  175570              DISPLAY:    175570
                    001400              .=1400                                  ;;+D
001400  000000              CAT:        OPEN        ;STARTING ADDRESS OF
                    001440              .=CAT+32.   ;CURRENT ADDRESS TABLE
001440  000000              WCT:        OPEN        ;STARTING ADDRES OF
                    001500              .=WCT+32.   ;WORD COUNT TABLE
001500  000000              BAT         OPEN        ;STARTING ADDRESS OF
                    001540              .=BAT+32.   ;BIT ASSEMBLY TABLE
001540  000000              VAC.        OPEN        ;32. SPARE WORDS
001542  175000              CSR:        175000      ;ADDRESS OF CLOCK STATUS REGISTER
001544  175002              BAR:        175002      ;ADDRESS OF BUFFER ACTIVE REGISTER
001546  175004              BKCSR:      175004      ;ADDRESS OF BREAK STATUS REGISTER
001560  175006              BASREG:     175006      ;ADDRESS OF BASE REGISTER
001562  000000              CLKINT:     OPEN        ;DM11 VECTOR ADDRESS (RECEIVER)
001564  000240              CLKLVL:     PRTY5       ;PRIORITY LEVEL
001566  000000              XMTINT:     OPEN        ;DM11 VECTOR ADDRESS (TRANSMITTER)
001560  000240              XMTLVL:     PRTY5       ;TRANSMITTER PRIORITY LEVEL
001562  000000              TTDAT:      OPEN        ;TUMBLE TABLE DATA
001564  000000              LINBIT:     OPEN        ;LINE BIT (FOR BAR)
001566  000000              RCVDAT:     OPEN
001570  000000              XMTDAT:     OPEN
001572  000000              CARMSK:     OPEN
                    001600              .=VAC+32.
001600  000000              TUMTAB:     OPEN        ;STARTING ADDRESS OF
                    002000              .=TUMTAB+128. ;TUMBLE TABLE
002000  000000              KSTART:     OPEN        ;CURRENT PROGRAM START ADDRESS
002002  000000              CURTST:     OPEN        ;CONTAINS ADDR OF CURRENT TEST
002004  000000              RTNNO:      OPEN        ;CONTAINS CURRENT TEST #
002006  000000              NXTST:      OPEN        ;CONTAINS ADDR OF NEXT TEST
002010  000000              ICTR:       OPEN        ;CONTAINS CURRENT ITERATION COUNT
002012  000000              SCOPTR:     OPEN        ;CONTAINS CURRENT SCOPE POINTER
002014  000000              PRGLIM:     OPEN
002016  007076              PRGTAB:     PRG0        ;PRG0 START ADDRESS
002020  016514                          PRG1        ;PRG1 START ADDRESS
002022  016574                          PRG2        ;PRG2 START ADDRESS
```

```
  713  002024  007120                RSTART: PRGOR                   ;PRGO RESTART ADDRESS
  714  002026  016524                        PRG1R                   ;PRG1     "       "
  715  002030  016604                        PRG2R                   ;PRG2     "       "
  716  002032  003322                EMTTAB: TYP                     ;POINTER TO TYPEOUT ROUTINE
  717  002034  002146                        ERR                     ;POINTER TO ERROR ROUTINE
  718  002036  002126                        DTCHK                   ;POINTER TO DATA COMPARISON ROUTINE
  719  002040  000000                        0
  720  002042  000000                        0
  721  002044  003232                        SRSETT                  ;POINTER TO RESET ROUTINE
  722  002046  002700                        ESCOPE                  ;POINTER TO SCOPE ROUTINE
  723  002050  003132                        SAVRG                   ;POINTER TO SAVE REGISTERS ROUTINE
  724  002052  003172                        RSTRG                   ;POINTER TO RESTORE REGISTERS ROUTINE
  725  002054  002164                        ERR1                    ;POINTER TO ERROR1 ROUTINE
  726  002056  003434                        INIT                    ;POINTER TO INITIALIZE ROUTINE
  727  002060  017412                        SUSWRR
  728  002062  017472                        KBDINTT
  729  002064  017546                        CNTLUU
  730  002066  177560                TKCSR:  177560
  731  002070  177562                TKDBR:  177562
  732  002072  177564                TPCSR:  177564
  733  002074  177566                TPDBR:  177566
  734  002076  000000                COUNT:  OPEN
  735  002100  000000                PCADD:  OPEN
  736  002102  000000                APCADD: OPEN
  737  002104  000000                PRVCNT: OPEN
  738  002106  175001                .CSR:   175001
  739  002110  175003                .BAR:   175003
  740  002112  175005                 BKCSR: 175005
  741  002114  175007                 BASREG:175007
  742  002116  000000                PASS:   OPEN
```

```
                                        ;ROUTINE TO TYPE OUT INCORRECT ROUTINE SELECTED
002120  104000                          INCRTN: TYPE
002122  020017                                  M1                      ;TYPE INCORRECT ROUTINE SELECTED
002124  000207                                  RTS     %7              ;EXIT.

                                        ;DATA COMPARISON ROUTINE
002126  123737  001566  001570        DTCHK:  CMPB    RCVDAT,XMTDAT   ;COMPARE RECEIVED & TRANSMITTED DATA
002134  001403                                  BEQ     1$              ;CHARS. BRANCH IF SAME
002136  004737  002332                          JSR     7,CNVDAT        ;CONVERT RCVDAT & XMTDAT TO ASCII
002142  104011                                  ERROR1
002144  000002                          1$:     RTI                     ; EXIT.

                                        ;ERROR ROUTINE WHENEVER THE PROGAM DETECTS AN ERROR THE ERROR
                                        ;AND ERROR1 EMT INSTRUCTIONS ENTER HERE. ERROR AT ERR:,AND
                                        ;ERROR1 AT ERR1:
002146  012737  000402  002246        ERR:    MOV     #402,ERRB       ;MOV BR .+6 TO ERRB
002154  013737  002100  002102                MOV     PCADD,APCADD    ;GET PC WHERE ERROR OCCURRED
002162  000410                                BR      ERRA
002164  012737  000240  002246        ERR1:   MOV     #240,ERRB       ;MOVE NOP TO ERRB
002172  013737  002100  002102                MOV     PCADD,APCADD    ;GET PC WHERE ERROR OCCURRED
002200  004737  002332                        JSR     7,CNVDAT        ;CONVERT RCVDAT & XMIT DAT TO ASCII
002204  104014                          ERRA:   KBDIN                   ;GO CHECK FOR  G
002206  032777  020000  176766                BIT     #BIT13,@SWR     ;ERROR PRINTOUT DESIRED
002214  001017                                BNE     ERRC            ;BRANCH IF NO PRINTOUT
002216  004537  006154                        JSR     5,OACNV         ;CONVERT
002222  002102                                APCADD                  ;DATA
002224  020224                                APC                     ;TO
002226  000006                                6                       ;ASCII
002230  004537  006154                        JSR     5,OACNV         ;FOR
002234  002004                                RTNNO                   ;PRINTOUT
002236  020216                                ATNUMB
002240  000003                                3
002242  104000                                TYPE                    ;TYPE ERROR
002244  020213                                EMO                     ;MESSAGE
002246  000000                          ERRB:   OPEN                    ;NOP IF ERROR1, BR  +6 IF ERROR
002250  104000                                  TYPE                  ;TYPE ANOTHER MESSAGE
002252  017754                                  ERDAT                 ;IF ERROR 1
002254  032777  000400  176720        ERRC:   BIT     #BIT8,@SWR      ;RING BELL ON ERROR?
002262  001411                                BEQ     ERRD            ;BRANCH IF NO BELL ON ERROR
002264  105777  177602                        TSTB    @TPCSR          ;TELEPRINTER
002270  100375                                BPL     .-4             ;READY?
002272  012777  000007  177574                MOV     #BELL,@TPDBR    ;RING THE BELL
002300  105777  177566                        TSTB    @TPCSR          ;WAIT FOR THE BELL TO RING
002304  100375                                BPL     .-4
002306  023737  000042  000046        ERRD:   CMP     @#42,@#46       ;ACT11?
002314  001403                                BEQ     ERRHLT
002316  005777  176660                        TST     @SWR            ;HALT ON ERROR
002322  100001                                BPL     ERREX           ;GO TO EXIT IF NO HALT ON ERROR
002324  000000                          ERRHLT: HALT
002326  104014                          ERREX:  KBDIN                   ;CHECK FOR   G
002330  000002                                  RTI                     ;RETURN


                                        ;SUBROUTINE TO CONVERT RCVDAT AND XMTDAT TO ASCII AND PLACE
```

```
                                        ;IN MESSAGE
002332  004537  006154            CNVDAT. JSR     5,OACNV
002336  001570                            XMTDAT
002340  017766                            AASB
002342  000006                            6
002344  004537  006154                    JSR     5,OACNV
002350  001566                            RCVDAT
002352  020002                            AWAS
002354  000006                            6
002356  000207                            RTS     7               ;EXIT
```

```
                                        ;THE FIRST PART OF THE START ROUTINE CONTAINS A SHORT
                                        ;ROUTINE TO CHECK FOR MEMORY MANAGEMENT.  ALTHOUGH THIS
                                        ;DIAGNOSTIC DOES NOT USE MEMORY MANAGEMENT, ITS PRESENCE
                                        ;INDICATES THAT OVER 28K OF MEMORY MAY BE PRESENT IN WHICH
                                        ;CASE TESTS RT66 AND RT67 MAY FAIL.  IF MEM. MAN.  IS
                                        ;PRESENT THESE TESTS ARE SKIPPED BY THE PROGRAM.

002360  012706  001200          START:  MOV     #SPBOT,%6
002364  104013                          SUSWR                           ;SET IF SWITCH-LESS PROCESSOR
002366  012737  002410  000004          MOV     #1$,@#ERRVEC            ;SET UP FOR ERROR TRAP
002374  005737  172300                  TST     @#172300                ;TEST FOR KT11
002400  012737  012716  012330          MOV     #RT70,@#RT65+2          ;KT11 PRESENT, SET UP TO
                                                                        ;SKIP RT66 AND RT67
002406  000402                          BR       +6
002410  012706  001200          1$:     MOV     #SPBOT,%6               ;TRAP OCCURRED, NO KT11 PRESENT,
                                                                        ;RESET STACK
002414  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC      ;RESET ERROR TRAP


                                                                        ;OUT INTERRUPTS (SET PRIORITY LEVEL 7)
002422  004737  003464                  JSR     7,@#DMPAR                       ;GET DM11 PARAMETERS
002426  012706  001200          RSTAT1: MOV     #SPBOT,%6
002432  104012                          INITIALIZE
002434  023737  000042  000046          CMP     @#42,@#46               ;ACT11?
002442  001405                          BEQ     PRGNUM+2
002444  104000                          TYPE
002446  020011                          MO
002450  004537  004416                  JSR     5,RECD                  ;GET PRGNUM AND PUT IT
002454  000000          PRGNUM: 0                                       ;HERE
002456  043737  002014  002454          BIC     PRGLIM,PRGNUM           ;MASK OFF UNUSED BITS
002464  006337  002454                  ASL     PRGNUM                  ;SHIFT PROGRAM #
002470  012737  004576  000024          MOV     #PFAIL,24
002476  012737  000340  000026          MOV     #PRTY7,26
002504  013700  002454                  MOV     PRGNUM,%0               ;GET PROGRAM #
002510  000170  002016                  JMP     @PRGTAB(0)              ;GO START PROGRAM
002514  012737  004576  000024  RSTAT2: MOV     #PFAIL,24
002522  012737  000340  000026          MOV     #PRTY7,26
002530  012706  001200                  MOV     #SPBOT,%6
002534  104012                          INITIALIZE
002536  013700  002454                  MOV     PRGNUM,%0               ;GET PROGRAM #
002542  000170  002024                  JMP     @RSTART(0)              ;GO RESTART PROGRAM
002546  022737  000176  001202  SRSET:  CMP     #SWREG,SWR
002554  001410                          BEQ     1$
002556  023737  000042  000046          CMP     @#42,@#46               ;ACT11?
002564  001405                          BEQ     GETRDY
002566  104000                          TYPE                            ;TYPE MESSAGE TO REQUEST SWITCH
002570  020030                          MJ                              ;REGISTER SETTINGS
002572  000000                          HALT                            ;WAIT FOR OPERATOR TO SET SWITCHES
002574  000401                          BR      GETRDY
002576  104015          1$:     CNTLU                                   ;GO GET SWREG SETTINGS
002600  013737  002000  002006  GETRDY: MOV     KSTART,NXTST            ;ADDR OF 1ST ROUTINE TO NXTST
002606  012737  000006  000004  GTRDYX: MOV     #6,@#ERRVEC                     ;RESET ERROR TRAP VECTOR
002614  104012                          INITIALIZE
002616  004737  003046          GTRDYA: JSR     %7,FORWD                ;ROLL FORWARD TO "NEXT" ROUTINE.
002622  032777  001000  176352          BIT     #BIT9,@SWR              ;CHECK SELECT ROUTINE SWITCH
002630  001003                          BNE     GTRDYC                  ;BRANCH IF SELECT ROUTINE SWITCH IS SET
```

```
867  002632  000177  177144                    JMP     @CURTST         ;GO RUN CURRENT ROUTINE
868  002636  000457                            BR      SCOPED          ;NO GO. MANUAL RTN BYPASSED
869  002640  017700  176336            GTRDYC  MOV     @SWR,%0         ;(SR) TO R0
870  002644  042700  177600                    BIC     #177600,%0      ;MASK UNDESIRED BITS
871  002650  123700  002004                    CMPB    RTNNO,%0        ;COMPARE RTNNO TO (R0)
872  002654  001002                            BNE     GTRDYD          ;BRANCH IF ROUTINE NOT FOUND YET
873  002656  000177  177120                    JMP     @CURTST         ;GO RUN ROUTINE.
874  002662  022737  177777  002006  GTRDYD.  CMP     #-1,NXTST       ;NO. CHECK FOR LAST ROUTINE
875  002670  001352                            BNE     GTRDYA          ;BRANCH IF NOT LAST ROUTINE
876  002672  004737  002120                    JSR     %7,INCRTN       ;YES. INCORRECT ROUTINE SELECTED
877  002676  000740                            BR      GETRDY          ;START OVER
878
879                                      ;SCOPE SERVICE ROUTINE
880  002700  000240                    ESCOPE. NOP
881  002702  104014                            KBDIN                   ;CHECK FOR  G
882  002704  005077  176634                    CLR     @BAR            ;CLEAR ALL DM11 REGISTERS
883  002710  005077  176626                    CLR     @CSR            ;AND SET BASE REGISTER
884  002714  005077  176626                    CLR     @#KCSR          ;AT THE STARTING ADDRESS
885  002720  104012                            INITIALIZE
886  002722  013716  002012                    MOV     SCOPTR,(SP)
887  002726  032777  040000  176246            BIT     #BIT14,@SWR     ;CHECK FOR SCOPE OPTION
888  002734  001402                            BEQ     SCOPEB          ;BRANCH IF SCOPE SW NOT SET
889  002736  000176  000000            SCOPEA: JMP     @(SP)           ;RETURN TO ROUTINE
890  002742  032777  004000  176232    SCOPEB: BIT     #BIT11,@SWR     ;TEST INHIBIT ITERATION SWITCH
891  002750  001012                            BNE     SCOPED          ;BRANCH IF INHIBIT ITERATION SW SET
892  002752  023737  000042  000046            CMP     @#42,@#46       ;ACT11?
893  002760  001003                            BNE     1$              ;BR IF NO
894  002762  005737  002116                    TST     @#PASS          ;1ST PASS?
895  002766  001403                            BEQ     SCOPED          ;BR IF YES
896  002770  006337  002010            1$:     DEC     ICTR            ;DECREMENT ITERATION COUNT
897  002774  001360                            BNE     SCOPEA          ;BRANCH IF COUNT NOT 0
898  002776  032777  001000  176176    SCOPED: BIT     #BIT9,@SWR      ;CHECK SELECT ROUTINE SWITCH
899  003004  001275                            BNE     GETRDY          ;BRANCH IF SELECT RTN SW SET
900  003006  022737  177777  002006            CMP     #-1,NXTST       ;LAST TEST?
901  003014  001274                            BNE     GTRDYX          ;BRANCH IF NOT LAST TEST
902  003016  005237  002116                    INC     @#PASS
903  003022  104000                            TYPE                    ;TYPE
904  003024  020022                            M2                      ;'PRGEND'
905  003026  013700  000042                    MOV     @#42,%0         ;CHECK XXDP/ACT11 MONITOR HOOK
906  003032  001662                            BEQ     GETRDY
907  003034  000005                            RESET
908  003036  004710                    SENDAD: JSR     7,(0)           ;RETURN TO XXDP/ACT11 MONITOR
909  003040  000240                            NOP
910  003042  000240                            NOP
911  003044  000240                            NOP
912  003046  013705  002006            FORWD:  MOV     NXTST,%5        ;ADDR OF NEXT ROUTINE TO R5
913  003052  012537  002004                    MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER.
914  003056  012537  002006                    MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE
915  003062  012537  002010                    MOV     (5)+,ICTR       ;GET ITERATION COUNT.
916  003066  012537  002012                    MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER.
917  003072  010537  002002            FORWDR: MOV     %5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST
918  003076  000207                            RTS     %7              ;EXIT FORWD SUBROUTINE.
919
920
921                                      ;EMT TRAP INTERPRETER
922  003100  011646                    EMTINT. MOV     (6),-(6)        ;GET PC OF NEXT INSTRUCTION
```

```
 923  003102  162716  000002          SUB     #2,(6)          ,FORM PC OF EMT INSTRUCTION
 924  003106  011637  002100          MOV     (6),PCADD       ,GET PC OF EMT INSTRUCTION
 925  003112  017616  000000          MOV     @(6),(6)        ,GET EMT INSTRUCTION
 926  003116  105066  000001          CLRB    1(6)            ,CLEAR MSH OF EMT INSTRUCTION
 927  003122  006316                  ASL     (6)             ,SHIFT EMT IDENTIFIER
 928  003124  062716  002032          ADD     #EMTTAB,(6)
 929  003130  013607                  MOV     @(6)+,X7        ,GO TO PROPER EMT
 930
 931                                  ,SAVE REGS 0 TO 4 SUBROUTINE
 932  003132  012637  003166  SAVRG:  MOV     (6)+,SVRPC      ,SAVE PC AND PSW
 933  003136  012637  003170          MOV     (6)+,SVRPSW
 934  003142  010446                  MOV     X4,-(6)         ,SAVE REGS 0 - 4
 935  003144  010346                  MOV     X3,-(6)         ,IN STACK
 936  003146  010246                  MOV     X2,-(6)
 937  003150  010146                  MOV     X1,-(6)
 938  003152  010046                  MOV     X0,-(6)
 939  003154  013746  003170          MOV     SVRPSW,-(6)     ,RESTORE PC AND PSW
 940  003160  013746  003166          MOV     SVRPC,-(6)
 941  003164  000002                  RTI                     ,EXIT
 942  003166  000000  SVRPC:  OPEN
 943  003170  000000  SVRPSW: OPEN
 944
 945                                  ;RESTORE REGS 0 TO 4 SUBROUTINE.
 946  003172  012637  003226  RSTRG:  MOV     (6)+,RSTPC      ,SAVE PC AND PSW
 947  003176  012637  003230          MOV     (6)+,RSTPSW
 948  003202  012600                  MOV     (6)+,X0         ;RESTORE REGS 0 - 4
 949  003204  012601                  MOV     (6)+,X1         ,FROM STACK
 950  003206  012602                  MOV     (6)+,X2
 951  003210  012603                  MOV     (6)+,X3
 952  003212  012604                  MOV     (6)+,X4
 953
 954  003214  013746  003230          MOV     RSTPSW,-(6)     ,RESTORE PC AND PSW
 955  003220  013746  003226          MOV     RSTPC,-(6)
 956  003224  000002                  RTI                     ;EXIT
 957  003226  000000  RSTPC:  OPEN
 958  003230  000000  RSTPSW: OPEN
 959
 960                                  ;ROUTINE TO ISSUE RESET.
 961  003232  012700  052525  SRSETT: MOV     #52525,X0               ;DATA TO R0.
 962  003236  005100                  COM     X0              ;COMPLEMENT (R0).
 963  003240  010037  003234          MOV     X0,SRSETT+2     ;(R0) TO SRSETT+2.
 964  003244  000005                  RESET                   ;ISSUE RESET.  (R0) IS
 965  003246  000002                  RTI                     ;DISPLAYED.  EXIT.
 966
 967                                  ;RANDOM NUMBER GENERATOR.  ROUTINE EXITS WITH NUMBER IN REGISTER 0.
 968  003250  013700  003316  RNGEN:  MOV     RP1,X0
 969  003254  006100                  RO'     X0
 970  003256  006100                  ROL     X0
 971  003260  063700  003320          ADD     RP2,X0
 972  003264  010037  003316          MOV     X0,RP1
 973  003270  006100                  ROL     X0
 974  003272  006100                  ROL     X0
 975  003274  063700  003320          ADD     RP2,X0
 976  003300  006100                  ROL     X0
 977  003302  006100                  ROL     X0
 978  003304  010037  003320          MOV     X0,RP2
```

```
  979  003310  013700  003316                    MOV     RP1,%0
  980  003314  000207                            RTS     %7              ,EXIT  NUMBER IN R0
  981  003316  001233                RP1     1233
  982  003320  007622                RP2.    7622
  983                                ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER
  984  003322  011600                TYP     MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
  985  003324  062716  000002                ADD     #2,@%6          ;SET UP EXIT.
  986  003330  011000                        MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
  987  003332  112037  003432        TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
  988  003336  122737  000100  003432        CMPB    #100,TYPDAT     ;CHECK FOR"@"CHARACTER
  989  003344  001001                        BNE     TYPC            ,BRANCH IF NOT"@".
  990  003346  000002                        RTI                     ;TERMINATOR CHAR. DONE  EXIT
  991  003350  122737  000045  003432  TYPC  CMPB    #45,TYPDAT      ,CHECK FOR"%".
  992  003356  001412                        BEQ     TYPF            ,BRANCH IF"%"
  993  003360  004737  003366                JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
  994  003364  000762                        BR      TYPA
  995  003366  113777  003432  176500  TYPD  MOVB    TYPDAT,@TPDBR   ;OUTPUT CHARACTER TO PRINTER
  996  003374  105777  176472                TSTB    @TPCSR          ;WAIT FOR DONE FLAG.
  997  003400  100375                        BPL     -4
  998  003402  000207                        RTS     %7              ,EXIT
  999  003404  112737  000015  003432  TYPF  MOVB    #15,TYPDAT      ,MOVE CARRIAGE RETURN CODE TO TYPDAT
 1000  003412  004737  003366                JSR     %7,TYPD         ;GO TYPE CHAR.
 1001  003416  112737  000012  003432  TYPG. MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT
 1002  003424  004737  003366                JSR     %7,TYPD         ;GO TYPE CHAR.
 1003  003430  000740                        BR      TYPA
 1004  003432  000000                TYPDAT: OPEN
 1005
 1006
 1007                                ;SUBROUTINE TO INITIALIZE STACK POINTER AND SET PROCESSOR PRIORITY
 1008                                ,LEVEL 7
 1009  003434  012777  001400  176106  INIT.  MOV     #CAT,@BASREG    ;INITIALIZE THE BASE REGISTER
 1010  003442  012737  000340  177776          MOV     #PRTY7,PSW              ;SET PRIORITY LEVEL 7
 1011  003450  011637  001200                MOV     (SP),SPBOT      ;GET RETURN ADDRESS
 1012  003454  012706  001200                MOV     #SPBOT,SP       ;SET BOTTOM OF THE STACK
 1013  003460  000176  000000                JMP     @(SP)           ;RETURN
 1014
 1015
 1016                                ;SUBROUTINE TO GET DM11 PARAMETERS
 1017                                ;VECTOR ADDRESS
 1018  003464  023737  000042  000046  DMPAR:  CMP     @#42,@#46       ;ACT11?
 1019  003472  001060                        BNE     6$              ;BR IF NO
 1020                                ;SIZE FOR INTERRUPT VECTOR IN AUTO MODE
 1021  003474  012700  000302                MOV     #302,R0         ;SET UP FLOATING VECT AREA
 1022  003500  010060  177776        4$:     MOV     R0,-2(R0)
 1023  003504  012720  000003                MOV     #3,(R0)+
 1024  003510  006720                        TST     (R0)+
 1025  003512  022700  000776                CMP     #776,R0
 1026  003516  100370                        BPL     4$
 1027  003520  012737  003610  000014        MOV     #5$,@#14        ;SET BPT VECT
 1028  003526  012737  000340  000016        MOV     #340,@#16       ;& PSW
 1029  003534  012737  177777  001440  3$:   MOV     #-1,WCT         ;SET TO XMIT 1 CHAR
 1030  003542  012737  017102  001400        MOV     #OUTBUF,CAT
 1031  003550  012777  000105  175764        MOV     #BIT6+BIT2+BIT0,@CSR    ;SET IE
 1032  003556  005037  177776                CLR     @#PSW           ;LVL 0
 1033  003562  012777  000001  175754        MOV     #LBIT0,@BAR     ;XMIT
 1034  003570  012737  177777  002076        MOV     #-1,COUNT       ,WAIT
```

```
1035  003576  005337  002076          2$      DEC     COUNT
1036  003602  001375                          BNE     2$
1037  003604  104001                          ERROR                   ;NO INT OCCURRED
1038  003606  000752                          BR      3$              ;REPEAT IT
1039  003610  162716  000004          5$:     SUB     #4,(SP)         ;CALC INT VECT
1040  003614  011637  003650                  MOV     (SP),@#VECTOR   ;STORE IT
1041  003620  012737  000016  000014          MOV     #16,@#14        ;RESTORE BPT VECT
1042  003626  004737  004372                  JSR     7,OVRLAY        ;.+2, HALT IN VECT AREA
1043  003632  000415                          BR      VECOK
1044  003634  004737  004372          6$:     JSR     7,OVRLAY        ;PUT HALT,.+2 IN VECTOR AREA
1045  003640  104000                          TYPE                    ;ASK USER FOR RECEIVER INT  VECTOR
1046  003642  017626                          WHERE                   ;OF UNIT UNDER TEST
1047  003644  004537  004416                  JSR     5,RECD          ;GET VECTOR AND PUT IT
1048  003650  000000          VECTOR: 0                               ;HERE
1049  003652  005737  003650                  TST     VECTOR
1050  003656  001003                          BNE     VECOK
1051  003660  012737  000300  003650          MOV     #300,VECTOR     ;SET VECTOR = TO 0300
1052  003666  023727  003650  000300  VECOK:  CMP     VECTOR,#300     ;IS VECTOR HIGHER OR
1053  003674  103003                          BHIS    VECOKB          ;EQUAL TO 0300
1054  003676  104000C         VECOKA: TYPE                            ;TYPE '?'
1055  003700  020017                          M1
1056  003702  000670                          BR      DMPAR           ;ASK FOR ANOTHER VECTOR
1057  003704  023727  003650  000770  VECOKB: CMP     VECTOR,#770     ;IS VECTOR = TO OR
1058  003712  101371                          BHI     VECOKA          ;LESS THAN 770
1059  003714  032737  000007  003650          BIT     #7,VECTOR       ;LSB OF VECTOR MUST BE ALL 0'S
1060  003722  001365                          BNE     VECOKA
1061  003724  013737  003650  001552          MOV     VECTOR,CLKINT
1062  003732  062737  000004  003650          ADD     #4,VECTOR
1063  003740  013737  003650  001556          MOV     VECTOR,XMTINT
1064
1065                          ;UNIT NUMBER
1066  003746  023737  000042  000046  DMPARB: CMP     @#42,@#46       ;ACT11?
1067  003754  001405                          BEQ     UNIT+2          ;BR IF YES
1068  003756  104000                          TYPE
1069  003760  017725                          WHICH
1070  003762  004537  004416                  JSR     5,RECD          ;GET UNIT AND PUT IT
1071  003766  000000          UNIT    0                               ;HERE
1072  003770  023727  003766  000017          CMP     UNIT,#17        ;UNIT SELECTED MUST BE
1073  003776  101403                          BLOS    UNTOKA          ;BETWEEN 0 & 17
1074  004000  104000                          TYPE
1075  004002  020017                          M1
1076  004004  000760                          BR      DMPARB
1077  004006  006337  003766          UNTOKA: ASL     UNIT
1078  004012  006337  003766                  ASL     UNIT
1079  004016  006337  003766                  ASL     UNIT
1080  004022  012702  000004                  MOV     #4,X2
1081  004026  012701  001542                  MOV     #CSR,X1
1082  004032  042711  000370          UNTOKB: BIC     #370,(1)        ;FORM ADDRESSES OF
1083  004036  063721  003766                  ADD     UNIT,(1)+       ;REGISTERS OF UNIT SELECTED
1084  004042  005302                          DEC     X2
1085  004044  001372                          BNE     UNTOKB
1086
1087  004046  012702  000004                  MOV     #4,X2
1088  004052  012703  001542                  MOV     #CSR,X3
1089  004056  012701  002106                  MOV     #.CSR,X1
1090  004062  012311          UNTOKC: MOV     (3)+,(1)        ;FORM ODD BYTE ADDRESSES
```

```
1091  004064  005221                          INC     (1)+
1092  004066  005302                          DEC     %2
1093  004070  001374                          BNE     UNTOKC
1094                                  ,CHARACTER LENGTH
1095  004072  023737  000042  000046  DMPARC: CMP     @#42,@#46       ,ACT11?
1096  004100  001405                          BEQ     LENGTH+2        ,BR IF YES
1097  004102  104000                          TYPE
1098  004104  017740                          LEVEL
1099  004106  004537  004416                  JSR     5,RFCD          ,GET LENGTH AND PUT IT
1100  004112  000000                  LENGTH: 0                       ,HERE
1101  004114  005737  004112                  TST     LENGTH
1102  004120  001003                          BNE     LENOKA
1103  004122  012737  000010  004112          MOV     #8.,LENGTH
1104  004130  023727  004112  000005  LENOKA: CMP     LENGTH,#5       ,CHARACTER LENGTH SELECTED MUST
1105  004136  103003                          BHIS    LENOKC          ,BE BETWEEN 5-8
1106  004140  104000                  LENOKB: TYPE                    ,CARRIAGE RETURN SELECTS 8
1107  004142  020017                          M1
1108  004144  000752                          BR      DMPARC
1109  004146  023727  004112  000010  LENOKC: CMP     LENGTH,#8.
1110  004154  101371                          BHI     LENOKB
1111  004156  162737  000005  004112          SUB     #5,LENGTH
1112  004164  006337  004112                  ASL     LENGTH
1113  004170  013701  004112                  MOV     LENGTH,%1
1114  004174  016137  004206  001572          MOV     LENOKD(1),@#CARMSK      ,SET CHARACTER LENGTH MASK
1115  004202  000240                          NOP
1116  004204  000207                          RTS     7               ,EXIT PARAMETERS ROUTINE
1117
1118
1119                                  ,THE BELOW TABLE REPRESENTS THE CHARACTER LENGTH MASK FOR 5,6,7, AND 8
                                      ;BITS PER CHARACTER RESPECTIVELY.
1120  004206  177740                  LENOKD: 177740
1121  004210  177700                          177700
1122  004212  177600                          177600
1123  004214  177400                          177400
1124
1125                                  ,CALCULATE MACHINE TIME TO TRANSMIT ONE CHARACTER
1126  004216  005037  004366          TIMER:  CLR     TIME1
1127  004222  012737  177777  001440          MOV     #-1,WCT         ;SET UP TO TRANSMIT
1128  004230  012737  017102  001400          MOV     #OUTBUF,CAT     ;1 CHARACTER ON LINE 1
1129  004236  012777  004336  175306          MOV     #TIMEC,@CLKINT  ;LOAD RECEIVER INTERRUPT
1130  004244  012777  000340  175302          MOV     #PRTY7,@CLKLVL  ;AND PRIORITY
1131  004252  012777  000001  175264          MOV     #LBITO,@BAR     ;START TRANSMITTING
1132  004260  012777  000106  175254          MOV     #BIT6+BIT2+BIT0,@CSR    ;SET IE BIT
1133  004266  006037  177776                  CLR     @#PSW           ;SET PROCESSER PRIORITY LEVEL = 0
1134  004272  012737  000044  002076  TIMEA:  MOV     #44,COUNT
1135  004300  062737  000001  004366          ADD     #1,TIME1        ;INCREMENT MACH. TIME TO TRANSMIT
1136  004306  001007                          BNE     TIMEB
1137  004310  006077  175226                  CLR     @CSR
1138  004314  012737  000340  177776          MOV     #PRTY7,PSW      ;SET PROCESSER PRIORITY LEVEL = 7
1139  004322  104001                          ERROR                   ;TRANSMITTER FAILED TO INTERRUPT
1140  004324  000734                          BR      TIMER
1141  004326  006337  002076          TIMEB:  DEC     COUNT
1142  004332  001375                          BNE     .-4
1143  004334  000756                          BR      TIMEA
1144  004336  006077  175200          TIMEC:  CLR     @CSR
1145  004342  013737  004366  004370          MOV     TIME1,TIME14
1146  004350  006037  004370                  ROR     TIME14
```

```
1147  004354  000241                          CLC
1148  004356  006037  004370                  ROR     TIME14
1149  004362  022626                          POPSP2
1150  004364  000207                          RTS     7               ;RESTORE STACK POINTER
1151                                                                  ;EXIT TIME CALCULATION ROUTINE
1152  004366  000000                  TIME1.  OPEN                    ;CONTAINS MACHINE TIME TO XMIT 1 CHAR
1153  004370  000000                  TIME14: OPEN                    ;CONTAIN TIME TO XMIT 1/4 CHAR
1154
1155                                  ;SUBROUTINE TO PUT HALT,.+2 IN VECTOR AREA (0300-1000)
1156  004372  012702  000302          OVRLAY: MOV     #302,R2
1157  004376  010262  177776          1$:     MOV     R2,-2(R2)
1158  004402  005022                          CLR     (R2)+
1159  004404  005722                          TST     (R2)+
1160  004406  022702  000776                  CMP     #776,R2
1161  004412  100371                          BPL     1$
1162  004414  000207                          RTS     7
1163
1164
1165                                  ;SUBROUTINE TO RECEIVE DATA
1166                                  ;THIS SUBROUTINE RECEIVES DATA FROM THE KEYBOARD (UP TO SIX OCTAL
1167                                  ;DIGITS AND PLACES THEM INTO THE ADDRESS FOLLOWING THE SUBROUTINE
1168                                  ;CALL (JSR 5,RECD).  NO REGISTER CONTENTS ARE DISTURBED.
1169
1170
1171                                  ;SUBROUTINE TO INPUT DATA FROM TTY
1172
1173  004416  010046                  RECD:   MOV     R0,-(SP)
1174  004420  005015                  1$:     CLR     (5)             ;CLEAR OLD DATA
1175  004422  012737  000007  004574          MOV     #7,CNT          ;SET CHAR COUNT
1176  004430  105777  175432          2$:     TSTB    @TKCSR          ;WAIT FOR CHAR
1177  004434  100375                          BPL     2$
1178  004436  117700  175426                  MOVB    @TKDBR,R0
1179  004442  142700  000200                  BICB    #200,R0         ;STRIP OFF PARITY
1180  004446  110077  175422                  MOVB    R0,@TPDBR       ;ECHO CHARACTER
1181  004452  122700  000025                  CMPB    #25,R0          ;IS IT A  U
1182  004456  001443                          BEQ     5$              ;BRANCH IF YES
1183  004460  122700  000015                  CMPB    #15,R0          ;IS IT A <CR>
1184  004464  001415                          BEQ     6$              ;BRANCH IF YESS
1185  004466  142700  000060                  BICB    #60,R0
1186  004472  132700  000110                  BITB    #110,R0         ;CHECK FOR 0-7 (8)
1187  004476  001031                          BNE     7$              ;BRANCH IF NOT
1188  004500  006315                          ASL     (5)
1189  004502  006315                          ASL     (5)
1190  004504  006315                          ASL     (5)             ;SHIFT DATA
1191  004506  160015                          BISB    R0,(5)          ;INSET NEW CHAR
1192  004510  005337  004574                  DEC     CNT
1193  004514  001422                          BEQ     7$              ;ONLY 6 CHAR'S PLEASE
1194  004516  000744                          BR      2$              ;NEXT CHARACTER
1195  004520  105777  175346          6$:     TSTB    @TPCSR
1196  004524  100375                          BPL     6$              ;WAIT FOR READY
1197  004526  012777  000012  175340          MOV     #12,@TPDBR      ;TYPE <LF>
1198  004534  105777  175332          8$:     TSTB    @TPCSR
1199  004540  100375                          BPL     8$              ;WAIT FOR READY         ;,++D
1200  004542  005077  175326                  CLR     @TPDBR          ;LOAD CHAR
1201  004546  105777  175320          9$:     TSTB    @TPCSR
1202  004562  100375                  BPL     9$
```

```
1203  004554  005725                          TST     (R5)+                   ;ADJUST R5
1204  004556  012600                          MOV     (SP)+,R0                ;RESTORE R0
1205  004560  000205                          RTS     R5
1206  004562  104000                  7$      TYPE
1207  004564  020017                          M1
1208  004566  104000                  5$:     TYPE
1209  004570  017666                          $CTLU
1210  004572  000712                          BR      1$                      ;START OVER
1211  004574  000000                  CNT:    0
1212
1213                                  ;POWER FAIL ROUTINE
1214  004576  012737  004606  000024  PFAIL:  MOV     @PWRUP,24
1215  004604  000000                          HALT
1216
1217                                  ;POWER UP SUBROUTINE
1218  004606  000005                  PWRUP:  RESET                           ;GIVE TELEPRINTER TIME TO START
1219  004610  012706  001200                  MOV     @SPBOT,%6
1220  004614  104001                          ERROR                           ;TYPE POWER FAIL ERROR
1221  004616  000137  002514                  JMP     @#RSTAT2                ;GO RESTART PROGRAM
1222
1223                                  ;LINE TEST SUBROUTINE: THIS LINE TEST PROVIDES SEVERAL TESTS ON A DM11 LINE
1224                                  ;THE SUBROUTINE IS CALLED BY JSR 5, LNTST.  THIS INSTRUCTION PROVIDES THE
1225                                  ;LINE BIT AND LINE NUMBER.  THE FOLLOWING LINE TESTS ARE PERFORMED
1226                                  ;WAITS UNTIL CHARACTER SHOULD HAVE BEEN TRANSMITTED, THEN TESTS
1227
1228                                          ;THAT BAR BIT CLEARED           ;DO NEXT TEST IF ERROR
1229                                          ;READY SET                      ;DO NEXT TEST IF ERROR
1230                                          ;WORD COUNT WENT TO 0           ;DO NEXT TEST IF ERROR
1231                                          ;CURRENT ADDRESS DID NOT INCREMENT ;DO NEXT TEST IF ERROR
1232                                          ;INTERRUPTS TO CORRECT VECTOR   ;DO NEXT TEST IF ERROR (NO INTERRUPT)
1233                                          ;READY BIT CAN BE CLEARED       ;END OF TEST
1234  004622  012537  016730          XMTTST: MOV     (5)+,@#LINE             ;GET LINE NUMBER
1235  004626  004737  007044                  JSR     7,GTLINE                ;GO FORM LINE BIT (FOR BAR)
1236  004632  005037  001570                  CLR     XMTDAT
1237  004636  004537  006246          1$:     JSR     5,@#XMITD               ;GO TO TRANSMIT SUBROUTINE
1238  004642  177777                          -1                              ;TRANSMIT ONE CHARACTER
1239  004644  012703  000010                  MOV     #10,%3                  ;WAIT IN
1240  004650  005002                          CLR     %2                      ;THIS
1241  004652  005302                  2$:     DEC     %2                      ;LOOP
1242  004654  001376                          BNE     .-2                     ;UNTIL THE
1243  004656  005303                          DEC     %3                      ;TRANSMITTER
1244  004660  001374                          BNE     2$                      ;IS FINISHED
1245  004662  017737  174656  001566          MOV     @#BAR,RCVDAT            ;BAR SHOULD NOW BE CLEAR
1246  004670  001401                          BEQ     3$                      ;BRANCH IF IT IS
1247  004672  104011                          ERROR1                          ;ERROR! BAR BIT FAILED TO CLEAR
1248  004674  005777  174642          3$:     TST     @#CSR                   ;TEST READY BIT SHOULD BE SET
1249  004700  100401                          BMI     4$                      ;BRANCH IF SET
1250  004702  104001                          ERROR                           ;ERROR! READY NOT SET
1251  004704  013701  016730          4$:     MOV     @#LINE,%1               ;GET LINE NUMBER
1252  004710  016137  001440  001566          MOV     WCT(1),RCVDAT           ;WORD COUNT SHOULD BE 0
1253  004716  001401                          BEQ     5$
1254  004720  104011                          ERROR1                          ;ERROR! WORD COUNT NOT EQUAL TO 0
1255  004722  012737  017102  001570  5$:     MOV     #OUTBUF,XMTDAT ;
1256  004730  016137  001400  001566          MOV     CAT(1),RCVDAT           ;CURRENT ADDRESS SHOULD NOT HAVE INCREMENTED
1257  004736  023737  001566  001570          CMP     RCVDAT,XMTDAT           ;
1258  004744  001401                          BEQ     6$
```

```
 1259   00 746  104011
 1260   004750  012777  005002  174600  6$:     ERROR1                  ;ERROR! CURRENT ADDR. DID NOT INCREMENT
 1261   004756  052777  010000  174556          MOV     #7$,@XMTINT     ;LOAD TRANSMITTER INTERRUPT VECTOR
 1262   004764  005037  177776                  BIS     #BIT12,@CSR     ;ENABLE TRANSMITTER INTERRUPT
 1263   004770  000240                          CLR     @#PSW           ;SET PROCESSOR PRIORITY =0
 1264   004772  012737  000340  177776          NOP
 1265   005000  104001                          MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
 1266                                           ERROR                   ;TRANSMITTER FAILED TO INTERRUPT OR
                                        ;INTERRUPTED TO WRONG LOCATION AND HALTED WITH ADDRESS +2 DISPLAYED
 1267   005002  022626                  7$:     CMP     (6)+,(6)+       ;RESET STACK PTR
 1268   005004  012737  000340  177776          MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
 1269   005012  042777  110000  174522          BIC     #BIT12+BIT15,@CSR       ;CLEAR XMIT IE & READY BITS
 1270   005020  005777  174516                  TST     @CSR            ;TEST THAT READY CLEARED
 1271   005024  100001                          BPL     8$              ;GO TO EXIT
 1272   005026  104001                          ERROR                   ;ERROR! READY FAILED TO CLEAR
 1273   005030  005726                  8$:     TST     (6)+            ;RESET STACK PTR
 1274   005032  104006                          SCOPE                   ;SCOPE
```

```
1275
1276
1277                                    ;RECEIVER LINE TESTS
1278                                    ;THE RECEIVER LINE TEST SUBROUTINE IS ENTERED WITH
1279                                    ;A JSR 5, RCVTST INSTRUCTION FOLLOWED BY THE
1280                                    ;LINE BIT AND LINE NUMBER OF THE LINE TO BE
1281                                    ;TESTED.  THE SUBROUTINE PERFORMS THE FOLLOWING
1282                                    ;TEST AS SHOWN BELOW  IN THE EVENT OF AN ERROR
1283                                    ;THE REMAINING TESTS ARE ABORTED
1284                                    ;TEST SEQUENCE AND ADDRESS TAG
1285                                    ;
1286                                    ;       CHARACTER DONE SETS                          RTSTA
1287                                    ;       CHARACTER DONE CAUSES INTERRUPT              RTSTB
1288                                    ;       CHARACTER DONE CAN BE CLEARED                RTSTC
1289                                    ;       TUMBLE TABLE ENTRY IS CORRECT                RTSTD
1290                                    ;       NO ENTRY IN NEXT TABLE ADDRESS               RTSTE
1291                                    ;       HARDWARE TABLE POINTER INCREMENTED           RTSTF
1292                                    ;       NEXT ENTRY WAS CORRECT                       RTSTG
1293
1294                                    ;NOTES: IF THE HARDWARE PROVIDES AN INCORRECT VECTOR
1295                                    ;       ADDRESS THE PROGRAM WILL HALT AND DISPLAY
1296                                    ;       THE INCORRECT VECTOR+2 IN THE ADDRESS LIGHTS.
1297
1298  005034  012737  177777  017102  RCVTST: MOV     #-1,OUTBUF      ;LOAD ALL 1'S INTO OUTPUT BUFFER
1299  005042  005037  001600           CLR     TUMTAB          ;CLEAR THE FIRST
1300  005046  005037  001602           CLR     TUMTAB+2        ;TWO TUMBLE TABLE ADDRESSES
1301  005052  012737  000340  177776   MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
1302  005060  012537  016730           MOV     (5)+,LINE       ;GET LINE NUMBER
1303  005064  004537  006246           JSR     5,@#XMITD       ;TRANSMIT 1 CHARACTER (0'S)
1304  005070  177777                   -1                      ;ON LINE SPECIFIED BY JSR
1305  005072  052777  000001  174442   BIS     #BIT0,@CSR      ;SET GO BIT
1306  005100  005777  174436           TST     @CSR            ;WAIT FOR TRANSMITTER
1307  005104  100375                   BPL     .-4             ;TO TRANSMIT 1 CHAR.
1308  005106  042777  100000  174426   BIC     #BIT15,@CSR     ;CLEAR TRANSMITTER READY FLAG
1309  005114  005046                   CLR     -(SP)           ;SET WATCH DOG TIMER
1310  005116  105777  174420     1$:   TSTB    @CSR            ;TEST CHAR. DONE FLAG
1311  005122  100404                   BMI     2$              ;BRANCH IF SET
1312  005124  005216                   INC     (SP)            ;WAIT FOR THE FLAG
1313  005126  001373                   BNE     1$
1314  005130  104001                   ERROR                   ;ERROR! CHAR. DONE FLAG FAILED TO SET
1315  005132  000660                   BR      8$              ;GO TO EXIT
1316  005134  005726           2$:     TST     (SP)+           ;RESTORE STACK PTR
1317  005136  012777  005172  174406   MOV     #3$,@CLKINT     ;LOAD RECEIVER INTERRUPT VEC. ADRS.
1318  005144  052777  000100  174370   BIS     #BIT6,@CSR      ;SET RECEIVER IE BIT
1319  005152  005037  177776           CLR     @#PSW           ;ENABLE INTERRUPTS
1320  005156  000240                   NOP
1321  005160  012737  000340  177776   MOV     #PRTY7,PSW      ;LOCK OUT INTERRUPTS
1322  005166  104001                   ERROR                   ;RECEIVER FAILED TO INTERRUPT
1323  005170  000631                   BR      8$              ;GO TO EXIT
1324  005172  012737  000340  177776   MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
1325  005200  022626           3$:     CMP     (6)+,(6)+
1326  005202  042777  000300  174332   BIC     #BIT7+BIT6,@CSR ;CLEAR CHAR. DONE FLAG
1327  005210  105777  174326           TSTB    @CSR            ;TEST THAT CHAR DONE FLAG CLEARED
1328  005214  100002                   BPL     4$              ;BRANCH IF CHAR. DONE FLAG CLEARED
1329  005216  104001                   ERROR                   ;ERROR! CHAR. DONE FAILED TO CLEAR
1330  005220  000515                   BR      8$              ;GO TO EXIT
```

```
1331  005222  013737  001600  001566  4$:     MOV     TUMTAB,RCVDAT   ;GET TUMBLE TABLE ENTRY
1332  005230  042737  020000  001566          BIC     #BIT13,RCVDAT   ;CLEAR PARITY INDICATOR
1333  005236  012737  000377  001570          MOV     #377,XMTDAT     ;LOAD XMTDAT WITH  TRANSMITTED DATA
1334  005244  043737  001572  001570          BIC     CARMSK,XMTDAT   ;CLEAR NON TRANSMITTED BITS
1335  005252  153737  016730  001571          BISB    LINE,XMTDAT+1   ;LOAD XMTDAT WITH PROPER LINE #
1336  005260  052737  100000  001570          BIS     #BIT15,XMTDAT   ;SET VALID DATA ENTRY BIT IN XMTDAT
1337  005266  023737  001566  001570          CMP     RCVDAT,XMTDAT   ;COMPARE TUMBLE TABLE ENTRY (RCVDAT) &
1338                                                                  ;CORRECT RESULT (XMTDAT)
1339
1340  005274  001402                          BEQ     5$
1341  005276  104011                          ERROR1                  ;ERROR! INCORRECT TUMBLE TABLE
1342  005300  000465                          BR      8$              ;ENTRY; GO TO EXIT
1343  005302  005037  001600          5$:     CLR     TUMTAB
1344  005306  013737  001602  001566          MOV     TUMTAB+2,RCVDAT ;GET NEXT ENTRY
1345  005314  001404                          BEQ     6$              ;BRANCH IF ALL 0'S
1346  005316  005037  001570                  CLR     XMTDAT
1347  005322  104011                          ERROR1                  ;ERROR! FALSE ENTRY IN NEXT
1348  005324  000453                          BR      8$              ;TUMBLE TABLE ADDRESS
1349  005326  004537  006246          6$:     JSR     5,@#XMITD       ;TRANSMIT 1 CHARACTER (ALL 1'S)
1350  005332  177777                          -1                      ;ON LINE SPECIFIED BY JSR
1351  005334  005777  174202                  TST     @CSR            ;WAIT FOR TRANSMITTER
1352  005340  100375                          BPL     .-4             ;READY FLAG
1353  005342  105777  174174                  TSTB    @CSR            ;TEST FOR THE DONE FLAG
1354  005346  100375                          BPL     .-4
1355  005350  042777  000200  174164          BIC     #BIT7,@CSR      ;CLEAR CHAR. DONE FLAG
1356  005356  013737  001600  001566          MOV     TUMTAB,RCVDAT   ;TEST THAT HARDWARE TUMBLE
1357  005364  001404                          BEQ     7$              ;TABLE POINTER INCREMENTED (+2)
1358  005366  005037  001570                  CLR     XMTDAT
1359  005372  104011                          ERROR1                  ;ERROR! TUMBLE TABLE POINTER DID
1360  005374  000427                          BR      8$              ;NOT INCREMENT; GO TO EXIT
1361  005376  013737  001602  001566  7$:     MOV     TUMTAB+2,RCVDAT ;GET TUMBLE TABLE ENTRY
1362  005404  042737  020000  001566          BIC     #BIT13,RCVDAT   ;CLEAR PARITY INDICATOR
1363  005412  012737  000377  001570          MOV     #377,XMTDAT     ;LOAD XMTDAT WITH TRANSMITTED DATA
1364  005420  043737  001572  001570          BIC     CARMSK,XMTDAT   ;CLEAR NON-TRANSMITTED BITS
1365  005426  153737  016730  001571          BISB    LINE,XMTDAT+1   ;LOAD LINE # INTO XMTDAT
1366  005434  052737  100000  001570          BIS     #BIT15,XMTDAT   ;SET VALID DATA ENTRY BIT INTO XMTDAT
1367  005442  023737  001566  001570          CMP     RCVDAT,XMTDAT   ;COMPARE TUMBLE TABLE ENTRY (RCVDAT) &
1368                                                                  ;CORRECT RESULT (XMTDAT)
1369  005450  001401                          BEQ     8$
1370  005452  104011                          ERROR1                  ;ERROR! 2ND TUMBLE TABLE ENTRY
1371  005454  104006                  8$:     SCOPE                   ;WAS INCORRECT; SCOPE
1372
1373
1374                                  ;SUBROUTINE TO TEST BREAK OPERATION
1375                                  ;THE TRANSMITTER WILL TRANSMIT THE BREAK FOR TWO CHARACTER
1376                                  ;TIMES AND THEN THE FOLLOWING TESTS WILL BE PERFORMED
1377                                  ;       A VALID DATA ENTRY WAS MADE     BKTSTB
1378                                  ;       BREAK BIT SET                   BKTSTC
1379                                  ;       DATA WAS ALL 0'S                        BKTSTD
1380  005456  012777  000001  174056  BRKTST: MOV     #1,@CSR         ;SET THE GO BIT
1381  005464  011577  174056                  MOV     (5),@#KCSR      ;SET THE BREAK BIT
1382  005470  105777  174046                  TSTB    @CSR            ;WAIT FOR THE RECEIVER TO
1383  005474  100375                          BPL     .-4             ;RECEIVE BREAK
1384  005476  042777  000200  174036          BIC     #BIT7,@CSR      ;CLEAR FLAG
1385  005504  105777  174032                  TSTB    @CSR            ;WAIT FOR THE RECEIVER TO
1386  005510  100375                          BPL     .-4             ;TO RECEIVE BREAK
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1387  005512  042777  000200  174022          BIC     #BIT7,@CSR      ;CLEAR FLAG
1388  005520  005077  174022                  CLR     @#KCSR          ;CLEAR BREAK BIT
1389  005524  005737  001600          1$:     TST     TUMTAB          ;TEST FOR VALID DATA ENTRY
1390  005530  100402                          BMI     2$
1391  005532  104001                          ERROR                   ;ERROR! NO VALID DATA ENTRY
1392  005534  000421                          BR      4$              ;GO TO EXIT
1393  005536  032737  040000  001600  2$:     BIT     #BIT14,TUMTAB   ;TEST THAT BREAK BIT IS SET
1394  005544  001002                          BNE     3$              ;IN TUMBLE TABLE
1395  005546  104001                          ERROR                   ;ERROR! BREAK BIT FAILED TO SET
1396  005550  000413                          BR      4$              ;GO TO EXIT
1397  005552  105737  001600          3$      TSTB    TUMTAB          ;TEST THAT DATA IS ALL 0'S
1398  005556  001410                          BEQ     4$
1399  005560  005037  001566                  CLR     RCVDAT
1400  005564  113737  001600  001566          MOVB    TUMTAB,RCVDAT   ;GET RECEIVED DATA
1401  005572  005037  001570                  CLR     XMTDAT
1402  005576  104011                          ERROR1                  ;ERROR! DATA WAS NOT ALL 0'S
1403  005600  104006                  4$      SCOPE                   ;SCOPE
1404
1405
1406                                  ;SUBROUTINE TO TRANSMIT & RECEIVE ON ALL LINES THE DELAY BETWEEN
1407                                  ;TRANSMITTING ON A LINE IS SUPPLIED BY THE CALLING JSR INSTRUCTION
1408                                  ;NOTE NO DATA CHECKING IS PERFORMED BY THIS TEST
1409  005602  012537  002076  DLYXMT: MOV     (5)+,@#COUNT    ;GET CHARACTER DELAY COUNT
1410  005606  005037  001570          CLR     XMTDAT
1411  005612  004537  006224          JSR     5,BMOVE         ;LOAD OUTPUT BUFFER WITH DATA
1412  005616  020233                  MSG1                    ;TO BE TRANSMITTED
1413  005620  017102                  OUTBUF
1414  005622  000100                  64.
1415  005624  012737  000001  001564          MOV     #LBIT0,@#LINBIT
1416  005632  005037  016730                  CLR     @#LINE
1417  005636  012777  000001  173676  1$:     MOV     #BIT0,@CSR      ;SET THE GO BIT
1418  005644  004537  006246          2$:     JSR     5,@#XMITD       ;TRANSMIT 64. CHAR.
1419  005650  177700                          -64.                    ;ON A LINE
1420  005652  013737  004366  005666          MOV     @#TIME1,4$
1421  005660  013704  002076                  MOV     @#COUNT,X4      ;GET CHARACTER DELAY COUNT
1422  005664  104400                  3$:     DELAY
1423  005666  000000                  4$:     0
1424  005670  005304                          DEC     X4
1425  005672  001374                          BNE     3$
1426  005674  062737  000002  016730          ADD     #2,LINE         ;FORM NEXT LINE NUMBER
1427  005702  006337  001564                  ASL     LINBIT          ;SHIFT LINE BIT
1428  005706  103356                          BCC     2$              ;BRANCH IF ALL LINES NOT DONE
1429  005710  012704  000100                  MOV     #64.,X4
1430  005714  013737  004366  005724          MOV     TIME1,6$
1431  005722  104400                  5$:     DELAY
1432  005724  000000                  6$:     0
1433  005726  005304                          DEC     X4
1434  005730  001374                          BNE     5$
1435  005732  017737  173606  001566          MOV     @BAR,RCVDAT     ;GET & TEST BAR DATA
1436  005740  001402                          BEQ     7$              ;EXIT IF DONE
1437  005742  104011                          ERROR1                  ;ERROR! BAR SHOULD'VE BEEN CLEAR
1438  005744  000413                          BR      8$
1439  005746  022777  100201  173566  7$:     CMP     #100201,@CSR    ;TEST THAT ONLY DONE,GO,& READY BITS ARE SET
1440  005754  001407                          BEQ     8$
1441  005756  012737  100201  001570          MOV     #100201,XMTDAT
1442  005764  017737  173552  001566          MOV     @CSR,RCVDAT     ;GET CSR CONTENTS
```

```
1443  005772  104011                          8$:     ERROR1                  ;INCORRECT CSR CONTENTS
1444  005774  005726                                  POPSP                   ;RESET THE STACK
1445  005776  104006                                  SCOPE                   ;SCOPE
1446
1447                                          ;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
1448  006000  011637  006050                 DLY     MOV     (6),3$          ;GET DELAY COUNT ADDRESS
1449  006004  062716  000002                         ADD     #2,(6)          ;SET UP EXIT ADDRESS
1450  006010  017737  000034  006050                 MOV     @3$,3$          ;GET DELAY COUNT
1451  006016  001413                                 BEQ     2$              ;EXIT IF NO DELAY
1452  006020  012737  000050  006052  1$      MOV     #50,4$
1453  006026  162737  000001  006050                 SUB     #1,3$
1454  006034  001404                                 BEQ     2$
1455  006036  005337  006052                         DEC     4$
1456  006042  001375                                 BNE     -4
1457  006044  000765                                 BR      1$
1458  006046  000002                          2$      RTI                     ;EXIT
1459  006050  000000                          3$      OPEN                    ;CONTAINS DELAY COUNT
1460  006052  000000                          4$      OPEN                    ;CONTAINS DELAY ROUTINE CONSTANT
1461
1462                                          ;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
1463  006054  012737  177777  006076          INBIN:  MOV     #-1,RIND        ;SET ALL VARIABLES
1464  006062  004537  006224                         JSR     %5,BMOVE        ;TO MINUS 1.
1465  006066  006076                                 RIND
1466  006070  006077                                 RIND+1
1467  006072  000005                                 5
1468  006074  000207                                 RTS     %7              ;EXIT
1469  006076  000000                          RIND:  OPEN
1470  006100  000000                          PTO:   OPEN
1471  006102  000000                          PT1:   OPEN
1472
1473                                          ;SPECIAL BINARY COUNT PATTERN SUBROUTINE. EXITS WITH BIN CHAR IN R1
1474  006104  013737  006100  006102          GTBIN:  MOV     PTO,PT1         ;PREVIOUS BIN CHAR TO PT1
1475  006112  005137  006102                          COM     PT1
1476  006116  005137  006076                          COM     RIND
1477  006122  001002                                  BNE     .+6
1478  006124  005237  006102                          INC     PT1
1479  006130  042737  177400  006102                  BIC     #177400,PT1     ;MASK TO 8 BITS
1480  006136  013737  006102  006100                  MOV     PT1,PTO         ;SAVE BIN CHAR IN PTO
1481  006144  013701  006102                          MOV     PT1,%1          ;BIN CHAR TO R1
1482  006150  000240                                  NOP
1483  006152  000207                                  RTS     %7              ;EXIT
1484
1485                                          ;OCTAL TO ASCII CONVERT ROUTINE
1486  006154  104007                          OACNV:  SAVREG                  ;SAVE REGISTERS ON THE STACK
1487  006156  013504                                  MOV     @(5)+,%4        ;GET OCTAL VALUE.
1488  006160  012501                                  MOV     (5)+,%1         ;GET DESTINATION ADDR
1489  006162  012502                                  MOV     (5)+,%2         ;GET CONVERT COUNT.
1490  006164  060201                                  ADD     %2,%1           ;DEVELOP ADDR TO STORE 1ST CHAR
1491  006166  010403                          OACNVA: MOV     %4,%3
1492  006170  042703  177770                          BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT DIGIT
1493  006174  062703  000060                          ADD     #60,%3          ;CONVERT DIGIT TO ASCII.
1494  006200  110341                                  MOVB    %3,-(1)         ;STORE ASCII CHARACTER.
1495  006202  042704  000007                          BIC     #7,%4
1496  006206  006004                                  ROR     %4
1497  006210  006004                                  ROR     %4
1498  006212  006004                                  ROR     %4
```

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1499  006214  005302                          DEC     %2              ;DONE ALL DIGITS?
1500  006216  001363                          BNE     OACNVA          ;BRANCH IF NOT DONE.
1501  006220  104010                          RSTREG                  ;RESTORE THE REGISTERS
1502  006222  000205                          RTS     %5              ;DONE.  EXIT.
1503
1504                                  ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
1505  006224  104307                  BMOVE:  SAVREG                  ;SAVE REGS.
1506  006226  012501                          MOV     (5)+,%1         ;GET"FROM"ADDRESS
1507  006230  012502                          MOV     (5)+,%2         ;GET"TO"ADDRESS
1508  006232  012503                          MOV     (5)+,%3         ;GET COUNT
1509  006234  112122                  1$:     MOVB    (1)+,(2)+       ;MOVE BYTE
1510  006236  005303                          DEC     %3              ;DECREMENT COUNT
1511  006240  001375                          BNE     1$              ;BRANCH IF NOT DONE
1512  006242  104010                          RSTREG                  ;RESTORE REGS.
1513  006244  000205                          RTS     %5              ;DONE EXIT
1514
1515
1516                                  ;SUBROUTINE TO TRANSMIT DATA.  SUBROUTINE CALLED BY
1517  006246  010046                  ;JSR 5,XMITD
1518  006250  013700  016730          XMITD:  MOV     %0,-(SP)        ;SAVE R0 ON THE STACK
1519  006254  004737  007044                  MOV     @#LINE,%0       ;GET LINE
1520  006260  012777  001400  173262          JSR     7,@#GTLINB      ;FORM LINE BIT (FOR BAR)
1521  006266  012760  017102  001400          MOV     #CAT,@#BASREG   ;INITIALIZE BASE REGISTER
1522  006274  012560  001440                  MOV     #OUTBUF,CAT(0)  ;LOAD FIRST CHAR ADDRESS IN CAT
1523  006300  053777  001564  173236          MOV     (5)+,WCT(0)     ;GET WORD COUNT
1524  006306  012600                          BIS     @#LINBIT,@#BAR  ;LOAD LINE POSITION INTO BAR
1525  006310  000205                          MOV     (SP)+,%0        ;RESTORE R0
1526                                          RTS     5               ;EXIT
1527
1528                                  ;ROUTINE TO TEST A LINE
1529                                  ;THE LINE TO BE TESTED IS PROVIDED BY THE JSR CALL TO THE ROUTINE
1530  006312  012537  016730          ;100. CHARACTERS ARE TRANSMITTED,RECEIVED AND CHECKED BY THIS ROUTINE
1531  006316  012737  000144  002076  DATTST: MOV     (5)+,@#LINE     ;GET LINE NUMBER
1532  006324  012702  017102          DATIAA: MOV     #100.,COUNT     ;GET CHARACTER COUNT
1533  006330  004737  006104                  MOV     #OUTBUF,%2      ;GET ADDRESS OF OUTPUT BUFFER
1534  006334  110122                  1$:     JSR     7,@#GTBIN       ;GET DATA
1535  006336  005337  002076                  MOVB    %1,(2)+         ;LOAD OUTPUT BUFFER WITH DATA
1536  006342  001372                          DEC     COUNT           ;GOT ALL DATA?
1537  006344  012701  001600                  BNE     1$
1538  006350  005037  001600                  MOV     #TUMTAB,%1      ;LOAD TUMBLE TABLE POINTER
1539  006354  004537  006224                  CLR     TUMTAB
1540  006360  001600                          JSR     5,BMOVE         ;CLEAR
1541  006362  001601                          TUMTAB                  ;TUMBLE
1542  006364  000177                          TUMTAB+1                ;TABLE
1543  006366  012702  017246                  177                     ;64 WORDS
1544  006372  062777  000001  173142          MOV     #INBUF,%2       ;SETUP INPUT BUFFER POINTER
1545  006400  004537  006246                  BIS     #BIT0,@#CSR     ;SET THE GO BIT
1546  006404  177634                          JSR     5,@#XMITD       ;TRANSMIT
1547  006406  032777  160000  173126  2$:     -100.                   ;100. CHARACTERS
1548  006414  001004                          BIT     #BIT15+BIT14+BIT13,@#CSR;TEST IF READY OR ANY ERROR
1549  006416  105777  173120                  BNE     3$              ;FLAGS ARE SET
1550  006422  100371                          TSTB    @#CSR           ;WAIT FOR THE RECEIVER
1551  006424  000415                          BPL     2$              ;TO RECEIVE A CHARACTER
1552  006426  032777  060000  173106  3$:     BR      5$
1553  006434  001403                          BIT     #BIT14+BIT13,@#CSR;TEST FOR ERROR FLAGS
1554  006436  104001                          BEQ     4$              ;BRANCH NO ERROR
                                              ERROR
```

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1555  006440  000137  006760                    JMP     15$                 ;GO EXIT
1556  006444  042777  100000  173070  4$        BIC     #BIT15,@CSR         ;CLEAR TRANSMITTER READY FLAG
1557  006452  105777  173064                    TSTB    @CSR                ;TEST FOR CHARACTER READY
1558  006456  100375                            BPL     -4
1559  006460  042777  000200  173054  5$        BIC     #BIT7,@CSR          ;CLEAR CHAR DONE BIT
1560  006466  005711                            TST     (1)
1561  006470  100401                            BMI     +4                  ;TEST FOR VALID ENTRY
1562  006472  104001                            ERROR                       ;REPORT INVALID ENTRY
1563  006474  111122                            MOVB    (1),(2)+            ;MOVE CHAR FROM TUM. TAB  TO INPUT BUFFER
1564
1565                                    ;ROUTINE TO STORE RECEIVED PARITY BIT IN PARITY BIT BUFFER
1566  006476  012705  000001                    MOV     #1,%5               ;GET ROTATE COUNT
1567  006502  000261                            SEC                         ;SET THE CARRY BIT
1568  006504  032711  020000                    BIT     #BIT13,(1)          ;TEST RECEIVED PARITY BIT
1569  006510  001001                            BNE     6$                  ;BRANCH IF RECEIVED PARITY WAS ODD
1570  006512  000241                            CLC                         ;CLEAR CARRY BIT
1571  006514  004537  006764          6$        JSR     5,RORPARBUF         ;ROTATE RECEIVED PARITY INTO PARITY BUFFER
1572
1573                                    ;ROUTINE TO TEST THAT ENTRY IS FOR THE CORRECT LINE
1574  006520  011137  001562                    MOV     (1),@#TTDAT         ;GET TABLE ENTRY
1575  006524  042737  160777  001562            BIC     #160777,TTDAT       ;CLEAR ALL BUT LINE NUMBER
1576  006532  123737  016730  001563            CMPB    LINE,TTDAT+1        ;COMPARE LINE NUMBERS
1577  006540  001410                            BEQ     7$
1578  006542  013737  016730  001570            MOV     LINE,XMTDAT         ;GET CORRECT LINE # (X2)
1579  006550  013737  001562  001566            MOV     TTDAT,RCVDAT        ;GET LINE # (X2) THAT FALSE DATA CAME IN ON
1580  006556  104011                            ERROR1                      ;ERROR! DATA CAME IN ON A LINE THAT
1581                                                                        ;PROGRAM WAS NOT TRANSMITTING ON
1582  006560  000477                            BR      15$                 ;EXIT TEST
1583  006562  020127  001776          7$        CMP     %1,#TUMTAB+176      ;IS POINTER AT THE END
1584  006566  001002                            BNE     8$                  ;OF THE TABLE
1585  006570  012701  001576                    MOV     #TUMTAB-2,%1
1586  006574  005721                  8$        TST     (1)+                ;INCREMENT POINTER
1587  006576  010046                            MOV     %0,-(6)             ;SAVE REGISTER ZERO
1588  006600  013700  016730                    MOV     LINE,%0             ;FETCH LINE NUMBER
1589  006604  005760  001440                    TST     WCT(0)              ;HAS THE LAST CHARACTER BEEN TRANSMITTED
1590  006610  001402                            BEQ     .+6                 ;LAST CHARACTER HAS BEEN TRANSMITTED
1591  006612  012600                            MOV     (6)+,%0             ;RESTORE REGISTER ZERO
1592  006614  000674                            BR      2$                  ;GO WAIT FOR NEXT CHARACTER
1593  006616  012600                            MOV     (6)+,%0             ;RESTORE REGISTER ZERO
1594  006620  012701  017102          9$        MOV     #OUTBUF,%1
1595  006624  012702  017246                    MOV     #INBUF,%2
1596  006630  012706  000014                    MOV     #12.,%6             ;ROTATE PARITY BUFFER
1597  006634  004537  006764                    JSR     5,RORPARBUF         ;12. PLACES RIGHT
1598  006640  005037  001566          10$       CLR     RCVDAT
1599  006644  005037  001570                    CLR     XMTDAT
1600  006650  020127  017245                    CMP     %1,#OUTBUF+99       ;HAVE ALL CHARS  BEEN COMPARED
1601  006654  001441                            BEQ     15$
1602  006656  112137  001570                    MOVB    (1)+,XMTDAT         ;GET TRANSMITTED CHARACTER
1603  006662  043737  001572  001570           BIC     CARMSK,XMTDAT       ;CLEAR NON-TRANSMITTED BITS
1604  006670  111237  001566                    MOVB    (2),RCVDAT          ;GET RECEIVED CHARACTER
1605  006674  104002                            DATCHK                      ;COMPARE TRANS. & RCVD  CHARS
1606
1607                                    ;ROUTINE TO COMPUTE AND CHECK PARITY ON RECEIVED DATA
1608  006676  012703  000010          11$:      MOV     #8.,%3              ;GET BIT COUNTER
1609  006702  005000                            CLR     %0                  ;CLEAR COMPUTED PARITY INDICATOR
1610  006704  106037  001566          12$:      RORB    RCVDAT              ;LOOK AT RECEIVED BIT
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1611  006710  103001                  BCC     13$             ;BRANCH IF A 0
1612  006712  005100                  COM     %0              ;COMPLEMENT R0 IF A 1
1613  006714  005303          13$     DEC     %3              ;DECREMENT BIT COUNTER
1614  006716  001372                  BNE     12$             ;LOOK AT NEXT BIT IF NOT DONE
1615  006720  000240                  NOP                     ;IF COMPUTED PARITY WAS ODD R0 WILL
1616                                  ;CONTAIN ALL 1'S, IF EVEN R0 = 0
1617  006722  112237  001566          MOVB    (2)+,RCVDAT     ;GET RECEIVED CHARACTER
1618  006726  012705  000001          MOV     #1,%5           ;ROTATE PARITY BUFFER 1 PLACE
1619  006732  004537  006764          JSR     5,RORPARBUF     ;RIGHT LEAVING RECEIVED PARITY BIT IN CARRY
1620  006736  103004                  BCC     14$             ;BRANCH IF RECEIVED PARITY WAS EVEN
1621  006740  005700                  TST     %0              ;TEST FOR COMPUTED ODD PARITY
1622  006742  001336                  BNE     10$             ;BRANCH IF COMPUTED & RECEIVED WAS ODD
1623  006744  104001                  ERROR                   ;ERROR! COMPUTED =EVEN,RECEIVED = ODD
1624  006746  000734                  BR      10$             ;CONTINUE TEST
1625  006750  005700          14$     TST     %0              ;TEST FOR EVEN COMPUTED PARITY
1626  006752  001732                  BEQ     10$             ;BRANCH IF COMPUTED PARITY WAS EVEN
1627  006754  104001                  ERROR                   ;ERROR! COMPUTED =ODD,RECEIVED = EVEN
1628  006756  000730                  BR      10$             ;CONTINUE TEST
1629  006760  005726          15$     POPSP                   ;REPOSITION STACK POINTER
1630  006762  104006                  SCOPE                   ;SCOPE
1631
1632                                  ;ROUTINE TO ROTATE PARITY BUFFER.
1633  006764  006037  007026  RORPARBUF: ROR   PAR0
1634  006770  006037  007030          ROR     PAR1
1635  006774  006037  007032          ROR     PAR2
1636  007000  006037  007034          ROR     PAR3
1637  007004  006037  007036          ROR     PAR4
1638  007010  006037  007040          ROR     PAR5
1639  007014  006037  007042          ROR     PAR6
1640  007020  005316                  DEC     (SP)            ;DECREMENT ROTATE COUNT
1641  007022  001360                  BNE     RORPARBUF
1642  007024  000205                  RTS     5
1643                                  ;PARITY BUFFER
1644  007026  000000          PAR0:   OPEN
1645  007030  000000          PAR1:   OPEN
1646  007032  000000          PAR2:   OPEN
1647  007034  000000          PAR3:   OPEN
1648  007036  000000          PAR4:   OPEN
1649  007040  000000          PAR5:   OPEN
1650  007042  000000          PAR6:   OPEN
1651
1652                                  ;SUBROUTINE TO FORM LINE BIT POSITION WITH THE LINE # IN LINE
1653  007044  010046          GTLINB. MOV     %0,-(SP)        ;SAVE R0 ON THE STACK
1654  007046  005037  001564          CLR     @#LINBIT        ;CLEAR LINE BIT
1655  007052  013700  016730          MOV     @#LINE,%0       ;GET LINE
1656  007056  000261                  SEC                     ;SET CARRY
1657  007060  006137  001564  1$:     ROL     LINBIT          ;SHIFT LINE BIT
1658  007064  162700  000002          SUB     #2,%0           ;SUBTRACT 2 FROM LINE NUMBER
1659  007070  100373                  BPL     1$              ;BRANCH IF GREATER THAN 0
1660  007072  012600                  MOV     (SP)+,%0        ;RESTORE R0
1661  007074  000207                  RTS     7               ;EXIT SUBROUTINE
1662
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1663
1664  007076  104000                    PRGO:   TYPE
1665  007100  020103                            PRGOM
1666  007102  012737  007136  002000            MOV     #RTO,KSTART     ;GET ADDRESS OF FIRST TEST
1667  007110  005037  002004                    CLR     RTNNO           ;CLEAR ROUTINE #
1668  007114  000137  002546                    JMP     SRSET
1669  007120  012737  007136  002000  PRGOR:   MOV     #RTO,KSTART     ;GET ADDRESS OF FIRST TEST
1670  007126  005037  002004                    CLR     RTNNO           ;CLEAR ROUTINE NUMBER
1671  007132  000137  002600                    JMP     GETRDY          ;GO AND START PROGRAM
1672                                    ;*****************************************************************************
1673  007136  000000                    RTO.    0                       ;ROUTINE # 0                              *
1674  007140  007200                            RT1                     ;ADDR OF NEXT ROUTINE                     *
1675  007142  000144                            100.                    ;ITERATION COUNT                          *
1676  007144  007146                            RTOA                    ;SCOPE ENTRY POINT                        *
1677          000000                            X=X+1
1678                                    ;*****************************************************************************
1679
1680                                    ;TEST ABILITY TO REFERENCE CSR WITHOUT TRAPPING
1681  007146  012737  007170  000004    RTOA:   MOV     #1$,@#ERRVEC    ;SET UP ERROR TRAP
1682  007154  005777  172362                    TST     @CSR            ;REFERENCE CSR
1683  007160  012737  000006  000004            MOV     #ERRVEC+2,@#ERRVEC      ;RESET TIME OUT TRAP
1684  007166  104006                            SCOPE
1685  007170  162716  000004            1$:     SUB     #4,(6)          ;RESTORE PC TO WHERE THE ILLEGAL
1686                                            ;REFERENCE OCCURED
1687  007174  104001                            ERROR                   ;ERROR! ILLEGAL REFERENCE OCCURED
1688  007176  000002                            RTI                     ;LOOP ILLEGAL REFERENCE INSTRUCTION
1689                                    ;*****************************************************************************
1690  007200  000001                    RT1     1                       ;ROUTINE # 1                              *
1691  007202  007252                            RT2                     ;ADDR OF NEXT ROUTINE.                    *
1692  007204  000144                            100.                    ;ITERATION COUNT                          *
1693  007206  007210                            RT1A                    ;SCOPE ENTRY POINT.                       *
1694          000001                            X=X+1
1695                                    ;*****************************************************************************
1696
1697                                    ;TEST THAT CSR BIT0 CAN BE SET AND CLEARED
1698  007210  012777  000001  172324    RT1A:   MOV     #BIT0,@CSR      ;SET BIT0.
1699  007216  022777  000001  172316            CMP     #BIT0,@CSR      ;TEST THAT BIT0 IS SET
1700  007224  001402                            BEQ     1$              ;BRANCH IF SET
1701  007226  104001                            ERROR                   ;CSR BIT0 FAILED TO SET
1702  007230  000407                            BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1703  007232  042777  000001  172302    1$:     BIC     #BIT0,@CSR      ;CLEAR BIT0
1704  007240  005777  172276                    TST     @CSR            ;TEST THAT BIT0 IS CLEAR
1705  007244  001401                            BEQ     2$
1706  007246  104001                            ERROR                   ;CSR BIT0 FAILED TO CLEAR
1707  007250  104006                    2$:     SCOPE
1708                                    ;*****************************************************************************
1709  007252  000002                    RT2:    2                       ;ROUTINE # 2                              *
1710  007254  007324                            RT3                     ;ADDR OF NEXT ROUTINE.                    *
1711  007256  000144                            100.                    ;ITERATION COUNT                          *
1712  007260  007262                            RT2A                    ;SCOPE ENTRY POINT.                       *
1713          000002                            X=X+1
1714                                    ;*****************************************************************************
1715
1716                                    ;TEST THAT CSR BIT1 CAN BE SET AND CLEARED
1717  007262  012777  000002  172252    RT2A:   MOV     #BIT1,@CSR      ;SET BIT1.
1718  007270  022777  000002  172244            CMP     #BIT1,@CSR      ;TEST THAT BIT1 IS SET
```

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1719  007276  001402                        BEQ     1$              ;BRANCH IF SET
1720  007300  104001                        ERROR                   ;CSR BIT1 FAILED TO SET
1721  007302  000407                        BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1722  007304  042777  000002  172230  1$    BIC     #BIT1,@CSR      ;CLEAR BIT1
1723  007312  005777  172224                TST     @CSR            ;TEST THAT BIT1 IS CLEAR
1724  007316  001401                        BEQ     2$
1725  007320  104001                        ERROR                   ;CSR BIT1 FAILED TO CLEAR
1726  007322  104006                2$:     SCOPE
1727                                        ;*****************************************************************************
1728  007324  000003                RT3:    3                       ;ROUTINE # 3                                    *
1729  007326  007376                        RT4                     ;ADDR OF NEXT ROUTINE                           *
1730  007330  000144                        100.                    ;ITERATION COUNT                                *
1731  007332  007334                        RT3A                    ;SCOPE ENTRY POINT.                             *
1732          000003                        X=X+1
1733                                        ;*****************************************************************************
1734
1735                                        ;TEST THAT CSR BIT2 CAN BE SET AND CLEARED
1736  007334  012777  000004  172200  RT3A: MOV     #BIT2,@CSR      ;SET BIT2.
1737  007342  022777  000004  172172        CMP     #BIT2,@CSR      ;TEST THAT BIT2 IS SET
1738  007350  001402                        BEQ     1$              ;BRANCH IF SET
1739  007352  104001                        ERROR                   ;CSR BIT2 FAILED TO SET
1740  007354  000407                        BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1741  007356  042777  000004  172156  1$:   BIC     #BIT2,@CSR      ;CLEAR BIT2
1742  007364  005777  172152                TST     @CSR            ;TEST THAT BIT2 IS CLEAR
1743  007370  001401                        BEQ     2$
1744  007372  104001                        ERROR                   ;CSR BIT2 FAILED TO CLEAR
1745  007374  104006                2$:     SCOPE
1746                                        ;*****************************************************************************
1747  007376  000004                RT4:    4                       ;ROUTINE # 4                                    *
1748  007400  007450                        RT5                     ;ADDR OF NEXT ROUTINE                           *
1749  007402  000144                        100.                    ;ITERATION COUNT                                *
1750  007404  007406                        RT4A                    ;SCOPE ENTRY POINT.                             *
1751          000004                        X=X+1
1752                                        ;*****************************************************************************
1753
1754                                        ;TEST THAT CSR BIT4 CAN BE SET AND CLEARED
1755  007406  012777  000020  172126  RT4A: MOV     #BIT4,@CSR      ;SET BIT4.
1756  007414  022777  000020  172120        CMP     #BIT4,@CSR      ;TEST THAT BIT4 IS SET
1757  007422  001402                        BEQ     1$              ;BRANCH IF SET
1758  007424  104001                        ERROR                   ;CSR BIT4 FAILED TO SET
1759  007426  000407                        BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1760  007430  042777  000020  172104  1$.   BIC     #BIT4,@CSR      ;CLEAR BIT4
1761  007436  005777  172100                TST     @CSR            ;TEST THAT BIT4 IS CLEAR
1762  007442  001401                        BEQ     2$
1763  007444  104001                        ERROR                   ;CSR BIT4 FAILED TO CLEAR
1764  007446  104006                2$:     SCOPE
1765                                        ;*****************************************************************************
1766  007450  000005                RT5:    5                       ;ROUTINE # 5                                    *
1767  007452  007522                        RT6                     ;ADDR OF NEXT ROUTINE.                          *
1768  007454  000144                        100.                    ;ITERATION COUNT                                *
1769  007456  007460                        RT5A                    ;SCOPE ENTRY POINT.                             *
1770          000005                        X=X+1
1771                                        ;*****************************************************************************
1772
1773                                        ;TEST THAT CSR BIT5 CAN BE SET AND CLEARED
1774  007460  012777  000040  172054  RT5A: MOV     #BIT5,@CSR      ;SET BIT5.
```

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1775  007466  022777  000040  172046          CMP     #BIT5,@CSR      ;TEST THAT BIT5 IS SET
1776  007474  001402                          BEQ     1$              ;BRANCH IF SET
1777  007476  104001                          ERROR                   ;CSR BIT5 FAILED TO SET
1778  007500  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1779  007502  042777  000040  172032  1$:     BIC     #BIT5,@CSR      ;CLEAR BIT5
1780  007510  005777  172026                  TST     @CSR            ;TEST THAT BIT5 IS CLEAR
1781  007514  001401                          BEQ     2$
1782  007516  104001                          ERROR                   ;CSR BIT5 FAILED TO CLEAR
1783  007520  104006                  2$:     SCOPE
1784                                  ;*****************************************************************************
1785  007522  000006                  RT6:    6                       ;ROUTINE # 6                                 *
1786  007524  007574                          RT7                     ;ADDR OF NEXT ROUTINE                        *
1787  007526  000144                          100.                    ;ITERATION COUNT                             *
1788  007530  007532                          RT6A                    ;SCOPE ENTRY POINT.                          *
1789           000006                         X=X+1
1790                                  ;*****************************************************************************
1791
1792                                  ;TEST THAT CSR BIT6 CAN BE SET AND CLEARED
1793  007532  012777  000100  172002  RT6A:   MOV     #BIT6,@CSR      ;SET BIT6.
1794  007540  022777  000100  171774          CMP     #BIT6,@CSR      ;TEST THAT BIT6 IS SET
1795  007546  001402                          BEQ     1$              ;BRANCH IF SET
1796  007550  104001                          ERROR                   ;CSR BIT6 FAILED TO SET
1797  007552  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1798  007554  042777  000100  171760  1$:     BIC     #BIT6,@CSR      ;CLEAR BIT6
1799  007562  005777  171754                  TST     @CSR            ;TEST THAT BIT6 IS CLEAR
1800  007566  001401                          BEQ     2$
1801  007570  104001                          ERROR                   ;CSR BIT6 FAILED TO CLEAR
1802  007572  104006                  2$:     SCOPE
1803                                  ;*****************************************************************************
1804  007574  000007                  RT7:    7                       ;ROUTINE # 7                                 *
1805  007576  007646                          RT10                    ;ADDR OF NEXT ROUTINE                        *
1806  007600  000144                          100.                    ;ITERATION COUNT                             *
1807  007602  007604                          RT7A                    ;SCOPE ENTRY POINT.                          *
1808           000007                         X=X+1
1809                                  ;*****************************************************************************
1810
1811                                  ;TEST THAT CSR BIT12 CAN BE SET AND CLEARED
1812  007604  012777  010000  171730  RT7A:   MOV     #BIT12,@CSR     ;SET BIT12.
1813  007612  022777  010000  171722          CMP     #BIT12,@CSR     ;TEST THAT BIT12 IS SET
1814  007620  001402                          BEQ     1$              ;BRANCH IF SET
1815  007622  104001                          ERROR                   ;CSR BIT12 FAILED TO SET
1816  007624  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1817  007626  042777  010000  171706  1$:     BIC     #BIT12,@CSR     ;CLEAR BIT12
1818  007634  005777  171702                  TST     @CSR            ;TEST THAT BIT12 IS CLEAR
1819  007640  001401                          BEQ     2$
1820  007642  104001                          ERROR                   ;CSR BIT12 FAILED TO CLEAR
1821  007644  104006                  2$:     SCOPE
1822                                  ;*****************************************************************************
1823  007646  000010                  RT10:   10                      ;ROUTINE # 10                                *
1824  007650  007720                          RT11                    ;ADDR OF NEXT ROUTINE.                       *
1825  007652  000144                          100.                    ;ITERATION COUNT                             *
1826  007654  007656                          RT10A                   ;SCOPE ENTRY POINT.                          *
1827           000010                         X=X+1
1828                                  ;*****************************************************************************
1829
1830                                  ;TEST THAT CSR BIT13 CAN BE SET AND CLEARED
```

```
1831  007656  012777  020000  171656  RT10A:  MOV     #BIT13,@CSR     ;SET BIT13.
1832  007664  022777  020000  171650          CMP     #BIT13,@CSR     ;TEST THAT BIT13 IS SET
1833  007672  001402                          BEQ     1$              ;BRANCH IF SET
1834  007674  104001                          ERROR                   ;CSR BIT13 FAILED TO SET
1835  007676  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
1836  007700  042777  020000  171634  1$:     BIC     #BIT13,@CSR     ;CLEAR BIT13
1837  007706  005777  171630                  TST     @CSR            ;TEST THAT BIT13 IS CLEAR
1838  007712  001401                          BEQ     2$
1839  007714  104001                          ERROR                   ;CSR BIT13 FAILED TO CLEAR
1840  007716  104006                  2$:     SCOPE
1841                                  ;*****************************************************************************
1842  007720  000011                  RT11:   11                      ;ROUTINE # 11                              *
1843  007722  010010                          RT12                    ;ADDR OF NEXT ROUTINE                      *
1844  007724  000144                          100.                    ;ITERATION COUNT                           *
1845  007726  007730                          RT11A                   ;SCOPE ENTRY POINT                         *
1846          000011                          X=X+1
1847                                  ;*****************************************************************************
1848
1849                                  ;TEST THAT RESET & CLEAR INSTRUCTION CLEAR ALL R/W BITS IN THE CONTROL
1850                                  ; STATUS REG. (CSR)
1851  007730  012777  030167  171604  RT11A:  MOV     #30167,@CSR     ;SET ALL R/W BITS IN THE CSR
1852  007736  005037  001570                  CLR     XMTDAT
1853  007742  104005                          SRESET                  ;ISSUE RESET
1854  007744  017737  171572  001566          MOV     @CSR,RCVDAT     ;GET CSR CONTENTS
1855  007752  001402                          BEQ     1$              ;BRANCH IF RESET CLEARED ALL BITS
1856  007754  104011                          ERROR1                  ;ERROR! RESET DID NOT CLEAR ALL BITS
1857  007756  000764                          BR      RT11A           ;LOOP ON ERROR
1858  007760  012777  030167  171554  1$:     MOV     #30167,@CSR     ;SET ALL R/W BITS IN CSR
1859  007766  005077  171550                  CLR     @CSR            ;CLEAR THE CSR
1860  007772  017737  171544  001566          MOV     @CSR,RCVDAT     ;GET & TEST CSR
1861  010000  001402                          BEQ     2$              ;GO TO EXIT IF RESULT = 0
1862  010002  104011                          ERROR1                  ;ERROR! CLEAR INST. DID NOT CLEAR ALL BITS
1863  010004  000765                          BR      1$              ;LOOP ERROR
1864  010006  104006                  2$:     SCOPE                   ;SCOPE
1865                                  ;*****************************************************************************
1866  010010  000012                  RT12:   12                      ;ROUTINE # 12                              *
1867  010012  010144                          RT13                    ;ADDR OF NEXT ROUTINE.                     *
1868  010014  000012                          10.                     ;ITERATION COUNT                           *
1869  010016  010020                          RT12A                   ;SCOPE ENTRY POINT.                        *
1870          000012                          X=X+1
1871                                  ;*****************************************************************************
1872
1873
1874                                  ;TEST THAT A BINARY COUNT CAN BE LOADED INTO A CLEAR BKCSR AND THAT
1875  010020  005037  001570          ;A BINARY COUNT CAN BE CLEARED.
1876  010024  013777  001570  171514  RT12A:  CLR     XMTDAT
1877  010032  017737  171510  001566  1$:     MOV     XMTDAT,@BKCSR   ;LOAD BINARY COUNT INTO BKCSR
1878  010040  023737  001570  001566          MOV     @BKCSR,RCVDAT   ;GET BKCSR DATA
1879  010046  001405                          CMP     XMTDAT,RCVDAT   ;COMPARE DATA LOADED & DATA READ BACK
1880  010050  104011                          BEQ     2$              ;BRANCH IF DATA COMPARES
1881  010052  032777  040000  171122          ERROR1                  ;ERROR! DATA DOD NIT COMPARE
1882  010060  001361                          BIT     #BIT14,@SWR     ;SCOPE LOOP?
1883  010062  013701  001570                  BNE     1$              ;BRANCH IF SCOPE LOOP
1884  010066  005037  001570          2$:     MOV     XMTDAT,X1       ;SAVE BINARY COUNT
1885  010072  005077  171450                  CLR     XMTDAT
1886  010076  017737  171444  001566  3$:     CLR     @BKCSR          ;CLEAR BKCSR AND TEST
                                              MOV     @BKCSR,RCVDAT   ;BKCSR CAN BE CLEARED
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1887  010104  001405                          BEQ     4$              ;BRANCH IF BKCSR CLEARED
1888  010106  104011                          ERROR1                  ;ERROR! BKCSR DID NOT CLEAR
1889  010110  032777  040000  171064          BIT     #BIT14,@SWR     ;SCOPE LOOP?
1890  010116  001365                          BNE     3$              ;BRANCH IF SCOPE LOOP
1891  010120  010137  001570          4$:     MOV     %1,XMTDAT       ;GET BINARY COUNT
1892  010124  023727  001570  177777          CMP     XMTDAT,#-1      ;ALL NUMBERS BEEN LOADED
1893  010132  001403                          BEQ     5$              ;GO TO EXIT
1894  010134  005237  001570                  INC     XMTDAT          ;INCREMENT BINARY COUNT
1895  010140  000731                          BR      1$              ;REPEAT TEST
1896  010142  104006                  5$:     SCOPE                   ;SCOPE
1897                                  ;*****************************************************************************
1898  010144  000013                  RT13:   13                      ;ROUTINE # 13                              *
1899  010146  010256                          RT14                    ;ADDR OF NEXT ROUTINE.                     *
1900  010150  000144                          100.                    ;ITERATION COUNT                           *
1901  010152  010154                          RT13A                   ;SCOPE ENTRY POINT.                        *
1902           000013                         X=X+1
1903                                  ;*****************************************************************************
1904
1905                                  ;TEST THAT RANDOM NUMBERS CAN BE LOADED INTO THE BKCSR
1906  010154  012702  010000          RT13A:  MOV     #10000,%2       ;GET RANDOM #COUNTER
1907  010160  017737  171362  002104  1$:     MOV     @#BKCSR,PRVCNT  ;GET PREVIOUS CONTENTS
1908  010166  004737  003250                  JSR     7,@#RNGEN       ;GO GET A RANDOM NUMBER
1909  010172  010037  001570                  MOV     %0,XMTDAT       ;GET RANDOM NUMBER
1910  010176  013777  001570  171342  2$:     MOV     XMTDAT,@#BKCSR  ;LOAD RANDOM NUMBER INTO BKCSR
1911  010204  017737  171336  001566          MOV     @#BKCSR,RCVDAT  ;GET BKCSR DATA
1912  010212  023737  001570  001566          CMP     XMTDAT,RCVDAT   ;COMPARE DATA
1913  010220  001401                          BEQ     3$              ;BRANCH IF SAME
1914  010222  104011                          ERROR1                  ;ERROR! DATA NOT THE SAME
1915  010224  032777  040000  170750  3$:     BIT     #BIT14,@SWR     ;SCOPE LOOP?
1916  010232  001406                          BEQ     4$              ;BRANCH IF NO LOOP ON ERROR
1917  010234  006077  171306                  CLR     @#BKCSR         ;
1918  010240  013777  002104  171300          MOV     PRVCNT,@#BKCSR  ;LOAD PREVIOUS CONTENTS
1919  010246  000753                          BR      2$              ;REPEAT TEST
1920  010250  005302                  4$:     DEC     %2
1921  010252  001342                          BNE     1$              ;BRANCH IF NOT
1922  010254  104006                  5$:     SCOPE                   ;SCOPE
1923                                  ;*****************************************************************************
1924  010256  000014                  RT14:   14                      ;ROUTINE # 14                              *
1925  010260  010316                          RT15                    ;ADDR OF NEXT ROUTINE.                     *
1926  010262  000012                          10.                     ;ITERATION COUNT                           *
1927  010264  010266                          RT14A                   ;SCOPE ENTRY POINT.                        *
1928           000014                         X=X+1
1929                                  ;*****************************************************************************
1930
1931                                  ;TEST THAT RESET CLEARS ALL BREAK STATUS REGISTER BITS
1932
1933  010266  012777  177777  171252  RT14A:  MOV     #-1,@#BKCSR
1934  010274  005037  001570                  CLR     XMTDAT
1935  010300  104005                          SRESET
1936  010302  017737  171240  001566          MOV     @#BKCSR,RCVDAT
1937  010310  001401                          BEQ     1$
1938  010312  104011                          ERROR1
1939  010314  104006                  1$:     SCOPE
1940                                  ;*****************************************************************************
1941  010316  000015                  RT15:   15                      ;ROUTINE # 15                              *
1942  010320  010452                          RT16                    ;ADDR OF NEXT ROUTINE                      *
```

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1943  010322  000012                          10.                     ;ITERATION COUNT                        *
1944  010324  010326                          RT15A                   ;SCOPE ENTRY POINT.                     *
1945          000015                          X=X+1
1946                                  ;*****************************************************************************
1947
1948                                  ;TEST THAT A BINARY COUNT CAN BE LOADED INTO A CLEAR BASREG AND THAT
1949                                  ;A BINARY COUNT CAN BE CLEARED.
1950  010326  005037  001570          RT15A:  CLR     XMTDAT
1951  010332  013777  001570  171210  1$:     MOV     XMTDAT,@BASREG  ;LOAD BINARY COUNT INTO BASREG
1952  010340  017737  171204  001566          MOV     @BASREG,RCVDAT  ;GET BASREG DATA
1953  010346  023737  001570  001566          CMP     XMTDAT,RCVDAT   ;COMPARE DATA
1954  010354  001405                          BEQ     2$              ;BRANCH IF DATA COMPARES
1955  010356  104011                          ERROR1                  ;ERROR! DATA DID NOT COMPARE
1956  010360  032777  040000  170614          BIT     #BIT14,@SWR     ;SCOPE LOOP?
1957  010366  001361                          BNE     1$              ;BRANCH IF SCOPE LOOP
1958  010370  013701  001570          2$      MOV     XMTDAT,R1       ;SAVE BINARY COUNT
1959  010374  005037  001570                  CLR     XMTDAT
1960  010400  005077  171144          3$:     CLR     @BASREG
1961  010404  017737  171140  001566          MOV     @BASREG,RCVDAT
1962  010412  001405                          BEQ     4$              ;BRANCH IF BKCSR CLEARED
1963  010414  104011                          ERROR1                  ;ERROR! BKCSR DID NOT CLEAR
1964  010416  032777  040000  170556          BIT     #BIT14,@SWR     ;SCOPE LOOP?
1965  010424  001365                          BNE     3$              ;BRANCH IF SCOPE LOOP
1966  010426  010137  001570          4$.     MOV     R1,XMTDAT       ;GET BINARY COUNT
1967  010432  023727  001570  177000          CMP     XMTDAT,#177000  ;ALL NUMBERS BEEN LOADED
1968  010440  001403                          BEQ     5$              ;GO TO EXIT
1969  010442  105237  001571                  INCB    XMTDAT+1        ;INCREMENT BINARY COUNT
1970  010446  000731                          BR      1$              ;REPEAT TEST
1971  010450  104006                  5$:     SCOPE                   ;SCOPE
1972                                  ;*****************************************************************************
1973  010452  000016                  RT16:   16                      ;ROUTINE # 16                           *
1974  010454  010570                          RT17                    ;ADDR OF NEXT ROUTINE.                  *
1975  010456  000144                          100.                    ;ITERATION COUNT                        *
1976  010460  010462                          RT16A                   ;SCOPE ENTRY POINT                      *
1977          000016                          X=X+1
1978                                  ;*****************************************************************************
1979
1980                                  ;TEST THAT RANDOM NUMBERS CAN BE LOADED INTO THE BASE REGISTER
1981  010462  012702  010000          RT16A:  MOV     #10000,R2       ;GET RANDOM #COUNTER
1982  010466  017737  171056  002104  1$:     MOV     @BASREG,PRVCNT  ;GET PREVIOUS CONTENTS
1983  010474  004737  003250                  JSR     7,@#RNGEN       ;GO GET A RANDOM NUMBER
1984  010500  042700  000377                  BIC     #000377,R0      ;CLEAR UNUSED BITS
1985  010504  010037  001570                  MOV     R0,XMTDAT       ;GET RANDOM NUMBER
1986  010510  013777  001570  171032  2$:     MOV     XMTDAT,@BASREG  ;LOAD RANDOM NUMBER INTO BASREG
1987  010516  017737  171026  001566          MOV     @BASREG,RCVDAT  ;GET BASREG DATA
1988  010524  023737  001570  001566          CMP     XMTDAT,RCVDAT   ;COMPARE DATA
1989  010532  001401                          BEQ     3$              ;BRANCH IF SAME
1990  010534  104011                          ERROR1                  ;ERROR! DATA NOT THE SAME
1991  010536  032777  040000  170436  3$:     BIT     #BIT14,@SWR     ;SCOPE LOOP?
1992  010544  001406                          BEQ     4$              ;BRANCH IF NO LOOP ON ERROR
1993  010546  005077  170776                  CLR     @BASREG
1994  010552  013777  002104  170770          MOV     PRVCNT,@BASREG  ;LOAD PREVIOUS CONTENTS
1995  010560  000753                          BR      2$              ;REPEAT TEST
1996  010562  005302                  4$:     DEC     R2              ;10000 NUMBERS BEEN TESTED
1997  010564  001340                          BNE     1$              ;BRANCH IF NOT
1998  010566  104006                  5$:     SCOPE                   ;SCOPE
```

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1999
2000  010570  000017                  ;*****************************************************************************
2001  010572  010662                  RT17:   17                      ;ROUTINE # 17                              *
2002  010574  000144                          RT20                    ;ADDR OF NEXT ROUTINE                      *
2003  010576  010600                          100.                    ;ITERATION COUNT                           *
2004          000017                          RT17A                   ;SCOPE ENTRY POINT.                        *
2005                                          X=X+1                   ;*****************************************************************************
2006
2007                                  ;TEST THAT ALL BAR BITS CAN BE INDIVIDUALLY SET AND CLEARED
2008  010600  013701  001544          RT17A:  MOV     BAR,X1          ;GET BAR ADDRESS
2009  010604  012777  001400  170736          MOV     #CAT,@BASREG    ;INITIALIZE BASE REGISTER
2010  010612  012700  000001                  MOV     #1,X0           ;GET BIT TESTER
2011  010616  050011          1$      BIS     X0,(1)          ;SET BAR BIT
2012  010620  020011                  CMP     X0,(1)          ;TEST THAT ONLY THE PROPER BAR BIT SET
2013  010622  001006                  BNE     3$              ;BRANCH IF ERROR
2014  010624  040011                  BIC     X0,(1)          ;CLEAR BAR BIT
2015  010626  005711                  TST     (1)             ;TEST THAT BAR BIT CLEARED
2016  010630  001011                  BNE     5$              ;BRANCH IF BAR BIT FAILED TO CLEAR
2017  010632  006300                  ASL     X0              ;SHIFT BIT TESTER
2018  010634  103370                  BCC     1$
2019  010636  104006          2$.     SCOPE                   ;SCOPE
2020  010640  010037  001570  3$:     MOV     X0,XMTDAT       ;GET WHAT DATA WAS SUPPOSED TO BE
2021  010644  011137  001566  4$:     MOV     (1),RCVDAT      ;GET WHAT DATA WAS
2022  010660  104011                  ERROR1                  ;ERROR! IMPROPER BIT OPERATION
2023  010662  000771                  BR      2$              ;GO TO SCOPE
2024  010664  005037  001570  5$:     CLR     XMTDAT          ;GET WHAT DATA WAS SUPPOSED TO BE
2025  010660  000771                  BR      4$
2026                                  ;*****************************************************************************
2027  010662  000020                  RT20:   20                      ;ROUTINE # 20                              *
2028  010664  010750                          RT21                    ;ADDR OF NEXT ROUTINE.                     *
2029  010666  000012                          10.                     ;ITERATION COUNT                           *
2030  010670  010672                          RT20A                   ;SCOPE ENTRY POINT.                        *
2031          000020                          X=X+1                   ;*****************************************************************************
2032
2033
2034                                  ;TEST THAT RESET CLEARS ALL BAR BITS
2035  010672  005037  001570          RT20A:  CLR     XMTDAT
2036  010676  052777  177777  170640          BIS     #-1,@BAR        ;SET ALL BAR BITS
2037  010704  104005                  SRESET                  ;RESET
2038  010706  017737  170632  001566          MOV     @BAR,RCVDAT     ;GET BAR DATA
2039  010714  001402                  BEQ     1$              ;BRANCH IF ALL 0'S
2040  010716  104011                  ERROR1                  ;ERROR! RESET DID NOT CLEAR ALL BAR BITS
2041  010720  000412                  BR      2$              ;GO TO EXIT
2042  010722  052777  177777  170614  1$:     BIS     #-1,@BAR        ;SET ALL BIT IN THE BAR
2043  010730  005077  170610                  CLR     @BAR            ;CLEAR ALL BITS IN THE BAR
2044  010734  017737  170604  001566          MOV     @BAR,RCVDAT     ;GET & TEST RESULT OF CLEAR OPERATION
2045  010742  001401                  BEQ     2$              ;EXIT IF ALL BITS CLEARED
2046  010744  104011                  ERROR1                  ;ERROR! ALL BITS DID NOT CLEAR
2047  010746  104006          2$:     SCOPE                   ;SCOPE
2048                                  ;*****************************************************************************
2049  010750  000021                  RT21:   21                      ;ROUTINE # 21                              *
2050  010752  011056                          RT22                    ;ADDR OF NEXT ROUTINE.                     *
2051  010754  000144                          100.                    ;ITERATION COUNT                           *
2052  010756  010760                          RT21A                   ;SCOPE ENTRY POINT.                        *
2053          000021                          X=X+1                   ;*****************************************************************************
2054
```

```
2055
2056                                                ;TEST THAT CSR RESPONDS PROPERLY TO BYTE COMMANDS
2057  010760  012777  010100  170554  RT21A:  MOV     #10100,@CSR     ;LOAD TEST NUMBER IN CSR
2058  010766  105077  170550           CLRB    @CSR            ;CLEAR EVEN BYTE
2059  010772  022777  010000  170542   CMP     #10000,@CSR     ;TEST THAT ONLY EVEN BYTE CLEARED
2060  011000  001410                   BEQ     1$
2061  011002  012737  010100  001570   MOV     #10100,XMTDAT   ;LOAD CORRECT RESULT
2062  011010  017737  170526  001566   MOV     @CSR,RCVDAT     ;GET ACTUAL RESULT
2063  011016  104011                   ERROR1                  ;ERROR! EVEN BYTE INSTRUCTION FAILED
2064  011020  000415                   BR      2$              ;GO TO SCOPE
2065  011022  012777  010100  170512  1$.     MOV     #10100,@CSR     ;LOAD TEST NUMBER IN CSR
2066  011030  105077  171052           CLRB    @.CSR           ;TEST THAT ONLY ODD BYTE CLEARED
2067  011034  001407                   BEQ     2$
2068  011036  012737  000100  001570   MOV     #00100,XMTDAT   ;LOAD CORRECT RESULT
2069  011044  017737  170472  001566   MOV     @CSR,RCVDAT     ;LOAD ACTUAL RESULT
2070  011052  104011                   ERROR1                  ;ERROR! ODD BYTE INSTRUCTION FAILED
2071  011054  104006           2$:     SCOPE                   ;SCOPE
2072                                   ;*****************************************************************************
2073  011056  000022           RT22:   22                      ;ROUTINE # 22                                      *
2074  011060  011164                   RT23                    ;ADDR OF NEXT ROUTINE                              *
2075  011062  000144                   100.                    ;ITERATION COUNT                                   *
2076  011064  011066                   RT22A                   ;SCOPE ENTRY POINT.                                *
2077           000022                   X=X+1
2078                                   ;*****************************************************************************
2079
2080                                   ;TEST THAT BAR RESPONDS PROPERLY TO BYTE COMMANDS
2081  011066  012777  010100  170450  RT22A:  MOV     #10100,@BAR     ;LOAD TEST NUMBER IN BAR
2082  011074  105077  170444           CLRB    @BAR            ;CLEAR EVEN BYTE
2083  011100  022777  010000  170436   CMP     #10000,@BAR     ;TEST THAT ONLY EVEN BYTE CLEARED
2084  011106  001410                   BEQ     1$
2085  011110  012737  010100  001570   MOV     #10100,XMTDAT   ;LOAD CORRECT RESULT
2086  011116  017737  170422  001566   MOV     @BAR,RCVDAT     ;GET ACTUAL RESULT
2087  011124  104011                   ERROR1                  ;ERROR! EVEN BYTE INSTRUCTION FAILED
2088  011126  000415                   BR      2$              ;GO TO SCOPE
2089  011130  012777  010100  170406  1$:     MOV     #10100,@BAR     ;LOAD TEST NUMBER IN BAR
2090  011136  105077  170746           CLRB    @.BAR           ;TEST THAT ONLY ODD BYTE CLEARED
2091  011142  001407                   BEQ     2$
2092  011144  012737  000100  001570   MOV     #00100,XMTDAT   ;LOAD CORRECT RESULT
2093  011152  017737  170364  001566   MOV     @CSR,RCVDAT     ;LOAD ACTUAL RESULT
2094  011160  104011                   ERROR1                  ;ERROR! ODD BYTE INSTRUCTION FAILED
2095  011162  104006           2$:     SCOPE                   ;SCOPE
2096                                   ;*****************************************************************************
2097  011164  000023           RT23:   23                      ;ROUTINE # 23                                      *
2098  011166  011272                   RT24                    ;ADDR OF NEXT ROUTINE.                             *
2099  011170  000144                   100.                    ;ITERATION COUNT                                   *
2100  011172  011174                   RT23A                   ;SCOPE ENTRY POINT.                                *
2101           000023                   X=X+1
2102                                   ;*****************************************************************************
2103
2104                                   ;TEST THAT BKCSR RESPONDS PROPERLY TO BYTE COMMANDS
2105  011174  012777  010100  170344  RT23A:  MOV     #10100,@BKCSR   ;LOAD TEST NUMBER IN BKCSR
2106  011202  105077  170340           CLRB    @BKCSR          ;CLEAR EVEN BYTE
2107  011206  022777  010000  170332   CMP     #10000,@BKCSR   ;TEST THAT ONLY EVEN BYTE CLEARED
2108  011214  001410                   BEQ     1$
2109  011216  012737  010100  001570   MOV     #10100,XMTDAT   ;LOAD CORRECT RESULT
2110  011224  017737  170316  001566   MOV     @BKCSR,RCVDAT   ;GET ACTUAL RESULT
```

```
2111  011232  104011                          ERROR1                          ;ERROR! EVEN BYTE INSTRUCTION FAILED
2112  011234  000415                          BR      2$                      ;GO TO SCOPE
2113  011236  012777  010100  170302  1$:     MOV     #10100,@BKCSR           ;LOAD TEST NUMBER IN BKCSR
2114  011244  105077  170642                  CLRB    @.BKCSR                 ;TEST THAT ONLY ODD BYTE CLEARED
2115  011250  001407                          BEQ     2$
2116  011252  012737  000100  001570          MOV     #00100,XMTDAT           ;LOAD CORRECT RESULT
2117  011260  017737  170256  001566          MOV     @CSR,RCVDAT             ;LOAD ACTUAL RESULT
2118  011266  104011                          ERROR1                          ;ERROR! ODD BYTE INSTRUCTION FAILED
2119  011270  104006                  2$:     SCOPE                           ;SCOPE
2120                                  ;*****************************************************************************
2121  011272  000024                  RT24:   24                              ;ROUTINE # 24                        *
2122  011274  011336                          RT25                            ;ADDR OF NEXT ROUTINE.               *
2123  011276  000144                          100.                            ;ITERATION COUNT                     *
2124  011300  011302                          RT24A                           ;SCOPE ENTRY POINT.                  *
2125           000024                         X=X+1
2126                                  ;*****************************************************************************
2127
2128                                  ;TEST THAT OVER RUN BIT (CSR BIT13) CAUSES AN INTERRUPT WHEN SET
2129  011302  012777  011334  170246  RT24A:  MOV     #1$,@XMTINT             ;LOAD TRANSMITTER INTERRUPT VECTOR
2130  011310  012777  010000  170224          MOV     #BIT12,@CSR             ;SET TRANSMITTER IE BIT
2131  011316  052777  020000  170216          BIS     #BIT13,@CSR             ;SET OVER RUN BIT
2132  011324  005037  177776                  CLR     @#PSW                   ;ENABLE INTERRUPTS
2133  011330  000240                          NOP
2134  011332  104001                          ERROR                           ;ERROR!OVERRUN FAILED TO CAUSE AN
2135                                                                          ;INTERRUPT,OR INTERRUPTED TO INCOR-
2136                                                                          ;RECT ADDRESS
2137  011334  104006                  1$:     SCOPE                           ;SCOPE
2138                                  ;*****************************************************************************
2139  011336  000025                  RT25:   25                              ;ROUTINE # 25                        *
2140  011340  011444                          RT26                            ;ADDR OF NEXT ROUTINE                *
2141  011342  000100                          100                             ;ITERATION COUNT                     *
2142  011344  011346                          RT25A                           ;SCOPE ENTRY POINT                   *
2143           000025                         X=X+1
2144                                  ;*****************************************************************************
2145
2146                                  ;TEST THAT THE DM11 INTERRUPTS AT THE CORRECT LEVEL
2147  011346  012737  000340  177776  RT25A:  MOV     #PRTY7,@#PSW
2148  011354  012777  011404  170174          MOV     #1$,@XMTINT             ;LOAD TRANSMITTER INTERRUPT VECTOR
2149  011362  012777  030000  170152          MOV     #30000,@CSR             ;SET OVER RUN & IE BITS
2150  011370  012737  000200  177776          MOV     #PRTY4,@#PSW            ;ALLOW INTERRUPTS ON LEVEL 5 & ABOVE
2151  011376  000240                          NOP
2152  011400  104001                          ERROR                           ;ERROR!DM11 FAILED TO INTERRUPT
2153  011402  000417                          BR      3$                      ;GO TO EXIT
2154  011404  022626                  1$:     CMP     (6)+,(6)+               ;RESET STACK POINTER
2155  011406  013737  001560  177776          MOV     XMTLVL,@#PSW            ;LOAD DM11 INTERRUPT LEVEL
2156  011414  012777  011440  170134          MOV     #2$,@XMTINT             ;LOAD TRANSMITTER INTERRUPT VECTOR
2157  011422  005077  170114                  CLR     @CSR
2158  011426  012777  030000  170106          MOV     #30000,@CSR
2159  011434  000240                          NOP
2160  011436  000401                          BR      3$                      ;GO TO EXIT
2161  011440  104001                  2$:     ERROR                           ;ERROR! DM11 INTERRUPTED ON HIGHER
2162                                                                          ;PRIORITY LEVEL THAN SET FOR
2163  011442  104006                  3$:     SCOPE
2164                                  ;*****************************************************************************
2165  011444  000026                  RT26:   26                              ;ROUTINE # 26                        *
2166  011446  011462                          RT27                            ;ADDRESS OF NEXT TEST.               *
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2167  011450  000144                        100.                    ;ITERATION COUNT                        *
2168  011452  011454                        LTSTO                   ;SCOPE ENTRY POINT                      *
2169          000026                        X=X+1
2170                              ;*********************************************************************************
2171                              ;TRANSMITTER LINE TEST LINE 0
2172  011454  004537  004622      LTSTO: JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 0
2173  011460  000000                        LINE0
2174          000001                        Y=Y+1
2175                              ;*********************************************************************************
2176  011462  000027              RT27:   27                      ;ROUTINE # 27                           *
2177  011464  011500                        RT30                    ;ADDRESS OF NEXT TEST.                  *
2178  011466  000144                        100.                    ;ITERATION COUNT                        *
2179  011470  011472                        LTST1                   ;SCOPE ENTRY POINT                      *
2180          000027                        X=X+1
2181                              ;*********************************************************************************
2182                              ;TRANSMITTER LINE TEST LINE 1
2183  011472  004537  004622      LTST1: JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 1
2184  011476  000002                        LINE1
2185          000002                        Y=Y+1
2186                              ;*********************************************************************************
2187  011500  000030              RT30:   30                      ;ROUTINE # 30                           *
2188  011502  011516                        RT31                    ;ADDRESS OF NEXT TEST.                  *
2189  011504  000144                        100.                    ;ITERATION COUNT                        *
2190  011506  011510                        LTST2                   ;SCOPE ENTRY POINT                      *
2191          000030                        X=X+1
2192                              ;*********************************************************************************
2193                              ;TRANSMITTER LINE TEST LINE 2
2194  011510  004537  004622      LTST2: JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 2
2195  011514  000004                        LINE2
2196          000003                        Y=Y+1
2197                              ;*********************************************************************************
2198  011516  000031              RT31:   31                      ;ROUTINE # 31                           *
2199  011520  011534                        RT32                    ;ADDRESS OF NEXT TEST.                  *
2200  011522  000144                        100.                    ;ITERATION COUNT                        *
2201  011524  011526                        LTST3                   ;SCOPE ENTRY POINT                      *
2202          000031                        X=X+1
2203                              ;*********************************************************************************
2204                              ;TRANSMITTER LINE TEST LINE 3
2205  011526  004537  004622      LTST3: JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 3
2206  011532  000006                        LINE3
2207          000004                        Y=Y+1
2208                              ;*********************************************************************************
2209  011534  000032              RT32:   32                      ;ROUTINE # 32                           *
2210  011536  011552                        RT33                    ;ADDRESS OF NEXT TEST                   *
2211  011540  000144                        100.                    ;ITERATION COUNT                        *
2212  011542  011544                        LTST4                   ;SCOPE ENTRY POINT                      *
2213          000032                        X=X+1
2214                              ;*********************************************************************************
2215                              ;TRANSMITTER LINE TEST LINE 4
2216  011544  004537  004622      LTST4: JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 4
2217  011550  000010                        LINE4
2218          000005                        Y=Y+1
2219                              ;*********************************************************************************
2220  011552  000033              RT33:   33                      ;ROUTINE # 33                           *
2221  011554  011570                        RT34                    ;ADDRESS OF NEXT TEST.                  *
2222  011556  000144                        100.                    ;ITERATION COUNT                        *
```

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2223  011560  011562                        LTST5                   ;SCOPE ENTRY POINT                      *
2224          000033                        X=X+1
2225                                ;*************************************************************************
2226                                ;TRANSMITTER LINE TEST LINE 5
2227  011562  004537  004622        LTST5: JSR       5,XMTTST       ;GO TEST TRANSMITTER LINE 5
2228  011566  000012                        LINE5
2229          000006                        Y=Y+1
2230                                ;*************************************************************************
2231  011570  000034                RT34:   34                      ;ROUTINE # 34                           *
2232  011572  011606                        RT35                    ;ADDRESS OF NEXT TEST                   *
2233  011574  000144                        100.                    ;ITERATION COUNT                        *
2234  011576  011600                        LTST6                   ;SCOPE ENTRY POINT                      *
2235          000034                        X=X+1
2236                                ;*************************************************************************
2237                                ;TRANSMITTER LINE TEST LINE 6
2238  011600  004537  004622        LTST6: JSR       5,XMTTST       ;GO TEST TRANSMITTER LINE 6
2239  011604  000015                        LINE6
2240          000007                        Y=Y+1
2241                                ;*************************************************************************
2242  011606  000035                RT35:   35                      ;ROUTINE # 35                           *
2243  011610  011624                        RT36                    ;ADDRESS OF NEXT TEST                   *
2244  011612  000144                        100.                    ;ITERATION COUNT                        *
2245  011614  011616                        LTST7                   ;SCOPE ENTRY POINT                      *
2246          000035                        X=X+1
2247                                ;*************************************************************************
2248                                ;TRANSMITTER LINE TEST LINE 7
2249  011616  004537  004622        LTST7: JSR       5,XMTTST       ;GO TEST TRANSMITTER LINE 7
2250  011622  000016                        LINE7
2251          000010                        Y=Y+1
2252                                ;*************************************************************************
2253  011624  000036                RT36.   36                      ;ROUTINE # 36                           *
2254  011626  011642                        RT37                    ;ADDRESS OF NEXT TEST                   *
2255  011630  000144                        100.                    ;ITERATION COUNT                        *
2256  011632  011634                        LTST10                  ;SCOPE ENTRY POINT                      *
2257          000036                        X=X+1
2258                                ;*************************************************************************
2259                                ;TRANSMITTER LINE TEST LINE 10
2260  011634  004537  004622        LTST10: JSR      5,XMTTST       ;GO TEST TRANSMITTER LINE 10
2261  011640  000020                        LINE10
2262          000011                        Y=Y+1
2263                                ;*************************************************************************
2264  011642  000037                RT37:   37                      ;ROUTINE # 37                           *
2265  011644  011660                        RT40                    ;ADDRESS OF NEXT TEST.                  *
2266  011646  000144                        100.                    ;ITERATION COUNT                        *
2267  011650  011652                        LTST11                  ;SCOPE ENTRY POINT                      *
2268          000037                        X=X+1
2269                                ;*************************************************************************
2270                                ;TRANSMITTER LINE TEST LINE 11
2271  011652  004537  004622        LTST11: JSR      5,XMTTST       ;GO TEST TRANSMITTER LINE 11
2272  011656  000022                        LINE11
2273          000012                        Y=Y+1
2274                                ;*************************************************************************
2275  011660  000040                RT40:   40                      ;ROUTINE # 40                           *
2276  011662  011676                        RT41                    ;ADDRESS OF NEXT TEST                   *
2277  011664  000144                        100.                    ;ITERATION COUNT                        *
2278  011666  011670                        LTST12                  ;SCOPE ENTRY POINT                      *
```

```
2279                000040                          X=X+1
2280                                        ;*****************************************************************************
2281                                        ;TRANSMITTER LINE TEST LINE 12
2282  011670  004537  004622    LTST12: JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 12
2283  011674  000024                      LINE12
2284                000013                  Y=Y+1
2285                                        ;*****************************************************************************
2286  011676  000041                RT41:   41                      ;ROUTINE # 41                           *
2287  011700  011714                        RT42                    ;ADDRESS OF NEXT TEST.                  *
2288  011702  000144                        100.                    ;ITERATION COUNT                        *
2289  011704  011706                        LTST13                  ;SCOPE ENTRY POINT                      *
2290                000041                  X=X+1
2291                                        ;*****************************************************************************
2292                                        ;TRANSMITTER LINE TEST LINE 13
2293  011706  004537  004622    LTST13: JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 13
2294  011712  000026                      LINE13
2295                000014                  Y=Y+1
2296                                        ;*****************************************************************************
2297  011714  000042                RT42:   42                      ;ROUTINE # 42                           *
2298  011716  011732                        RT43                    ;ADDRESS OF NEXT TEST.                  *
2299  011720  000144                        100.                    ;ITERATION COUNT                        *
2300  011722  011724                        LTST14                  ;SCOPE ENTRY POINT                      *
2301                000042                  X=X+1
2302                                        ;*****************************************************************************
2303                                        ;TRANSMITTER LINE TEST LINE 14
2304  011724  004537  004622    LTST14: JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 14
2305  011730  000030                      LINE14
2306                000015                  Y=Y+1
2307                                        ;*****************************************************************************
2308  011732  000043                RT43:   43                      ;ROUTINE # 43                           *
2309  011734  011750                        RT44                    ;ADDRESS OF NEXT TEST                   *
2310  011736  000144                        100.                    ;ITERATION COUNT                        *
2311  011740  011742                        LTST15                  ;SCOPE ENTRY POINT                      *
2312                000043                  X=X+1
2313                                        ;*****************************************************************************
2314                                        ;TRANSMITTER LINE TEST LINE 15
2315  011742  004537  004622    LTST15: JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 15
2316  011746  000032                      LINE15
2317                000016                  Y=Y+1
2318                                        ;*****************************************************************************
2319  011750  000044                RT44:   44                      ;ROUTINE # 44                           *
2320  011752  011766                        RT45                    ;ADDRESS OF NEXT TEST.                  *
2321  011754  000144                        100.                    ;ITERATION COUNT                        *
2322  011756  011760                        LTST16                  ;SCOPE ENTRY POINT                      *
2323                000044                  X=X+1
2324                                        ;*****************************************************************************
2325                                        ;TRANSMITTER LINE TEST LINE 16
2326  011760  004537  004622    LTST16: JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 16
2327  011764  000034                      LINE16
2328                000017                  Y=Y+1
2329                                        ;*****************************************************************************
2330  011766  000045                RT45:   45                      ;ROUTINE # 45                           *
2331  011770  012004                        RT46                    ;ADDRESS OF NEXT TEST.                  *
2332  011772  000144                        100.                    ;ITERATION COUNT                        *
2333  011774  011776                        LTST17                  ;SCOPE ENTRY POINT                      *
2334                000045                  X=X+1
```

```
2335
2336                                    ;*****************************************************************************
2337  011776  004537  004622            ;TRANSMITTER LINE TEST LINE 17
2338  012002  000036                     LTST17: JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 17
2339          000020                             LINE17
2340          000000                             Y=Y+1
2341          000000                             Y=0
2342                                             A=0
2343  012004  000046                     ;*****************************************************************************
2344  012006  012022                     RT46:   46                      ;ROUTINE # 46                              *
2345  012010  000144                             RT47                    ;ADDRESS OF NEXT TEST                      *
2346  012012  012014                             100.                    ;ITERATION COUNT                           *
2347          000046                             RCV0                    ;SCOPE ENTRY POINT                         *
2348                                             X=X+1                   ;                                          *
2349                                  ;*****************************************************************************
2350  012014  004537  005034            ;RECEIVER LINE TEST LINE 0
2351  012020  000000                     RCV0:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 0
2352          000001                             LINE0
2353                                             Y=Y+1
2354  012022  000047                     ;*****************************************************************************
2355  012024  012040                     RT47:   47                      ;ROUTINE # 47                              *
2356  012026  000144                             RT50                    ;ADDRESS OF NEXT TEST                      *
2357  012030  012032                             100.                    ;ITERATION COUNT                           *
2358          000047                             RCV1                    ;SCOPE ENTRY POINT                         *
2359                                             X=X+1                   ;                                          *
2360                                  ;*****************************************************************************
2361  012032  004537  005034            ;RECEIVER LINE TEST LINE 1
2362  012036  000002                     RCV1:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 1
2363          000002                             LINE1
2364                                             Y=Y+1
2365  012040  000050                     ;*****************************************************************************
2366  012042  012056                     RT50:   50                      ;ROUTINE # 50                              *
2367  012044  000144                             RT51                    ;ADDRESS OF NEXT TEST                      *
2368  012046  012050                             100.                    ;ITERATION COUNT                           *
2369          000050                             RCV2                    ;SCOPE ENTRY POINT                         *
2370                                             X=X+1                   ;                                          *
2371                                  ;*****************************************************************************
2372  012050  004537  005034            ;RECEIVER LINE TEST LINE 2
2373  012054  000004                     RCV2:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 2
2374          000003                             LINE2
2375                                             Y=Y+1
2376  012056  000051                     ;*****************************************************************************
2377  012060  012074                     RT51:   51                      ;ROUTINE # 51                              *
2378  012062  000144                             RT52                    ;ADDRESS OF NEXT TEST                      *
2379  012064  012066                             100.                    ;ITERATION COUNT                           *
2380          000051                             RCV3                    ;SCOPE ENTRY POINT                         *
2381                                             X=X+1                   ;                                          *
2382                                  ;*****************************************************************************
2383  012066  004537  005034            ;RECEIVER LINE TEST LINE 3
2384  012072  000006                     RCV3:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 3
2385          000004                             LINE3
2386                                             Y=Y+1
2387  012074  000052                     ;*****************************************************************************
2388  012076  012112                     RT52:   52                      ;ROUTINE # 52                              *
2389  012100  000144                             RT53                    ;ADDRESS OF NEXT TEST                      *
2390  012102  012104                             100.                    ;ITERATION COUNT                           *
                                                 RCV4                    ;SCOPE ENTRY POINT                         *
```

```
2391            000052                          X=X+1
2392                                    ;*****************************************************************************
2393                                    ;RECEIVER LINE TEST LINE 4
2394  012104    004537  005034        RCV4:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 4
2395  012110    000010                        LINE4
2396            000005                        Y=Y+1
2397                                    ;*****************************************************************************
2398  012112    000053                RT53:   53                      ;ROUTINE # 53                           *
2399  012114    012130                        RT54                    ;ADDRESS OF NEXT TEST                   *
2400  012116    000144                        100.                    ;ITERATION COUNT                        *
2401  012120    012122                        RCV5                    ;SCOPE ENTRY POINT                      *
2402            000053                        X=X+1
2403                                    ;*****************************************************************************
2404                                    ;RECEIVER LINE TEST LINE 5
2405  012122    004537  005034        RCV5:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 5
2406  012126    000012                        LINE5
2407            000006                        Y=Y+1
2408                                    ;*****************************************************************************
2409  012130    000054                RT54:   54                      ;ROUTINE # 54                           *
2410  012132    012146                        RT55                    ;ADDRESS OF NEXT TEST                   *
2411  012134    000144                        100.                    ;ITERATION COUNT                        *
2412  012136    012140                        RCV6                    ;SCOPE ENTRY POINT                      *
2413            000054                        X=X+1
2414                                    ;*****************************************************************************
2415                                    ;RECEIVER LINE TEST LINE 6
2416  012140    004537  005034        RCV6:   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 6
2417  012144    000014                        LINE6
2418            000007                        Y=Y+1
2419                                    ;*****************************************************************************
2420  012146    000055                RT55:   55                      ;ROUTINE # 55                           *
2421  012150    012164                        RT56                    ;ADDRESS OF NEXT TEST                   *
2422  012152    000144                        100.                    ;ITERATION COUNT                        *
2423  012154    012156                        RCV7                    ;SCOPE ENTRY POINT                      *
2424            000055                        X=X+1
2425                                    ;*****************************************************************************
2426                                    ;RECEIVER LINE TEST LINE 7
2427  012156    004537  005034        RCV7:   JSR     5,RCVTST        ;GO TEST RECCIVER LINE 7
2428  012162    000016                        LINE7
2429            000010                        Y=Y+1
2430                                    ;*****************************************************************************
2431  012164    000056                RT56:   56                      ;ROUTINE # 56                           *
2432  012166    012202                        RT57                    ;ADDRESS OF NEXT TEST                   *
2433  012170    000144                        100.                    ;ITERATION COUNT                        *
2434  012172    012174                        RCV10                   ;SCOPE ENTRY POINT                      *
2435            000056                        X=X+1
2436                                    ;*****************************************************************************
2437                                    ;RECEIVER LINE TEST LINE 10
2438  012174    004537  005034        RCV10:  JSR     5,RCVTST        ;GO TEST RECEIVER LINE 10
2439  012200    000020                        LINE10
2440            000011                        Y=Y+1
2441                                    ;*****************************************************************************
2442  012202    000057                RT57:   57                      ;ROUTINE # 57                           *
2443  012204    012220                        RT60                    ;ADDRESS OF NEXT TEST                   *
2444  012206    000144                        100.                    ;ITERATION COUNT                        *
2445  012210    012212                        RCV11                   ;SCOPE ENTRY POINT                      *
2446            000057                        X=X+1
```

```
2447
2448                                    ;*****************************************************************************
2449  012212  004537  005034            ;RECEIVER LINE TEST LINE 11
2450  012216  000022            RCV11:   JSR     5,RCVTST       ;GO TEST RECEIVER LINE 11
2451          000012                     LINE11
2452                                     Y=Y+1
2453  012220  000060                    ;*****************************************************************************
2454  012222  012236            RT60:    60                     ;ROUTINE # 60                    *
2455  012224  000144                     RT61                   ;ADDRESS OF NEXT TEST            *
2456  012226  012230                     100.                   ;ITERATION COUNT                 *
2457          000060                     RCV12                  ;SCOPE ENTRY POINT               *
2458                                     X=X+1
2459                                    ;*****************************************************************************
2460  012230  004537  005034            ;RECEIVER LINE TEST LINE 12
2461  012234  000024            RCV12:   JSR     5,RCVTST       ;GO TEST RECEIVER LINE 12
2462          000013                     LINE12
2463                                     Y=Y+1
2464  012236  000061                    ;*****************************************************************************
2465  012240  012254            RT61:    61                     ;ROUTINE # 61                    *
2466  012242  000144                     RT62                   ;ADDRESS OF NEXT TEST            *
2467  012244  012246                     100.                   ;ITERATION COUNT                 *
2468          000061                     RCV13                  ;SCOPE ENTRY POINT               *
2469                                     X=X+1
2470                                    ;*****************************************************************************
2471  012246  004537  005034            ;RECEIVER LINE TEST LINE 13
2472  012252  000026            RCV13:   JSR     5,RCVTST       ;GO TEST RECEIVER LINE 13
2473          000014                     LINE13
2474                                     Y=Y+1
2475  012254  000062                    ;*****************************************************************************
2476  012256  012272            RT62:    62                     ;ROUTINE # 62                    *
2477  012260  000144                     RT63                   ;ADDRESS OF NEXT TEST            *
2478  012262  012264                     100.                   ;ITERATION COUNT                 *
2479          000062                     RCV14                  ;SCOPE ENTRY POINT               *
2480                                     X=X+1
2481                                    ;*****************************************************************************
2482  012264  004537  005034            ;RECEIVER LINE TEST LINE 14
2483  012270  000030            RCV14:   JSR     5,RCVTST       ;GO TEST RECEIVER LINE 14
2484          000015                     LINE14
2485                                     Y=Y+1
2486  012272  000063                    ;*****************************************************************************
2487  012274  012310            RT63:    63                     ;ROUTINE # 63                    *
2488  012276  000144                     RT64                   ;ADDRESS OF NEXT TEST            *
2489  012300  012302                     100.                   ;ITERATION COUNT                 *
2490          000063                     RCV15                  ;SCOPE ENTRY POINT               *
2491                                     X=X+1
2492                                    ;*****************************************************************************
2493  012302  004537  005034            ;RECEIVER LINE TEST LINE 15
2494  012306  000032            RCV15:   JSR     5,RCVTST       ;GO TEST RECEIVER LINE 15
2495          000016                     LINE15
2496                                     Y=Y+1
2497  012310  000064                    ;*****************************************************************************
2498  012312  012326            RT64:    64                     ;ROUTINE # 64                    *
2499  012314  000144                     RT65                   ;ADDRESS OF NEXT TEST            *
2500  012316  012320                     100.                   ;ITERATION COUNT                 *
2501          000064                     RCV16                  ;SCOPE ENTRY POINT               *
2502                                     X=X+1
                                        ;*****************************************************************************
```

```
2503
2504  012320  004537  005034          ,RECEIVER LINE TEST LINE 16
2505  012324  000034          RCV16:  JSR     5,RCVTST        ,GO TEST RECEIVER LINE 16
2506          000017                  LINE16
2507                                  Y=Y+1
2508  012326  000065          ,*****************************************************************************
2509  012330  012346          RT65:   65                      ;ROUTINE # 65                           *
2510  012332  000144                  RT66                    ;ADDRESS OF NEXT TEST                   *
2511  012334  012336                  100.                    ;ITERATION COUNT                        *
2512          000065                  RCV17                   ;SCOPE ENTRY POINT                      *
2513                                  X=X+1
2514                          ;*****************************************************************************
2515  012336  004537  005034  ;RECEIVER LINE TEST LINE 17
2516  012342  000036          RCV17:  JSR     5,RCVTST        ;GO TEST RECEIVER LINE 17
2517          000020                  LINE17
2518  012344  000240                  Y=Y+1
2519                                  NOP
2520  012346  000066          ;*****************************************************************************
2521  012350  012606          RT66:   66                      ;ROUTINE # 66                           *
2522  012352  000012                  RT67                    ;ADDR OF NEXT ROUTINE.                  *
2523  012354  012362                  10.                     ;ITERATION COUNT                        *
2524          000066                  RT66A                   ;SCOPE ENTRY POINT.                     *
2525                                  X=X+1
2526                          ;*****************************************************************************
2527  012356  000240
2528  012360  000240                  NOP
2529                                  NOP
2530                          ;TEST THAT NEX BIT (CSR BIT 14) SETS WHEN THE TRANSMITTER REFERENCES
2531                          ;NON-EXISTANT MEMORY, THE CORRESPONDING BAR BIT CLEARS
2532  012362  004737  004216  ;AND THAT AN INTERRUPT OCCURS.  ALL LINES ARE USED FOR THE TEST
2533                          RT66A:  JSR     7,TIMER         ;GO CALCULATE MACINE TIME TO TRANSMIT
2534  012366  012701  001400                                  ;ONE CHARACTER
2535  012372  012702  160000          MOV     #LAT,X1         ;GET CAT ADDRESS
2536  012376  012703  000020          MOV     #160000,X2      ;GET A NON-EXISTANT ADDRESS
2537  012402  010221                  MOV     #16.,X3         ;GET COUNTER
2538  012404  006303          1$      MOV     X2,(1)+         ;LOAD THE CURRENT ADDRESS
2539  012406  001375                  DEC     X3              ;TABLE WITH NON-EXISTANT
2540  012410  012701  000001          BNE     1$              ;ADDRESSES
2541  012414  012777  012552  167134  MOV     #LBIT0,X1       ;GET LINE BIT
2542  012422  062777  000060  167112  MOV     #6$,@XMTINT     ;LOAD TRANSMITTER INT. VECTOR
2543  012430  060177  167110  2$:     BIS     #60,@CSR        ;SET EXTENDED ADDRESS BITS
2544  012434  013737  004370  012444  BIS     X1,@BAR         ;START TRANSMITTER
2545  012442  104400                  MOV     TIME14,3$       ;LOAD DELAY TIME TO
2546  012444  000000          3$:     DELAY                   ;DELAY FOR 1/4TH OF A CHARACTER
2547  012446  017737  167072  001566  OPEN                    ;TO RESPOND TO NEX
2548  012454  001406                  MOV     @BAR,RCVDAT     ;GET BAR DATA & TEST
2549  012456  005037  001570          BEQ     4$              ;THAT IT IS CLEAR
2550  012462  104011                  CLR     XMTDAT
2551  012464  005077  167054          ERROR1                  ;ERROR!BAR BIT DID NOT CLEAR
2552  012470  000440                  CLR     @BAR
2553  012472  032777  040000  167042  BR      7$              ;GO TO SCOPE
2554  012500  001002          4$:     BIT     #BIT14,@CSR     ;TEST THAT NEX BIT IS SET
2555  012502  104001                  BNE     5$              ;BRANCH IF SET
2556  012504  000432                  ERROR                   ;ERROR! NEX BIT FAILED TO SET
2557  012506  042777  100000  167026  BR      7$              ;GO TO SCOPE
2558  012514  052777  010000  167020  5$:     BIC     #BIT15,@CSR     ;CLEAR TRANSMITTER READY FLAG
                                      BIS     #BIT12,@CSR     ;SET TRANSMITTER IE BIT
```

```
2559  012522  005037  177776          CLR     @#PSW           ;ALLOW INTERRUPTS
2560  012526  000240                  NOP
2561  012530  012737  000340  177776  MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
2562  012536  010137  001570          MOV     X1,XMTDAT       ;LOAD LINE THAT FAILED
2563  012542  005037  001566          CLR     RCVDAT
2564  012546  104011                  ERROR1                  ;ERROR! NEX FAILED TO CAUSE INTERRUPT
2565                                                          ;TYPEOUT SHOWS LINE # THAT FAILED
2566  012550  000410                  BR      7$              ;GO TO SCOPE
2567  012552  005077  166764      6$: CLR     @CSR
2568  012556  012737  000340  177776  MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
2569  012564  022626                  CMP     (6)+,(6)+       ;ADJUST STACK PTR
2570  012566  006301                  ASL     X1              ;SHIFT LINE BIT
2571  012570  103314                  BCC     2$              ;DO NEXT LINE
2572  012572  013737  004366  012602  7$: MOV     TIME1,8$        ;WAIT FOR TRANSMITTER TO RUN
2573  012600  104400                  DELAY                   ;TO COMPLETION BEFORE
2574  012602  000000              8$: OPEN                    ;EXITING TEST
2575  012604  104006                  SCOPE                   ;SCOPE
2576
2577  012606  000067          RT67:   67                      ;ROUTINE # 67                          *
2578  012610  012716                  RT70                    ;ADDR OF NEXT ROUTINE                  *
2579  012612  000012                  10.                     ;ITERATION COUNT                       *
2580  012614  012616                  RT67A                   ;SCOPE ENTRY POINT.                    *
2581          000067                  X=X+1
2582
2583
2584
2585  012616  012777  160000  166724  RT67A:  MOV     #160000,@#SRE6  ;SET BASE REGISTER TO NON-EXISTANT ADRS
2586  012624  012737  012706  000004          MOV     #4$,@#ERRVEC    ;SET TIME OUT TRAP VECTOR
2587  012632  005737  160000          TST     @#160000        ;CHECK THAT ADDRESS TIMES OUT
2588  012636  013737  004370  012654  MOV     TIME14,1$       ;GET TIME TO TRANSMIT 1/4 CHAR
2589  012644  052777  000001  166672  BIS     #LBIT0,@#AR     ;START TO TRANSMIT ON LINE 0
2590  012652  104400                  DELAY                   ;DELAY 1/4TH OF A CHARACTER
2591  012654  000000              1$: OPEN                    ;TIME
2592  012656  005077  166662          CLR     @#AR            ;STOP TRANSMITTER
2593  012662  022777  040060  166652  CMP     @#BIT14+60,@#CSR ;TEST THAT ONLY NEX IS SET
2594  012670  001401                  BEQ     2$
2595  012672  104001                  ERROR                   ;ERROR! EITHER NEX FAILED TO SET
2596                                                          ;OR OTHER BITS SET
2597  012674  013737  004366  012704  2$: MOV     TIME1,3$        ;DELAY 1 CHARACTER TIME TO ALLOW
2598  012702  104400                  DELAY                   ;TRANSMITTER TO RUN TO
2599  012704  000000              3$: OPEN                    ;COMPLETION
2600  012706  012737  000006  000004  4$: MOV     @#ERRVEC+2,@#ERRVEC     ;RESTORE TIME OUT TRAP
2601  012714  104006                  SCOPE
2602
2603  012716  000070          RT70:   70                      ;ROUTINE # 70                          *
2604  012720  013032                  RT71                    ;ADDR OF NEXT ROUTINE.                 *
2605  012722  000144                  100.                    ;ITERATION COUNT                       *
2606  012724  012726                  RT70A                   ;SCOPE ENTRY POINT.                    *
2607          000070                  X=X+1
2608
2609
2610
2611
2612
2613
2614  012726  005037  016730  RT70A:  CLR     LINE            ;SET UP TO TRANSMIT
```

```
 2615  012732  004537  006246          1$:     JSR     5,@#XMITD       ;10  CHARACTERS
 2616  012736  177766                          -10.                    ;ON EACH LINE
 2617  012740  005777  166576                  TST     @CSR            ;WAIT FOR 10  CHARACTERS
 2618  012744  100375                          BPL     .-4             ;TO BE TRANSMITTED
 2619  012746  042777  100000  166566          BIC     #100000,@CSR
 2620  012754  105777  166562                  TSTB    @CSR            ;TEST RECEIVER DONE FLAG
 2621  012760  100010                          BPL     2$
 2622  012762  013737  001564  001566          MOV     LINBIT,RCVDAT   ;GET LINE BIT OF ACTIVE LINE
 2623  012770  013737  001564  001570          MOV     LINBIT,XMTDAT   ;THAT ERROR OCCURED ON
 2624  012776  104011                          ERROR1                  ;ERROR! DATA WAS RECEIVED ON LINE INDICATED
 2625  013000  000413                          BR      4$              ;GO TO SCOPE
 2626  013002  062737  000002  016730  2$:     ADD     #2,LINE         ;SET UP NEXT LINE NUMBER
 2627  013010  006337  001564                  ASL     LINBIT          ;GET READY TO TRANSMIT ON NEXT LINE
 2628  013014  103346                          BCC     1$              ;GO TRANSMIT ON NEXT LINE
 2629  013016  013737  004366  013026          MOV     TIME1,3$
 2630  013024  104400                          DELAY                   ;DELAY 1 CHARACTER
 2631  013026  000000                  3$:     0                       ;TIME BEFORE ENTERING NEXT TEST
 2632  013030  104006                  4$:     SCOPE                   ;SCOPE
 2633                                  ;*****************************************************************************
 2634  013032  000071                  RT71:   71                      ;ROUTINE # 71                              *
 2635  013034  013226                          RT72                    ;ADDR OF NEXT ROUTINE                      *
 2636  013036  000024                          20.                     ;ITERATION COUNT                           *
 2637  013040  013042                          RT71A                   ;SCOPE ENTRY POINT.                        *
 2638          000071                          X=X+1
 2639                                  ;*****************************************************************************
 2640
 2641                                  ;TEST THAT CURRENT ADDRESS INCREMENTS PROPERLY WHEN A CHAR-
 2642                                  ;ACTER IS TRANSMITTED.  LINE 0 IS USED FOR THE TEST.
 2643  013042  005000                  RT71A:  CLR     X0              ;R0=CURRENT ADRS AFTER TRANSMISSION
 2644  013044  010001          1$:     MOV     X0,X1           ;R0=CURRENT ADDRESS BEFORE TRANSMISSION
 2645  013046  005201                  INC     X1              ;AND R1=CURRENT ADDRESS AFTER TRANSMISSION
 2646  013050  012737  013212  000004  MOV     #3$,@#ERRVEC            ;SET UP PROCESSOR
 2647  013056  012737  000340  000006  MOV     #PRTY7,@#ERRVEC+2       ;TIME OUT TRAP
 2648  013064  012777  001400  166456  MOV     #CAT,@#BASREG   ;SET UP BASE REGISTER
 2649  013072  010037  001400          MOV     X0,CAT          ;LOAD CURRENT ADDRESS TABLE (LINE 0)
 2650  013076  105710                  TSTB    (0)             ;DOES MEMORY EXIST?
 2651  013100  012737  177776  001440  MOV     #-2,WCT         ;SET CHAR. COUNT TO TRANSMIT 1 CHAR.
 2652  013106  012777  000006  166426  MOV     #6,@CSR         ;SET MAINT & GO BITS
 2653  013114  012777  000001  166422  MOV     #LBITO,@BAR     ;TRANSMIT ON LINE 0
 2654  013122  105777  166414          TSTB    @CSR            ;WAIT FOR THE RECEIVER
 2655  013126  100375                  BPL     .-4             ;TO RECEIVE FIRST CHARACTER
 2656  013130  042777  000200  166404  BIC     #200,@CSR       ;CLEAR RECEIVER DONE FLAG
 2657  013136  105777  166400          TSTB    @CSR            ;WAIT FOR RECEIVER TO RECEIVE
 2658  013142  100375                  BPL     .-4             ;THE SECOND CHARACTER
 2659  013144  023701  001400          CMP     CAT,X1          ;TEST THAT CURRENT ADRS
 2660                                                          ;INCREMENTED PROPERLY
 2661  013150  001413                  BEQ     2$
 2662  013152  010137  001570          MOV     X1,XMTDAT       ;GET COMPUTED RESULT
 2663  013156  013737  001400  001566  MOV     CAT,RCVDAT      ;GET ACTUAL RESULT
 2664  013164  104011                  ERROR1                  ;ERROR! CURRENT ADDRESS DID NOT
 2665  013166  032777  040000  166006  BIT     #BIT14,@SWR     ;INCREMENT PROPERLY
 2666  013174  001323                  BNE     1$              ;BRANCH IF SCOPE SWITCH IS SET
 2667  013176  000405                  BR      3$              ;GO TO EXIT
 2668  013200  005701          2$:     TST     X1
 2669  013202  001403                  BEQ     3$
 2670  013204  000261                  SEC
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2671  013206  006100                          ROL     %0
2672  013210  100715                          BMI     1$
2673  013212  012737  000006  000004  3$:     MOV     #ERRVEC+2,@#ERRVEC      ;RESTORE TIME OUT TRAP
2674  013220  005037  000006                  CLR     @#ERRVEC+2
2675  013224  104006                          SCOPE                           ;SCOPE
2676
2677  013226  000072                  ;*****************************************************************************
2678  013230  013572                  RT72:   72                              ;ROUTINE # 72                        *
2679  013232  000024                          RT73                            ;ADDR OF NEXT ROUTINE.               *
2680  013234  013236                          20.                             ;ITERATION COUNT                     *
2681           000072                         RT72A                           ;SCOPE ENTRY POINT.                  *
2682                                          X=X+1
2683                                  ;*****************************************************************************
2684
2685                                  ;TEST THAT DATA CAN BE TRANSMITTED FROM ALL AVAILABLE CORE.
2686                                  ;LINE 0 IS USED FOR THE TEST AND ONLY ONE WORD IS TRANSMITTED
2687  013236  005000                  ;AT A TIME.
2688  013240  000005                  RT72A:  CLR     %0                      ;CLEAR INDEX REGISTER
2689  013242  016037  013526  001400          RESET
2690  013250  012777  000005  166264  1$:     MOV     AREA(0),CAT             ;LOAD CURRENT ADDRESS
2691  013256  012737  177777  001440          MOV     #5,@CSR                 ;SET MAINT & GO BITS
2692  013264  012777  000001  166252          MOV     #-1,WCT                 ;SET UP CHAR COUNT TO TRANSMIT 1 CHAR
2693  013272  005777  166244                  MOV     #LBIT0,@BAR             ;TRANSMIT CHAR ON LINE 0
2694  013276  100375                          TST     @CSR                    ;WAIT FOR THE TRANSMITTER
2695  013300  105777  166236                  BPL     .-4                     ;TO TRANSMIT THE CHARACTER
2696  013304  100375                          TSTB    @CSR                    ;TEST FOR DONE
2697  013306  005077  166230                  BPL     .-4
2698  013312  005037  001566                  CLR     @CSR                    ;CLEAR ALL FLAGS
2699  013316  113737  001600  001566          CLR     RCVDAT
2700  013324  117037  013526  001570          MOVB    TUMTAB,RCVDAT           ;GET RECEIVED CHARACTER
2701  013332  043737  001572  001570          MOVB    @AREA(0),XMTDAT         ;GET TRANSMITTED CHARACTER
2702  013340  123737  001566  001570          BIC     CARMSK,XMTDAT           ;CLEAR NON-TRANSMITTED BITS
2703  013346  001402                          CMPB    RCVDAT,XMTDAT           ;COMPARE CHARACTERS
2704  013350  104011                          BEQ     2$                      ;BRANCH IF VALID COMPARISON
2705                                          ERROR1                          ;ERROR!DATA COMPARISON ERROR
2706  013352  000464                  ;(CAT)-1 IS THE MEMORY LOCATION WHERE THE DATA WAS TRANSMITTED FROM
2707  013354  020027  000006                  BR      6$                      ;GO TO EXIT
2708  013360  001402                  2$:     CMP     %0,#6                   ;HAS FIRST 4K BEEN TESTED
2709  013362  005720                          BEQ     3$                      ;BRANCH IF IT HAS
2710  013364  000726                          TST     (0)+                    ;INCREMENT INDEX
2711                                          BR      1$                      ;GO REPEAT TEST
2712
2713  013366                          3$:                                     ;BEGIN TESTING ABOVE 4K
2714  013366  012737  013514  000004          MOV     #5$,@#ERRVEC            ;SET TIME OUT TRAP TO EXIT
2715                                                                          ;TEST IF MEMORY TIMES OUT
2716  013374  005001                          CLR     %1                      ;SET UP DATA IDENTIFIER
2717  013376  005201                  4$:     INC     %1                      ;INCREMENT DATA IDENTIFIER
2718  013400  005720                          TST     (0)+                    ;INCREMENT INDEX
2719  013402  110170  013526                  MOVB    %1,@AREA(0)             ;LOAD IDENTIFIER INTO MEMORY
2720  013406  016037  013526  001400          MOV     AREA(0),CAT             ;LOAD CURRENT ADDRESS
2721  013414  012777  000005  166120          MOV     #5,@CSR                 ;SET MAINT & GO BITS
2722  013422  012737  177777  001440          MOV     #-1,WCT                 ;SET UP CHAR COUNT TO TRANSMIT 1 CHAR
2723  013430  012777  000001  166106          MOV     #LBIT0,@BAR             ;TRANSMIT ON LINE 0
2724  013436  005777  166100                  TST     @CSR                    ;WAIT FOR THE TRANSMITTER TO
2725  013442  100375                          BPL     .-4                     ;TRANSMIT THE CHARACTER
2726  013444  105777  166072                  TSTB    @CSR                    ;TEST FOR CHARACTER DONE
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2727  013450  100375                        BPL     .-4
2728  013452  005077  166064                CLR     @CSR
2729  013456  113737  001600  001566        MOVB    TUMTAB,RCVDAT   ;GET THE RECEIVED CHARACTER
2730  013464  117037  013526  001570        MOVB    @AREA(0),XMTDAT ;GET THE TRANSMITTED CHARACTER
2731  013472  043737  001572  001570        BIC     CARMSK,XMTDAT   ;CLEAR NON-TRANSMITTED BITS
2732  013500  123737  001566  001570        CMPB    RCVDAT,XMTDAT   ;COMPARE CHARACTERS
2733  013506  001733                        BEQ     4$              ;BRANCH IF VALID COMPARISON
2734  013510  104011                        ERROR1                  ;ERROR!DATA COMPARISON ERROR NUMBER
2735  013512  000404                        BR      6$              ;IN S/B GIVES MEMORY LOCATION (SEE TABLE
2736  013514  022626                5$:     POPSP2                  ;RESET THE STACK
2737  013516  012737  000006  000004        MOV     #6,@#ERRVEC     ;RESTORE TIME OUT TRAP
2738  013524  104006                4$:     SCOPE                   ;EXIT TEST
2739                                        ;MEMORY LOCATIONS TRANSMITTED FROM TABLE
2740  013526  000000                AREA:   0                       ;FOR DATA IN FIRST
2741  013530  005252                        5252                    ;4K SEE THE LISTING
2742  013532  012525                        12525                   ;CONTENTS OF THESE LOCATIONS (BYTE)
2743  013534  017777                        17777                   ;IS THE DATA TRANSMITTED
2744  013536  020000                A8K.    20000                   ;CONTENTS =1 (IF AVAILABLE)
2745  013540  026314                        26314                   ;    "     2       "
2746  013542  031463                        31463                   ;    "     3       "
2747
2748  013544  037477                        37477                   ;    "     4       "
2749  013546  040000                A12K:   40000                   ;    "     5       "
2750  013560  057477                        57477                   ;    "     6       "
2751  013562  060000                A16K:   60000                   ;    "     7       "
2752  013564  077477                        77477                   ;    "     10      "
2753  013566  100000                A20K:   100000                  ;    "     11      "
2754  013560  117477                        117477                  ;    "     12      "
2755  013562  120000                A24K:   120000                  ;    "     13      "
2756  013564  137477                        137477                  ;    "     14      "
2757  013566  140000                A28K:   140000                  ;    "     15      "
2758  013570  173000                        173000                  ;    "     16      "
2759                                        ;*****************************************************************************
2760  013572  000073                RT73:   73                      ;ROUTINE # 73                                    *
2761  013574  014006                        RT74                    ;ADDR OF NEXT ROUTINE.                           *
2762  013576  000012                        10.                     ;ITERATION COUNT                                 *
2763  013600  013602                        RT73A                   ;SCOPE ENTRY POINT.                              *
2764          000073                        X=X+1
2765                                        ;*****************************************************************************
2766
2767                                        ;TEST THAT THE TRANSMITTER CAN TRANSMIT 100. CHARACTERS BEFORE SETTING
2768                                        ;THE READY BIT (CSR 15),AND CLEARING THE BAR BIT
2769  013602  005037  016730        RT73A:  CLR     LINE
2770  013606  012777  000001  165726  1$:     MOV     #1,@CSR         ;SET THE GO BIT
2771  013614  005037  001566                CLR     RCVDAT
2772  013620  013737  016730  001570        MOV     @#LINE,XMTDAT   ;GET LINE NUMBER (X2)
2773  013626  004537  006246                JSR     5,@#XMITD       ;TRANSMIT 100. CHARACTERS
2774  013632  177634                        -100.                   ;ON LINE AS SPECIFIED BY LINE
2775  013634  106777  165702        2$:     TSTB    @CSR            ;WAIT FOR THE RECEIVER
2776  013640  100375                        BPL     2$              ;TO RECEIVE ONE CHARACTER
2777  013642  042777  000200  165672        BIC     #BIT7,@CSR      ;CLEAR CHAR. DONE FLAG
2778  013650  005237  001566                INC     RCVDAT          ;INCREMENT CHAR. RCVD COUNT
2779  013654  023727  001566  000144        CMP     RCVDAT,#100     ;HAVE 100. CHARS. BEEN RCVD
2780  013662  001416                        BEQ     4$
2781  013664  005777  165652                TST     @CSR            ;TEST READY FLAG
2782  013670  100002                        BPL     3$              ;GO TEST BAR
```

```
2783  013672  104011                          ERROR1                  ;ERROR!READY BIT SET TOO SOON
2784
2785  013674  000443                  ;TYPEOUT SHOWS HOW MANY CHARS WERE RECEIVED WHEN READY SET AND THE LINE # (X2)
                                      BR      8$                      ;GO TO EXIT
2786
2787  013676  023777  001564  165640  3$:     CMP     @#LINBIT,@BAR   ;TEST THAT BAR BIT IS SET
2788  013704  001753                  BEQ     2$                      ;BRANCH IF SET
2789  013706  017737  165632  001570  MOV     @BAR,XMTDAT             ;GET BAR CONTENTS
2790  013714  104011                  ERROR1                          ;ERROR! BAR BIT CLEARED TO SOON
2791
2792                                  ;TYPEOUT SHOWS THE BAR CONTENTS AND HOW MANY CHARS WERE RECEIVED WHEN BAR FAILED
                                      ;LOCATION LINBIT HAS THE CORRECT BAR CONTENTS.
2793  013716  000432                  BR      8$                      ;EXIT TEST
2794  013720  013737  004370  013730  4$:     MOV     TIME14,5$       ;DELAY 1/4 CHARACTER TIME
2795  013726  104400                  DELAY                           ;TO ALLOW TRANSMITTER TO FINISH
2796  013730  000000                  5$:     OPEN
2797  013732  005777  165604                  TST     @CSR            ;TEST READY FLAG (SHOULD BE SET)
2798  013736  100402                  BMI     6$                      ;GO TEST BAR
2799  013740  104001                  ERROR                           ;ERROR! READY FLAG FAILED TO SET
2800  013742  000420                  BR      8$                      ;GO TO EXIT
2801  013744  005777  165574          6$:     TST     @BAR            ;TEST THAT BAR BIT IS CLEAR
2802  013750  001407                  BEQ     7$                      ;GO TO 7$ IF CLEAR
2803  013752  017737  165566  001566  MOV     @BAR,RCVDAT
2804  013760  005037  001570          CLR     XMTDAT
2805  013764  104011                  ERROR1                          ;ERROR! BAR BIT FAILED TO CLEAR
2806  013766  000406                  BR      8$
2807  013770  062737  000002  016730  7$:     ADD     #2,@#LINE
2808  013776  006337  001564          ASL     @#LINBIT
2809  014002  103301                  BCC     1$
2810  014004  104006                  8$:     SCOPE
2811
2812  014006  000074                  RT74:   74                      ;ROUTINE # 74                                   *
2813  014010  014174                          RT75                    ;ADDR OF NEXT ROUTINE                           *
2814  014012  000012                          10.                     ;ITERATION COUNT                                *
2815  014014  014016                          RT74A                   ;SCOPE ENTRY POINT                              *
2816          000074                          X=X+1
2817
2818
2819
2820
2821
2822  014016  012701  001600          RT74A:  MOV     #TUMTAB,X1      ;CLEAR THE
2823  014022  012702  000100                  MOV     #64.,X2         ;TUMBLE TABLE
2824  014026  005021                  1$:     CLR     (1)+
2825  014030  005302                          DEC     X2
2826  014032  001375                          BNE     1$
2827  014034  012701  001600                  MOV     #TUMTAB,X1
2828  014040  012777  000004  165474          MOV     #BIT2,@CSR      ;SET MAINT BIT & CLEAR GO BIT
2829  014046  005037  001570                  CLR     XMTDAT
2830  014052  005037  001566                  CLR     RCVDAT
2831  014056  012737  177677  001440          MOV     #-65.,WCT       ;SET UP TO TRANSMIT 65  CHARACTERS
2832  014064  052777  000001  165450          BIS     #BIT0,@CSR      ;SET THE GO BIT
2833  014072  012777  000001  165440          MOV     #LBIT0,@BAR     ;TRANSMIT ON LINE 0
2834  014100  105777  165436          2$:     TSTB    @CSR            ;WAIT FOR CHAR  DONE FLPG
2835  014104  100375                  BPL     2$
2836  014106  042777  000200  165426          BIC     #BIT7,  @CSR    ;CLEAR CHAR  DONE FLAG
2837  014114  005237  001566                  INC     RCVDAT          ;INCREMENT CHARACTERS
2838  014120  005237  001570                  INC     XMTDAT          ;RECEIVED COUNT
```

```
2839  014124  005711                          TST     (1)             ;TEST TT ENTRY FOR VALID
2840  014126  100402                          BMI     3$              ;DATA ENTRY
2841  014130  104011                          ERROR1                  ;ERROR! NO VALID DATA ENTRY
2842                                                                  ;TYPEOUT SHOWS # OF CHARS  RCVD WHEN ERROR OCCURED
2843  014132  000417                          BR      4$              ;GO TO SCOPE
2844  014134  005021                  3$:     CLR     (1)+            ;CLEAR TT ENTRY
2845  014136  023727  001570  000100         CMP     XMTDAT,#64.     ;HAVE 64. CHARACTERS BEEN RECEIVED
2846  014144  001355                          BNE     2$
2847  014146  005777  165370                  TST     @CSR            ;WAIT FOR THE LAST CHARACTER
2848  014152  100375                          BPL     .-4             ;TO BE TRANSMITTED
2849  014154  105777  165362                  TSTB    @CSR            ;TEST FOR DONE
2850  014160  100375                          BPL     .-4
2851  014162  005737  001600                  TST     TUMTAB          ;TEST FIRST TT ENTRY
2852  014166  100401                          BMI     4$              ;FOR VALID DATA
2853  014170  104001                          ERROR                   ;ERROR! POINTER DID NOT RETURN
2854  014172  104006                  4$:     SCOPE                   ;SCOPE
2855          000000                          A=0
2856          000000                          Y=0
2857                                  ;*******************************************************************************
2858  014174  000075                  RT75:   75                      ;ROUTINE # 75                                  *
2859  014176  014212                          RT76                    ;ADDRESS OF NEXT TEST                          *
2860  014200  000144                          100.                    ;ITERATION COUNT                               *
2861  014202  014204                          BRK0                    ;SCOPE ENTRY POINT                             *
2862          000075                          X=X+1
2863                                  ;*******************************************************************************
2864                                  ;BREAK TEST ON LINE 0.
2865  014204  004537  005456          BRK0:   JSR     5,BRKTST        ;GO DO BREAK TEST
2866  014210  000001                          LBIT0                   ;ON LINE 0
2867          000001                          Y=Y+1
2868                                  ;*******************************************************************************
2869  014212  000076                  RT76:   76                      ;ROUTINE # 76                                  *
2870  014214  014230                          RT77                    ;ADDRESS OF NEXT TEST                          *
2871  014216  000144                          100.                    ;ITERATION COUNT                               *
2872  014220  014222                          BRK1                    ;SCOPE ENTRY POINT                             *
2873          000076                          X=X+1
2874                                  ;*******************************************************************************
2875                                  ;BREAK TEST ON LINE 1.
2876  014222  004537  005456          BRK1:   JSR     5,BRKTST        ;GO DO BREAK TEST
2877  014226  000002                          LBIT1                   ;ON LINE 1
2878          000002                          Y=Y+1
2879                                  ;*******************************************************************************
2880  014230  000077                  RT77:   77                      ;ROUTINE # 77                                  *
2881  014232  014246                          RT100                   ;ADDRESS OF NEXT TEST                          *
2882  014234  000144                          100.                    ;ITERATION COUNT                               *
2883  014236  014240                          BRK2                    ;SCOPE ENTRY POINT                             *
2884          000077                          X=X+1
2885                                  ;*******************************************************************************
2886                                  ;BREAK TEST ON LINE 2
2887  014240  004537  005456          BRK2:   JSR     5,BRKTST        ;GO DO BREAK TEST
2888  014244  000004                          LBIT2                   ;ON LINE 2
2889          000003                          Y=Y+1
2890                                  ;*******************************************************************************
2891  014246  000100                  RT100:  100                     ;ROUTINE # 100                                 *
2892  014250  014264                          RT101                   ;ADDRESS OF NEXT TEST                          *
2893  014252  000144                          100.                    ;ITERATION COUNT                               *
2894  014254  014256                          BRK3                    ;SCOPE ENTRY POINT                             *
```

```
2895            000100                          X=X+1
2896                            ;*****************************************************************************
2897                            ;BREAK TEST ON LINE 3.
2898  014256    004537  005456  BRK3:   JSR     5,BRKTST        ;GO DO BREAK TEST
2899  014262    000010          LBIT3                           ;ON LINE 3
2900            000004          Y=Y+1
2901                            ;*****************************************************************************
2902  014264    000101  RT101:  101                             ;ROUTINE # 101                          *
2903  014266    014302          RT102                           ;ADDRESS OF NEXT TEST                   *
2904  014270    000144          100.                            ;ITERATION COUNT                        *
2905  014272    014274          BRK4                            ;SCOPE ENTRY POINT                      *
2906            000101          X=X+1
2907                            ;*****************************************************************************
2908                            ;BREAK TEST ON LINE 4.
2909  014274    004537  005456  BRK4:   JSR     5,BRKTST        ;GO DO BREAK TEST
2910  014300    000020          LBIT4                           ;ON LINE 4
2911            000005          Y=Y+1
2912                            ;*****************************************************************************
2913  014302    000102  RT102:  102                             ;ROUTINE # 102                          *
2914  014304    014320          RT103                           ;ADDRESS OF NEXT TEST                   *
2915  014306    000144          100.                            ;ITERATION COUNT                        *
2916  014310    014312          BRK5                            ;SCOPE ENTRY POINT                      *
2917            000102          X=X+1
2918                            ;*****************************************************************************
2919                            ;BREAK TEST ON LINE 5.
2920  014312    004537  005456  BRK5:   JSR     5,BRKTST        ;GO DO BREAK TEST
2921  014316    000040          LBIT5                           ;ON LINE 5
2922            000006          Y=Y+1
2923                            ;*****************************************************************************
2924  014320    000103  RT103:  103                             ;ROUTINE # 103                          *
2925  014322    014336          RT104                           ;ADDRESS OF NEXT TEST                   *
2926  014324    000144          100.                            ;ITERATION COUNT                        *
2927  014326    014330          BRK6                            ;SCOPE ENTRY POINT                      *
2928            000103          X=X+1
2929                            ;*****************************************************************************
2930                            ;BREAK TEST ON LINE 6.
2931  014330    004537  005456  BRK6:   JSR     5,BRKTST        ;GO DO BREAK TEST
2932  014334    000100          LBIT6                           ;ON LINE 6
2933            000007          Y=Y+1
2934                            ;*****************************************************************************
2935  014336    000104  RT104:  104                             ;ROUTINE # 104                          *
2936  014340    014354          RT105                           ;ADDRESS OF NEXT TEST                   *
2937  014342    000144          100.                            ;ITERATION COUNT                        *
2938  014344    014346          BRK7                            ;SCOPE ENTRY POINT                      *
2939            000104          X=X+1
2940                            ;*****************************************************************************
2941                            ;BREAK TEST ON LINE 7.
2942  014346    004537  005456  BRK7:   JSR     5,BRKTST        ;GO DO BREAK TEST
2943  014352    000200          LBIT7                           ;ON LINE 7
2944            000010          Y=Y+1
2945                            ;*****************************************************************************
2946  014354    000105  RT105:  105                             ;ROUTINE # 105                          *
2947  014356    014372          RT106                           ;ADDRESS OF NEXT TEST                   *
2948  014360    000144          100.                            ;ITERATION COUNT                        *
2949  014362    014364          BRK10                           ;SCOPE ENTRY POINT                      *
2950            000105          X=X+1
```

```
2951
2952
2953  014364  004537  005456          ;*****************************************************************************
2954  014370  000400                  ;BREAK TEST ON LINE 10.
2955          000011          BRK10:  JSR     5,BRKTST        ;GO DO BREAK TEST
2956                                  LBIT10                  ;ON LINE 10
2957  014372  000106                  Y=Y+1
2958  014374  014410          ;*****************************************************************************
2959  014376  000144          RT106:  106                     ;ROUTINE # 106                              *
2960  014400  014402                  RT107                   ;ADDRESS OF NEXT TEST                       *
2961          000106                  100.                    ;ITERATION COUNT                            *
2962                                  BRK11                   ;SCOPE ENTRY POINT                          *
2963                                  X=X+1                   ;                                           *
2964  014402  004537  005456  ;*****************************************************************************
2965  014406  001000          ;BREAK TEST ON LINE 11.
2966          000012          BRK11:  JSR     5,BRKTST        ;GO DO BREAK TEST
2967                                  LBIT11                  ;ON LINE 11
2968  014410  000107                  Y=Y+1
2969  014412  014426          ;*****************************************************************************
2970  014414  000144          RT107:  107                     ;ROUTINE # 107                              *
2971  014416  014420                  RT110                   ;ADDRESS OF NEXT TEST                       *
2972          000107                  100.                    ;ITERATION COUNT                            *
2973                                  BRK12                   ;SCOPE ENTRY POINT                          *
2974                                  X=X+1                   ;                                           *
2975  014420  004537  005456  ;*****************************************************************************
2976  014424  002000          ;BREAK TEST ON LINE 12.
2977          000013          BRK12:  JSR     5,BRKTST        ;GO DO BREAK TEST
2978                                  LBIT12                  ;ON LINE 12
2979  014426  000110                  Y=Y+1
2980  014430  014444          ;*****************************************************************************
2981  014432  000144          RT110:  110                     ;ROUTINE # 110                              *
2982  014434  014436                  RT111                   ;ADDRESS OF NEXT TEST                       *
2983          000110                  100.                    ;ITERATION COUNT                            *
2984                                  BRK13                   ;SCOPE ENTRY POINT                          *
2985                                  X=X+1                   ;                                           *
2986  014436  004537  005456  ;*****************************************************************************
2987  014442  004000          ;BREAK TEST ON LINE 13.
2988          000014          BRK13:  JSR     5,BRKTST        ;GO DO BREAK TEST
2989                                  LBIT13                  ;ON LINE 13
2990  014444  000111                  Y=Y+1
2991  014446  014462          ;*****************************************************************************
2992  014450  000144          RT111:  111                     ;ROUTINE # 111                              *
2993  014452  014454                  RT112                   ;ADDRESS OF NEXT TEST                       *
2994          000111                  100.                    ;ITERATION COUNT                            *
2995                                  BRK14                   ;SCOPE ENTRY POINT                          *
2996                                  X=X+1                   ;                                           *
2997  014454  004537  005456  ;*****************************************************************************
2998  014460  010000          ;BREAK TEST ON LINE 14.
2999          000015          BRK14:  JSR     5,BRKTST        ;GO DO BREAK TEST
3000                                  LBIT14                  ;ON LINE 14
3001  014462  000112                  Y=Y+1
3002  014464  014500          ;*****************************************************************************
3003  014466  000144          RT112:  112                     ;ROUTINE # 112                              *
3004  014470  014472                  RT113                   ;ADDRESS OF NEXT TEST                       *
3005          000112                  100.                    ;ITERATION COUNT                            *
3006                                  BRK15                   ;SCOPE ENTRY POINT                          *
                                        X=X+1                   ;                                           *
                                ;*****************************************************************************
```

```
3007
3008  014472  004537  005456          ;BREAK TEST ON LINE 15
3009  014476  020000                  BRK15:  JSR     5,BRKTST        ;GO DO BREAK TEST
3010          000016                          LBIT15                  ;ON LINE 15
3011                                          Y=Y+1
3012  014500  000113                  ;*****************************************************************************
3013  014502  014516                  RT113:  113                     ;ROUTINE # 113                          *
3014  014504  000144                          RT114                   ;ADDRESS OF NEXT TEST                   *
3015  014506  014510                          100.                    ;ITERATION COUNT                        *
3016          000113                          BRK16                   ;SCOPE ENTRY POINT                      *
3017                                          X=X+1
3018                                  ;*****************************************************************************
3019  014510  004537  005456          ;BREAK TEST ON LINE 16.
3020  014514  040000                  BRK16:  JSR     5,BRKTST        ;GO DO BREAK TEST
3021          000017                          LBIT16                  ;ON LINE 16
3022                                          Y=Y+1
3023  014516  000114                  ;*****************************************************************************
3024  014520  014534                  RT114.  114                     ;ROUTINE # 114                          *
3025  014522  000144                          RT115                   ;ADDRESS OF NEXT TEST                   *
3026  014524  014526                          100.                    ;ITERATION COUNT                        *
3027          000114                          BRK17                   ;SCOPE ENTRY POINT                      *
3028                                          X=X+1
3029                                  ;*****************************************************************************
3030  014526  004537  005456          ;BREAK TEST ON LINE 17.
3031  014532  100000                  BRK17:  JSR     5,BRKTST        ;GO DO BREAK TEST
3032          000020                          LBIT17                  ;ON LINE 17
3033          000000                          Y=Y+1
3034          000000                          A=0
3035                                          Y=0
3036  014534  000115                  ;*****************************************************************************
3037  014536  014552                  RT115:  115                     ;ROUTINE #115                           *
3038  014540  000144                          RT116                   ;ADDRESS OF NEXT TEST                   *
3039  014542  014544                          100.                    ;ITERATION COUNT                        *
3040          000115                          DATO                    ;SCOPE ENTRY POINT                      *
3041                                          X=X+1
3042                                  ;*****************************************************************************
3043  014544  004537  006312          ;DATA TEST 100 CHARACTERS LINE0
3044  014550  000000                  DATO:   JSR     5,DATTST        ;GO RUN DATA TEST
3045          000001                          LINE0                   ;ON LINE0
3046                                          Y=Y+1
3047  014552  000116                  ;*****************************************************************************
3048  014554  014570                  RT116:  116                     ;ROUTINE #116                           *
3049  014556  000144                          RT117                   ;ADDRESS OF NEXT TEST                   *
3050  014560  014562                          100.                    ;ITERATION COUNT                        *
3051          000116                          DAT1                    ;SCOPE ENTRY POINT                      *
3052                                          X=X+1
3053                                  ;*****************************************************************************
3054  014562  004537  006312          ;DATA TEST 100 CHARACTERS LINE1
3055  014566  000002                  DAT1:   JSR     5,DATTST        ;GO RUN DATA TEST
3056          000002                          LINE1                   ;ON LINE1
3057                                          Y=Y+1
3058  014570  000117                  ;*****************************************************************************
3059  014572  014606                  RT117:  117                     ;ROUTINE #117                           *
3060  014574  000144                          RT120                   ;ADDRESS OF NEXT TEST                   *
3061  014576  014600                          100.                    ;ITERATION COUNT                        *
3062          000117                          DAT2                    ;SCOPE ENTRY POINT                      *
                                              X=X+1
```

```
3063
3064
3065  014600  004537  006312          ;*****************************************************************************
3066  014604  000004                  ;DATA TEST 100 CHARACTERS LINE2
3067          000003          DAT2:   JSR     5,DATTST        ;GO RUN DATA TEST
3068                                  LINE2                   ;ON LINE2
3069  014606  000120                  Y=Y+1
3070  014610  014624          ;*****************************************************************************
3071  014612  000144          RT120:  120                     ;ROUTINE #120                              *
3072  014614  014616                  RT121                   ;ADDRESS OF NEXT TEST                      *
3073          000120                  100.                    ;ITERATION COUNT                           *
3074                                  DAT3                    ;SCOPE ENTRY POINT                         *
3075                                  X=X+1
3076  014616  004537  006312  ;*****************************************************************************
3077  014622  000006          ;DATA TEST 100 CHARACTERS LINE3
3078          000004          DAT3    JSR     5,DATTST        ;GO RUN DATA TEST
3079                                  LINE3                   ;ON LINE3
3080  014624  000121                  Y=Y+1
3081  014626  014642          ;*****************************************************************************
3082  014630  000144          RT121:  121                     ;ROUTINE #121                              *
3083  014632  014634                  RT122                   ;ADDRESS OF NEXT TEST                      *
3084          000121                  100.                    ;ITERATION COUNT                           *
3085                                  DAT4                    ;SCOPE ENTRY POINT                         *
3086                                  X=X+1
3087  014634  004537  006312  ;*****************************************************************************
3088  014640  000010          ;DATA TEST 100 CHARACTERS LINE4
3089          000005          DAT4:   JSR     5,DATTST        ;GO RUN DATA TEST
3090                                  LINE4                   ;ON LINE4
3091  014642  000122                  Y=Y+1
3092  014644  014660          ;*****************************************************************************
3093  014646  000144          RT122:  122                     ;ROUTINE #122                              *
3094  014650  014652                  RT123                   ;ADDRESS OF NEXT TEST                      *
3095          000122                  100.                    ;ITERATION COUNT                           *
3096                                  DAT5                    ;SCOPE ENTRY POINT                         *
3097                                  X=X+1
3098  014652  004537  006312  ;*****************************************************************************
3099  014656  000012          ;DATA TEST 100 CHARACTERS LINE5
3100          000006          DAT5:   JSR     5,DATTST        ;GO RUN DATA TEST
3101                                  LINE5                   ;ON LINE5
3102  014660  000123                  Y=Y+1
3103  014662  014676          ;*****************************************************************************
3104  014664  000144          RT123:  123                     ;ROUTINE #123                              *
3105  014666  014670                  RT124                   ;ADDRESS OF NEXT TEST                      *
3106          000123                  100.                    ;ITERATION COUNT                           *
3107                                  DAT6                    ;SCOPE ENTRY POINT                         *
3108                                  X=X+1
3109  014670  004537  006312  ;*****************************************************************************
3110  014674  000014          ;DATA TEST 100 CHARACTERS LINE6
3111          000007          DAT6:   JSR     5,DATTST        ;GO RUN DATA TEST
3112                                  LINE6                   ;ON LINE6
3113  014676  000124                  Y=Y+1
3114  014700  014714          ;*****************************************************************************
3115  014702  000144          RT124:  124                     ;ROUTINE #124                              *
3116  014704  014706                  RT125                   ;ADDRESS OF NEXT TEST                      *
3117          000124                  100.                    ;ITERATION COUNT                           *
3118                                  DAT7                    ;SCOPE ENTRY POINT                         *
                                        X=X+1
                        ;*****************************************************************************
```

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3119
3120  014706  004537  006312          ;DATA TEST 100 CHARACTERS LINE7
3121  014712  000016          DAT7:   JSR     5,DATTST        ;GO RUN DATA TEST
3122          000010                  LINE7                   ;ON LINE7
3123                                  Y=Y+1
3124  014714  000125          ;*********************************************************************************************
3125  014716  014732          RT125:  125                     ;ROUTINE #125                                        *
3126  014720  000144                  RT126                   ;ADDRESS OF NEXT TEST                                *
3127  014722  014724                  100.                    ;ITERATION COUNT                                     *
3128          000125                  DAT10                   ;SCOPE ENTRY POINT                                   *
3129                                  X=X+1
3130                          ;*********************************************************************************************
3131  014724  004537  006312  ;DATA TEST 100 CHARACTERS LINE10
3132  014730  000020          DAT10:  JSR     5,DATTST        ;GO RUN DATA TEST
3133          000011                  LINE10                  ;ON LINE10
3134                                  Y=Y+1
3135  014732  000126          ;*********************************************************************************************
3136  014734  014750          RT126:  126                     ;ROUTINE #126                                        *
3137  014736  000144                  RT127                   ;ADDRESS OF NEXT TEST                                *
3138  014740  014742                  100                     ;ITERATION COUNT                                     *
3139          000126                  DAT11                   ;SCOPE ENTRY POINT                                   *
3140                                  X=X+1
3141                          ;*********************************************************************************************
3142  014742  004537  006312  ;DATA TEST 100 CHARACTERS LINE11
3143  014746  000022          DAT11:  JSR     5,DATTST        ;GO RUN DATA TEST
3144          000012                  LINE11                  ;ON LINE11
3145                                  Y=Y+1
3146  014750  000127          ;*********************************************************************************************
3147  014752  014766          RT127:  127                     ;ROUTINE #127                                        *
3148  014754  000144                  RT130                   ;ADDRESS OF NEXT TEST                                *
3149  014756  014760                  100.                    ;ITERATION COUNT                                     *
3150          000127                  DAT12                   ;SCOPE ENTRY POINT                                   *
3151                                  X=X+1
3152                          ;*********************************************************************************************
3153  014760  004537  006312  ;DATA TEST 100 CHARACTERS LINE12
3154  014764  000024          DAT12:  JSR     5,DATTST        ;GO RUN DATA TEST
3155          000013                  LINE12                  ;ON LINE12
3156                                  Y=Y+1
3157  014766  000130          ;*********************************************************************************************
3158  014770  015004          RT130:  130                     ;ROUTINE #130                                        *
3159  014772  000144                  RT131                   ;ADDRESS OF NEXT TEST                                *
3160  014774  014776                  100.                    ;ITERATION COUNT                                     *
3161          000130                  DAT13                   ;SCOPE ENTRY POINT                                   *
3162                                  X=X+1
3163                          ;*********************************************************************************************
3164  014776  004537  006312  ;DATA TEST 100 CHARACTERS LINE13
3165  015002  000026          DAT13:  JSR     5,DATTST        ;GO RUN DATA TEST
3166          000014                  LINE13                  ;ON LINE13
3167                                  Y=Y+1
3168  015004  000131          ;*********************************************************************************************
3169  015006  015022          RT131:  131                     ;ROUTINE #131                                        *
3170  015010  000144                  RT132                   ;ADDRESS OF NEXT TEST                                *
3171  015012  015014                  100.                    ;ITERATION COUNT                                     *
3172          000131                  DAT14                   ;SCOPE ENTRY POINT                                   *
3173                                  X=X+1
3174                          ;*********************************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE14
```

```
3175  015014  004537  006312          DAT14:  JSR     5,DATTST        ;GO RUN DATA TEST
3176  015020  000030                          LINE14                  ;ON LINE14
3177          000015                          Y=Y+1
3178                          ;*****************************************************************************
3179  015022  000132          RT132:  132                             ;ROUTINE #132                    *
3180  015024  015040                  RT133                           ;ADDRESS OF NEXT TEST            *
3181  015026  000144                  100.                            ;ITERATION COUNT                 *
3182  015030  015032                  DAT15                           ;SCOPE ENTRY POINT               *
3183          000132                  X=X+1
3184                          ;*****************************************************************************
3185                          ;DATA TEST 100 CHARACTERS LINE15
3186  015032  004537  006312  DAT15:  JSR     5,DATTST        ;GO RUN DATA TEST
3187  015036  000032                  LINE15                  ;ON LINE15
3188          000016                  Y=Y+1
3189                          ;*****************************************************************************
3190  015040  000133          RT133:  133                             ;ROUTINE #133                    *
3191  015042  015056                  RT134                           ;ADDRESS OF NEXT TEST            *
3192  015044  000144                  100.                            ;ITERATION COUNT                 *
3193  015046  015050                  DAT16                           ;SCOPE ENTRY POINT               *
3194          000133                  X=X+1
3195                          ;*****************************************************************************
3196                          ;DATA TEST 100 CHARACTERS LINE16
3197  015050  004537  006312  DAT16:  JSR     5,DATTST        ;GO RUN DATA TEST
3198  015054  000034                  LINE16                  ;ON LINE16
3199          000017                  Y=Y+1
3200                          ;*****************************************************************************
3201  015056  000134          RT134:  134                             ;ROUTINE #134                    *
3202  015060  015074                  RT135                           ;ADDRESS OF NEXT TEST            *
3203  015062  000144                  100.                            ;ITERATION COUNT                 *
3204  015064  015066                  DAT17                           ;SCOPE ENTRY POINT               *
3205          000134                  X=X+1
3206                          ;*****************************************************************************
3207                          ;DATA TEST 100 CHARACTERS LINE17
3208  015066  004537  006312  DAT17:  JSR     5,DATTST        ;GO RUN DATA TEST
3209  015072  000036                  LINE17                  ;ON LINE17
3210          000020                  Y=Y+1
3211                          ;*****************************************************************************
3212  015074  000135          RT135:  135                             ;ROUTINE # 135                   *
3213  015076  015474                  RT136                           ;ADDR OF NEXT ROUTINE.           *
3214  015100  000144                  100.                            ;ITERATION COUNT                 *
3215  015102  015104                  RT135A                          ;SCOPE ENTRY POINT.              *
3216          000135                  X=X+1
3217                          ;*****************************************************************************
3218
3219
3220                          ;TEST THAT DATA (ALL 1'S) CAN BE TRANSMITTED ON LINES SIMULTANEOUSLY
3221                          ;THE FOLLOWING TESTS ARE PERFORMED:
3222                          ;       THERE ARE 16. DATA ENTRIES
3223                          ;       THERE ISN'T A 17TH ENTRY
3224                          ;       DATA RECEIVED IS CORRECT
3225                          ;       ONE DATA ENTRY PER LINE
3226  015104  005037  001600  RT135A: CLR      TUMTAB          ;CLEAR THE
3227  015110  004537  006224          JSR     5,BMOVE         ;TUMBLE
3228  015114  001600                  TUMTAB                  ;TABLE
3229  015116  001601                  TUMTAB+1                ;(200
3230  015120  000177                  177                     ;ENTRIES)
```

```
3231  015122  012737  177777  017102          MOV     #-1,OUTBUF      ;LOAD CHAR INTO OUTPUT BUFFER
3232  015130  005000                          CLR     %0              ;SET R0 = LINE 0
3233  015132  012737  000001  001564          MOV     #LBIT0,LINBIT   ;GET LINE BIT
3234  015140  012777  000001  164374          MOV     #BIT0,@CSR      ;SET THE GO BIT
3235  015146  010037  016730          1$:     MOV     %0,LINE         ;GET LINE NUMBER
3236  015152  004537  006246                  JSR     5,XMITD         ;TRANSMIT 1 CHAR.
3237  015156  177777                          -1                      ;ON EACH LINE
3238  015160  005720                          TST     (0)+            ;INCREMENT LINE NUMBER (+2)
3239  015162  006337  001564                  ASL     LINBIT          ;SHIFT LINE BIT TO NEXT LINE
3240  015166  103367                          BCC     1$              ;BRANCH IF ALL LINES NOT DONE
3241  015170  013737  004366  015200          MOV     TIME1,2$        ;PUT TIME TO TRANSMIT 1 CHAR
3242  015176  104400                          DELAY                   ;DELAY 1
3243  015200  000000                  2$      OPEN                    ;CHARACTER TIME
3244  015202  017737  164336  001566          MOV     @BAR,RCVDAT     ;GET & TEST BAR CONTENTS
3245  015210  001410                          BEQ     3$              ;BRANCH IF 0
3246  015212  005037  001570                  CLR     XMTDAT
3247  015216  104011                          ERROR1                  ;ERROR! BAR NOT CLEAR AFTER ALL
3248  015220  005077  164320                  CLR     @BAR            ;LINES FINISHED
3249  015224  005077  164312                  CLR     @CSR
3250  015230  000520                          BR      16$             ;GO TO EXIT
3251  015232  032777  020000  164302  3$      BIT     #BIT13,@CSR     ;TEST THAT OVER RUN DID NOT SET
3252  015240  001404                          BEQ     4$
3253  015242  104001                          ERROR                   ;ERROR! OVER RUN BIT SET
3254  015244  005077  164272                  CLR     @CSR
3255  015250  000510                          BR      16$             ;GO TO EXIT
3256
3257                                  ;TEST THAT THERE ARE 16  VALID DATA ENTRIES
3258  015252  005077  164264          4$:     CLR     @CSR            ;CLEAR THE CSR
3259  015256  012702  000020                  MOV     #16.,X2         ;GET TT SCAN COUNT
3260  015262  012701  001600                  MOV     #TUMTAB,X1      ;GET FIRST TT ADDRESS
3261  015266  005302                  5$:     DEC     X2              ;DECREMENT SCAN COUNTER
3262  015270  100404                          BMI     6$              ;BRANCH IF 16. ENTRIES SCANNED
3263  015272  005721                          TST     (1)+            ;TEST FOR VALID DATA ENTRY
3264  015274  100774                          BMI     5$              ;BRANCH IF FOUND
3265  015276  104001                          ERROR                   ;ERROR! MISING DATA ENTRY
3266  015300  000474                          BR      16$             ;GO TO EXIT
3267  015302  005721                  6$:     TST     (1)+            ;TEST 17TH ENTRY (SHOULD BE = TO 0)
3268  015304  001402                          BEQ     7$              ;BRANCH IF 0
3269  015306  104001                          ERROR                   ;ERROR! EXTRA DATA ENTRY
3270  015310  000470                          BR      16$             ;GO TO EXIT
3271
3272                                  ;TEST THAT THE DATA IS CORRECT IN ALL 16. ENTRIES
3273  015312  012701  001600          7$:     MOV     #TUMTAB,X1      ;GET FIST TT ADDRESS
3274  015316  012702  000020                  MOV     #16.,X2         ;GET SCAN COUNT
3275  015322  005302                  8$:     DEC     X2              ;DECREMENT SCAN COUNT
3276  015324  100421                          BMI     10$             ;BRANCH IF 16. ENTRIES SCANNED
3277  015326  013737  017102  001570          MOV     OUTBUF,XMTDAT   ;GET TRANSMITTED DATA
3278  015334  043737  001572  001570          BIC     CARMSK,XMTDAT   ;CLEAR NON-TRANSMITTED BITS
3279  015342  113737  001600  001566          MOVB    TUMTAB,RCVDAT   ;GET RECEIVED DATA
3280  015350  123737  001570  001566          CMPB    XMTDAT,RCVDAT   ;COMPARE DATA
3281  015356  001402                          BEQ     9$
3282  015360  104011                          ERROR1                  ;ERROR  INCORRECT DATA
3283  015362  000443                          BR      16$             ;GO TO EXIT
3284  015364  005721                  9$:     TST     (1)+            ;INCREMENT TT ADDRESS
3285  015366  000755                          BR      8$              ;TEST NEXT ENTRY
3286
```

```
3287
3288  015370  012701  001600          ;CLEAR ALL BUT LINE NUMBER IN TUMBLE TABLE ENTRY
3289  015374  012702  000020  10$:    MOV     #TUMTAB,%1      ;GET FIRST TT ADDRESS
3290  015400  005302                  MOV     #16.,%2         ;GET SCAN COUNT
3291  015402  100403          11$:    DEC     %2              ;DECREMENT SCAN COUNT
3292  015404  042721  160777          BMI     12$             ;BRANCH IF ALL LINES TESTED
3293  015410  000773                  BIC     #160777,(1)+    ;CLEAR ALL BUT LINE NUMBER IN TT
3294                                  BR      11$             ;DO NEXT TT ADDRESS
3295
3296  015412  005037  001570          ;TEST THAT THERE IS AN ENTRY FOR EACH OF THE 16  LINES
3297  015416  012701  000020  12$:    CLR     XMTDAT
3298  015422  012702  000020          MOV     #16.,%1
3299  015426  012700  001600  13$:    MOV     #16.,%2
3300  015432  023720  001570          MOV     #TUMTAB,%0
3301  015436  001406          14$:    CMP     XMTDAT,(0)+     ;TEST FOR LINE ENTRY
3302  015440  005302                  BEQ     15$             ;BRANCH IF FOUND
3303  015442  001373                  DEC     %2              ;DECREMENT SCAN COUNT
3304  015444  005037  001566          BNE     14$             ;LOOK AT NEXT ENTRY
3305  015450  104011                  CLR     RCVDAT
3306  015452  000407                  ERROR1                  ;ERROR! NO ENTRY FOUND FOR THIS LINE
3307  015454  005301                  BR      16$             ;GO TO EXIT
3308  015456  005701          15$.    DEC     %1              ;DECREMENT LINES FOUND COUNT
3309  015460  001404                  TST     %1
3310  015462  062737  001000  001570  BEQ     16$             ;BRANCH IF ALL LINE TESTED
3311  015470  000754                  ADD     #1000,XMTDAT    ;INCREMENT LINE NUMBER
3312  015472  104006                  BR      13$             ;GO DO NEXT LINE
3313                          16$:    SCOPE                   ;SCOPE
3314  015474  000136          ;*****************************************************************************
3315  015476  016010  RT136:  136                             ;ROUTINE # 136                              *
3316  015500  000144                  RT137                   ;ADDR OF NEXT ROUTINE                       *
3317  015502  015504                  100.                    ;ITERATION COUNT                            *
3318          000136                  RT136A                  ;SCOPE ENTRY POINT.                         *
3319                                  X=X+1
3320                          ;*****************************************************************************
3321
3322  015504  013737  004366  015560  ;TEST THAT THE DM11 CAN TRANSMIT A BREAK ON ALL LINES SIMULTANEOUSLY
3323  015512  005037  001600  RT136A: MOV     @#TIME1,1$      ;GET TIME TO TRANSMIT ONE CHARACTER
3324  015516  004537  006224          CLR     TUMTAB          ;CLEAR
3325  015622  001600                  JSR     5,BMOVE         ;THE
3326  015624  001601                  TUMTAB                  ;TUMBLE
3327  015626  000177                  TUMTAB+1                ;TABLE
3328  015630  012777  000001  164004  177
3329  015636  012777  177777  164002  MOV     #BIT0,@#CSR     ;SET GO
3330  015644  105777  163772          MOV     #-1,@#KCSR      ;SET BREAK BIT FOR ALL LINES
3331  015650  100375                  TSTB    @#CSR           ;WAIT FOR THE RECEIVER
3332  015652  005077  163770          BPL     .-4             ;TO RECEIVE A BREAK
3333  015656  104400                  CLR     @#KCSR          ;CLEAR ALL BREAK BITS
3334  015660  000000                  DELAY                   ;WAIT ONE CHARACTER
3335  015662  022777  000201  163752  1$:     OPEN                    ;TIME
3336  015670  001410                  CMP     #201,@#CSR      ;TEST THAT ONLY GO AND DONE ARE SET
3337  015672  017737  163744  001566  BEQ     2$
3338  015600  012737  000201  001570  MOV     @#CSR,RCVDAT    ;GET CSR ENTRY
3339  015606  104011                  MOV     #201,XMTDAT     ;GET CORRECT RESULT
3340  015610  000476                  ERROR1                  ;ERROR! INCORRECT CSR DATA
3341                                  BR      13$             ;EXIT
3342
                        ;TEST THAT THERE IS 16. VALID DATA ENTRIES
```

```
3343  015612  012701  001600          2$      MOV     #TUMTAB,%1      ;GET TUMBLE TABLE BASE ADDRESS
3344  015616  012702  000020                  MOV     #16.,%2         ;GET SCAN COUNT
3345  015622  005721                  3$      TST     (1)+            ;TEST FOR VALID DATA ENTRY
3346  015624  100402                          BMI     4$              ;BRANCH IF VALID DATA ENTRY FOUND
3347  015626  104001                          ERROR                   ;ERROR! MISSING VALID DATA ENTRY
3348  015630  000466                          BR      13$             ;EXIT
3349  015632  005302                  4$      DEC     %2              ;DECREMENT SCAN COUNT
3350  015634  001372                          BNE     3$              ;BRANCH IF 16. ENTRIES NOT SCANNED
3351
3352                                  ;TEST THAT THE BREAK BIT IS SET IN 16. TUMBLE TABLE ENTRIES
3353  015636  012701  001600                  MOV     #TUMTAB,%1
3354  015642  012702  000020                  MOV     #16.,%2
3355  015646  032721  040000          5$      BIT     #BIT14,(1)+     ;BREAK BIT SET?
3356  015652  001002                          BNE     6$              ;BRANCH IF SET
3357  015654  104001                          ERROR                   ;ERROR! MISSING BREAK BIT
3358  015656  000453                          BR      13$             ;EXIT
3359  015660  005302                  6$      DEC     %2              ;DECREMENT SCAN COUNT
3360  015662  001371                          BNE     5$
3361
3362                                  ;TEST THAT THE TUMBLE TABLE DATA BYTE IS ALL 0'S
3363  015664  012701  001600                  MOV     #TUMTAB,%1
3364  015670  012702  000020                  MOV     #16.,%2
3365  015674  105721                  7$:     TSTB    (1)+            ;TEST DATA BYTE
3366  015676  001402                          BEQ     8$              ;BRANCH IF 0'S
3367  015700  104001                          ERROR                   ;ERROR! INCORRECT DATA
3368  015702  000441                          BR      13$             ;EXIT
3369  015704  105721                  8$:     TSTB    (1)+            ;STEP TABLE POINTER TO NEXT DATA BYTE
3370  015706  005302                          DEC     %2
3371  015710  001371                          BNE     7$
3372
3373                                  ;CLEAR ALL BUT LINE NUMBER IN TUMBLE TABLE ENTRY
3374  015712  012701  001600                  MOV     #TUMTAB,%1
3375  015716  012702  000020                  MOV     #16.,%2
3376  015722  042721  160777          9$:     BIC     #160777,(1)+    ;CLEAR ALL BUT LINE NUMBER
3377  015726  005302                          DEC     %2
3378  015730  001374                          BNE     9$
3379
3380                                  ;TEST THAT THERE IS A TUMBLE TABLE ENTRY FOR EACH LINE
3381  015732  005004                          CLR     %4              ;CLEAR LINE NUMBER
3382  015734  012703  000020                  MOV     #16.,%3
3383  015740  012702  000020          10$:    MOV     #16.,%2
3384  015744  012701  001600                  MOV     #TUMTAB,%1
3385  015750  020421                  11$:    CMP     %4,(1)+         ;TEST FOR LINR ENTRY FOR THIS LINE
3386  015752  001410                          BEQ     12$             ;BRANCH IF FOUND
3387  015754  005302                          DEC     %2
3388  015756  001374                          BNE     11$
3389  015760  010437  001570                  MOV     %4,XMTDAT
3390  015764  010437  001566                  MOV     %4,RCVDAT
3391  015770  104011                          ERROR1                  ;ERROR! NO LINE ENTRY FOUND FOR THIS LINE
3392  015772  000405                          BR      13$             ;EXIT
3393  015774  005303                  12$:    DEC     %3              ;ALL LINES BEEN FOUND
3394  015776  001403                          BEQ     13$             ;EXIT IF YES
3395  016000  062704  001000                  ADD     #1000,%4        ;SEARCH FOR
3396  016004  000755                          BR      10$             ;NEXT LINE
3397  016006  104006                  13$:    SCOPE                   ;SCOPE
3398                                  ;*****************************************************************************
```

```
 3399  016010  000137                RT137:  137                     ;ROUTINE # 137                  *
 3400  016012  016026                        RT140                   ;ADDR OF NEXT ROUTINE           *
 3401  016014  000002                        2                       ;ITERATION COUNT                *
 3402  016016  016020                        RT137A                  ;SCOPE ENTRY POINT.             *
 3403          000137                        X=X+1
 3404                                ;*****************************************************************
 3405
 3406
 3407                                ;TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
                                     ;NEXT LINE.
 3408  016020  004537  005602        RT137A: JSR     5,@#DLYXMT      ;GO DO TEST. DELAY
 3409  016024  000040                        32.                     ;THIS MUCH BETWEEN LINES
 3410                                ;*****************************************************************
 3411  016026  000140                RT140:  140                     ;ROUTINE # 140                  *
 3412  016030  016044                        RT141                   ;ADDR OF NEXT ROUTINE.          *
 3413  016032  000002                        2                       ;ITERATION COUNT                *
 3414  016034  016036                        RT140A                  ;SCOPE ENTRY POINT.             *
 3415          000140                        X=X+1
 3416                                ;*****************************************************************
 3417
 3418
 3419                                ;TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
                                     ;NEXT LINE.
 3420  016036  004537  005602        RT140A: JSR     5,@#DLYXMT      ;GO DO TEST. DELAY
 3421  016042  000020                        16.                     ;THIS MUCH BETWEEN LINES
 3422                                ;*****************************************************************
 3423  016044  000141                RT141:  141                     ;ROUTINE # 141                  *
 3424  016046  016062                        RT142                   ;ADDR OF NEXT ROUTINE.          *
 3425  016050  000002                        2                       ;ITERATION COUNT                *
 3426  016052  016054                        RT141A                  ;SCOPE ENTRY POINT.             *
 3427          000141                        X=X+1
 3428                                ;*****************************************************************
 3429
 3430
 3431                                ;TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
                                     ;NEXT LINE.
 3432  016054  004537  005602        RT141A: JSR     5,@#DLYXMT      ;GO DO TEST. DELAY
 3433  016060  000010                        8.                      ;THIS MUCH BETWEEN LINES
 3434                                ;*****************************************************************
 3435  016062  000142                RT142:  142                     ;ROUTINE # 142                  *
 3436  016064  016100                        RT143                   ;ADDR OF NEXT ROUTINE.          *
 3437  016066  000002                        2                       ;ITERATION COUNT                *
 3438  016070  016072                        RT142A                  ;SCOPE ENTRY POINT.             *
 3439          000142                        X=X+1
 3440                                ;*****************************************************************
 3441
 3442
 3443                                ;TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
                                     ;NEXT LINE.
 3444  016072  004537  005602        RT142A: JSR     5,@#DLYXMT      ;GO DO TEST. DELAY
 3445  016076  000004                        4                       ;THIS MUCH BETWEEN LINES
 3446                                ;*****************************************************************
 3447  016100  000143                RT143:  143                     ;ROUTINE # 143                  *
 3448  016102  016116                        RT144                   ;ADDR OF NEXT ROUTINE.          *
 3449  016104  000002                        2                       ;ITERATION COUNT                *
 3450  016106  016110                        RT143A                  ;SCOPE ENTRY POINT.             *
 3451          000143                        X=X+1
 3452                                ;*****************************************************************
 3453
 3454                                ;TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
```

```
3455
3456  016110  004537  005602          ;NEXT LINE.
3457  016114  000002          RT143A: JSR     5,@#DLYXMT      ;GO DO TEST. DELAY
3458                                  2                       ;THIS MUCH BETWEEN LINES
3459  016116  000144          ;*********************************************************************
3460  016120  016134          RT144:  144                     ;ROUTINE # 144                    *
3461  016122  000002                  RT145                   ;ADDR OF NEXT ROUTINE.            *
3462  016124  016126                  2                       ;ITERATION COUNT                  *
3463          000144                  RT144A                  ;SCOPE ENTRY POINT                *
3464                                  X=X+1
3465          ;*********************************************************************
3466
3467          ;TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
3468  016126  004537  005602          ;NEXT LINE.
3469  016132  000001          RT144A: JSR     5,@#DLYXMT      ;GO DO TEST. DELAY
3470                                  1                       ;THIS MUCH BETWEEN LINES
3471  016134  000145          ;*********************************************************************
3472  016136  016302          RT145:  145                     ;ROUTINE # 145                    *
3473  016140  000144                  RT146                   ;ADDR OF NEXT ROUTINE.            *
3474  016142  016144                  100.                    ;ITERATION COUNT                  *
3475          000145                  RT145A                  ;SCOPE ENTRY POINT.               *
3476                                  X=X+1
3477          ;*********************************************************************
3478
3479          ;TEST THAT THE DM11 WORKS PROPERLY WHEN THE HALF-DUPLEX BIT (CSR BIT 1)
3480          ;IS SET.  THE TEST TRANSMITS DATA ON LINE 0, AND 'BREAKS' ON LINE 1.  ONLY
3481  016144  005037  001600  ;THE BREAK SHOULD BE RECEIVED ON LINE 0 IN THE TUMBLE TABLE.
3482  016150  005037  001602  RT145A: CLR     TUMTAB          ;CLEAR THE FIRST TWO
3483  016154  012737  017102  001400          CLR     TUMTAB+2        ;TUMBLE TABLE ENTRIES
3484  016162  012737  177777  001440          MOV     #OUTBUF,CAT     ;SET UP TO
3485  016170  012777  000007  163344          MOV     #-1,WCT         ;TRANSMIT 1 CHARACTER
3486  016176  012777  000001  163340          MOV     #7,@CSR         ;SET GO, HALF DUPLEX & MAINT BITS
3487  016204  012777  000002  163334          MOV     #LBIT0,@BAR     ;TRANSMIT 1 CHAR. ON LINE 0
3488  016212  105777  163324                  MOV     #LBIT1,@BKCSR   ;SET BREAK ON LINE 1
3489  016216  100375                          TSTB    @CSR            ;WAIT FOR THE CHARACTER
3490  016220  005077  163322                  BPL     .-4             ;TO BE RECEIVED
3491                                          CLR     @BKCSR          ;CLEAR THE BREAK BIT ON LINE 1
3492
3493  016224  022737  141000  001600  ;TEST THAT ONLY THE BREAK WAS RECEIVED
3494  016232  001410                  CMP     #141000,TUMTAB  ;TDST FOR BREAK ENTRY (LINE 1)
3495  016234  013737  001600  001566          BEQ     1$
3496  016242  012737  141000  001570          MOV     TUMTAB,RCVDAT   ;GET ACTUAL ENTRY
3497  016250  104011                          MOV     #141000,XMTDAT  ;GET CORRECT ENTRY
3498  016252  000407                          ERROR1                  ;ERROR! INCORRECT BREAK ENTRY
3499  016254  013737  001602  001566  1$:     BR      2$              ;GO TO EXIT
3500  016262  001403                          MOV     TUMTAB+2,RCVDAT ;TEST THAT NEXT ENTRY IS CLEAR
3501  016264  005037  001570                  BEQ     2$              ;EXIT IF CORRECT
3502  016270  104011                          CLR     XMTDAT
3503  016272  005777  163244          2$:     ERROR1                  ;ERROR! SECOND ENTRY WAS NOT CLEAR
3504  016276  100375                          TST     @CSR            ;WAIT FOR THE TRANSMITTER
3505  016300  104006                          BPL     .-4             ;TO FINISH
3506                                          SCOPE                   ;SCOPE
3507  016302  000146          ;*********************************************************************
3508  016304  177777  RT146:  146                     ;ROUTINE # 146                    *
3509  016306  000144                  RTLAST                  ;ADDR OF NEXT ROUTINE.            *
3510  016310  016312                  100.                    ;ITERATION COUNT                  *
                                      RT146A                  ;SCOPE ENTRY POINT.               *
```

```
            000146                                  X=X+1
                                            ;*****************************************************************
                                            ;TEST THAT THE DM11 RESPONDS CORRECTLY TO A RESET
016312  012737  017102  001400      RT146A: MOV     #OUTBUF,CAT         ;SET UP TO TRANSMIT 10
016320  012737  177770  001440              MOV     #-10,WCT            ;CHARACTERS ON LINE 0
016326  013737  004366  016376              MOV     TIME1,2$            ;GET TIME TO TRANSMIT 2 CHARACTERS
016334  013737  004366  016442              MOV     TIME1,6$
016342  005037  001570                      CLR     XMTDAT
016346  012777  000007  163166              MOV     #7,@CSR             ;SET MAINT., HALF DUPLEX & GO BITS
016354  012777  000001  163162              MOV     #LBIT0,@BAR         ;START TO TRANSMIT ON LINE 0
016362  012777  000002  163156              MOV     #LBIT1,@BKCSR       ;BREAK ON LINE 1
016370  012704  000002                      MOV     #2,%4
016374  104400                      1$:     DELAY                       ;WAIT 2 CHARACTER
016376  000000                      2$      OPEN                        ;TIMES
016400  005304                              DEC     %4
016402  001374                              BNE     1$
016404  104005                              SRESET                      ;RESET
016406  017737  163130  001566              MOV     @CSR,RCVDAT         ;GET CSR CONTENTS
016414  001401                              BEQ     3$                  ;BRANCH IF 0
016416  104011                              ERROR1                      ;ERROR! CSR DID NOT CLEAR
016420  017737  163120  001566      3$.     MOV     @BAR,RCVDAT         ;GET BAR CONTENTS
016426  001402                              BEQ     4$                  ;BRANCH IF 0
016430  104011                              ERROR1                      ;ERROR! BAR IS NOT CLEAR
016432  000427                              BR      5$                  ,EXIT
016434  012704  000010              4$:     MOV     #8.,%4
016440  104400                      5$:     DELAY                       ;WAIT 8 MORE CHARACTER TIMES
016442  000000                      6$:     OPEN
016444  005304                              DEC     %4
016446  001374                              BNE     5$
016450  017737  163066  001566              MOV     @CSR,RCVDAT         ;TEST THAT CSR IS CLEAR
016456  001402                              BEQ     7$
016460  104011                              ERROR1                      ;ERROR! CSR WAS NOT CLEAR
016462  000413                              BR      9$                  ;GO TO EXIT
016464  017737  163054  001566      7$:     MOV     @BAR,RCVDAT         ;TES THAT BAR IS CLEAR
016472  001402                              BEQ     8$
016474  104011                              ERROR1                      ;ERROR! BAR DID NOT CLEAR
016476  000405                              BR      9$
016500  017737  163042  001566      8$:     MOV     @BKCSR,RCVDAT       ;TEST THAT BKCSR IS CLEAR
016506  001401                              BEQ     9$
016510  104011                              ERROR1                      ;ERROR! BKCSR DID NOT CLEAR
016512  104006                      9$      SCOPE                       ;SCOPE
```

```
3553
3554  016514
3555  016514  104000
3556  016516  020117
3557  016520  004737  016720
3558  016524  004737  016772
3559  016530  005777  163010
3560  016534  001375
3561  016536  005077  163000
3562  016542  005037  016570
3563  016546  017737  162430  016570
3564  016554  042737  000377  016570
3565  016562  000337  016570
3566  016566  104400
3567  016570  000000
3568  016572  000754
3569
3570
                        ;PRG1- TRANSMITTER SCOPE LOOP
PRG1:
                TYPE                            ;BEGIN
                PRG1M                           ;TYPE PROGRAM TITLE
                JSR     7,PARAM                 ;GO GET USER PARAMETERS
PRG1R:          JSR     7,LOOP                  ;GO LOOP TRANSMITTER
PRG1B:          TST     @BAR                    ;WAIT FOR ALL LINES TO FINISH
                BNE     PRG1B                   ;BRANCH IF NOT DONE
PRG1C:          CLR     @CSR                    ;CLEAR THE CSR
                CLR     PRG1D                   ;CLEAR DELAY TIME
                MOV     @SWR,PRG1D              ;GET DELAY                      ;,,++D
                BIC     #377,PRG1D                                              ;,;++D
                SWAB    PRG1D                                                   ;,,++D
                DELAY                           ;DELAY AS SPECIFIED
PRG1D.          OPEN                            ;BY USER
                BR      PRG1R                   ;LOOP BACK
```

```
3571
3572
3573  016574
3574  016574  104000                        ;PRG2- RECEIVER SCOPE LOOP
3575  016576  020135                PRG2:
3576  016600  004737  016720                        TYPE                    ;BEGIN
3577  016604  004737  016772                        PRG2M                   ;TYPE PROGRAM
3578  016610  012777  000001  162724        PRG2R:  JSR     7,PARAM         ;TITLE
3579  016616  005777  162722                PRG2A:  MOV     #BIT0,@CSR      ;GO GET USER PARAMETERS
3580  016622  001415                        PRG2AA: TST     @BAR            ;GO START TRANSMITTER
3581  016624  105777  162712                        BEQ     PRG2B           ;SET GO,CLEAR THE OTHERS
3582  016630  100372                        PRG2AA  TSTB    @CSR            ;HAVE ALL LINES SELECTED FINISHED
3583  016632  042777  000200  162702        PRG2AA  BIC     #BIT7,@CSR      ;BRANCH IF FINISHED TRANSMITTING
3584  016640  020127  001776                PRG2AA  CMP     %1,#TUMTAB+176  ;WAIT FOR THE RECEIVER TO
3585  016644  001002                        PRG2AA  BNE     .+6             ;RECEIVE A CHARACTER
3586  016646  012701  001576                PRG2AA  MOV     #TUMTAB-2,%1    ;CLEAR RECEIVER FLAG
3587  016652  005721                        PRG2AA  TST     (1)+            ;IS THE POINTER AT THE END OF THE TT
3588  016654  000755                        PRG2AA  BR      PRG2A           ;BRANCH IF NOT
3589  016656  005077  162660        PRG2B   CLR     @CSR            ;RESET POINTER
3590  016662  005077  162656                CLR     @BAR            ;INCREMENT POINTER
3591  016666  005037  016714                CLR     PRG2C           ;GO BACK & TEST TRANSMITTER FLAG
3592  016672  017737  162304  016714        MOV     @SWR,PRG2C      ;CLEAR THE CSR
3593  016700  042737  000377  016714        BIC     #377,PRG2C      ;CLEAR THE BAR
3594  016706  000337  016714                SWAB    PRG2C           ;CLEAR USER DELAY
3595  016712  104400                        DELAY                   ;GET USER DELAY                 ;,,++D
3596  016714  000000        PRG2C   OPEN                            ;DELAY AS SPECIFIED             ;,,++D
3597  016716  000732                BR      PRG2R           ;BY USER                        ;,,++D
3598                                                        ;REPEAT LOOP
3599
3600                                ;SUBROUTINE TO GET USER PARAMETERS (FOR PRG1 & 2)
3601  016720  104000        PARAM:  TYPE                    ;ASK USER WHICH LINE
3602  016722  020154                LINPAR                  ;TO TEST
3603  016724  004537  004416        JSR     5,RECD          ;GET LINE AND PUT IT
3604  016730  000000        LINE:   0                       ;HERE
3605  016732  104000        PARAMA: TYPE                    ;ASK USER HOW MANY
3606  016734  020177                HOWMAN                  ;CHARACTERS TO TRANSMIT
3607  016736  004537  004416        JSR     5,RECD          ;GET CHARS AND PUT IT
3608  016742  000000        CHARS.  0                       ;HERE
3609  016744  023727  016742  000310        CMP     CHARS,#200.     ;LIMIT RESPONSE TO 200.
3610  016752  101403                BLOS    PARAMB          ;(CORE LIMITATION)
3611  016754  104000                TYPE
3612  016756  020017                M1
3613  016760  000764                BR      PARAMA          ;RE-REQUEST PARAMETER
3614  016762  104000        PARAMB: TYPE                    ;TYPE INSTRUCTIONS
3615  016764  020043                M4
3616  016766  104015                CNTLU                   ;GO GET VALUE
3617  016770  000207                RTS     7               ;EXIT
3618
3619
3620                                ;SUBROUTINE TO TRANSMIT DATA FROM THE SR
3621  016772  117737  162204  017102  LOOP:   MOVB    @SWR,OUTBUF     ;FILL OUTPUT
3622  017000  004537  006224                JSR     5,BMOVE         ;BUFFER
3623  017004  017102                        OUTBUF                  ;WITH
3624  017006  017103                        OUTBUF+1                ;DATA TO BE
3625  017010  000307                        199.                    ;TRANSMITTED
3626  017012  012777  001400  162530        MOV     #CAT,@BASREG    ;INITIALIZE BASE REGISTER
```

```
3627  017020  012737  017102  001400          MOV     #OUTBUF,CAT     ;LOAD CURRENT
3628  017026  004537  006224                  JSR     5,BMOVE         ;ADDRESS TABLE
3629  017032  001400                          CAT                     ;WITH ADDRESS
3630  017034  001402                          CAT+2                   ;OF OUTPUT BUFFER
3631  017036  000040                          32.
3632  017040  013737  016742  001440          MOV     CHARS,WCT       ;LOAD WORD COUNT
3633  017046  005437  001440                  NEG     WCT             ;FORM TWO'S COMPLEMENT
3634  017052  004537  006224                  JSR     5,BMOVE         ;TABLE WITH
3635  017056  001440                          WCT                     ;NUMBER OF
3636  017060  001442                          WCT+2                   ;CHARACTERS TO BE
3637  017062  000040                          32.                     ;TRANSMITTED
3638  017064  013737  016730  001564          MOV     LINE,LINBIT     ;SAVE LINES TO BE TRANSMITTED ON
3639  017072  013777  016730  162444          MOV     LINE,@BAR       ;START TRANSMITTING ON SELECTED LINES
3640  017100  000207                          RTS     7               ;EXIT
3641
3642
3643  017102  000000          OUTBUF: 0                               ;FIRST ADDRESS OF 100
3644          017246                  .=OUTBUF+100.                   ;CHARACTER OUTPUT BUFFER
3645  017246  000000          INBUF:  0                               ;FIRST ADDRESS OF 100.
3646          017412                  .=INBUF+100.                    ;CHARACTER INPUT BUFFER (WHERE RECEIVED
3647                                                                  ;DATA IS STORED)
3648
3649  017412  013746  000006  SUSWRR: MOV     @#6,-(SP)                       ;SAVE VECTORS
3650  017416  013746  000004          MOV     @#4,-(SP)
3651  017422  012737  017442  000004  MOV     #1$,@#4                 ;SET UP FOR TIMEOUT
3652  017430  022777  177777  161544  CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
3653  017436  001402                  BEQ     2$
3654  017440  000407                  BR      3$
3655  017442  022626          1$:     CMP     (SP)+,(SP)+             ;ADJUST STACK
3656  017444  012737  000176  001202  2$:     MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
3657  017452  012737  000174  001204          MOV     #DISPREG,DISPLAY                ;POINT TO SOFT DISPLAY REG
3658  017460  012637  000004          3$:     MOV     (SP)+,@#4               ;RESTORE VECTORS
3659  017464  012637  000006                  MOV     (SP)+,@#6
3660  017470  000002                          RTI
3661
3662
3663                                  ;ROUTINE TO CHECK FOR  G BEING TYPED
3664
3665  017472  022737  000176  001202  KBDINTT: CMP     #SWREG,SWR
3666  017500  001021                  BNE     1$
3667  017502  023737  000042  000046  CMP     @#42,@#46       ;ACT11?
3668  017510  001415                  BEQ     1$              ;BR IF YES
3669  017512  005037  017604          CLR     TMP1                    ;CLEAR TEMP AREA
3670  017516  117737  162346  017604  MOVB    @TKDBR,TMP1             ;FETCH THE BUFFER
3671  017524  142737  000200  017604  BICB    #200,TMP1               ;STRIP OFF PARITY
3672  017532  122737  000007  017604  CMPB    #7,TMP1                 ;WAS IT  G
3673  017540  001001                  BNE     1$                      ;NOP
3674  017542  104015                  CNTLU                           ;GO CHANGE IT
3675  017544  000002          1$:     RTI                             ;EXIT
3676
3677
3678                                  ;ROUTINE TO CHANGE CONTENTS OF SWREG(LOC 176)
3679
3680  017546  022737  000176  001202  CNTLUU: CMP     #SWREG,SWR
3681  017554  001023                  BNE     FJX
3682  017556  104000                  TYPE
```

```
3683  017560  017641                          $SWREG
3684  017562  004537  006154                  JSR     R5,OACNV            ;CONVERT TO ASCII
3685  017566  000176                          SWREG
3686  017570  017647                          $VALUE
3687  017572  000006                          6
3688  017574  104000                          TYPE
3689  017576  017647                          $VALUE
3690  017600  004537  004416                  JSR     5,RECD              ;GET TMP1 AND PUT IT
3691  017604  000000              TMP1.       0                           ;HERE
3692  017606  022737  000007  004574          CMP     #7,CNT
3693  017614  001403                          BEQ     FJX
3694  017616  013777  017604  161356          MOV     TMP1,@SWR           ;CHANGE CONTENTS OF SWREG
3695  017624  000002              FJX:        RTI
3696
```

```
3697                                        ;MESSAGES
3698  017626  053045  041505  020124  WHERE   .ASCII  '%VECT ADR?@'
3699  017634  042101  037522     100
3700  017641     045  053523  036522  $SWREG: .ASCII  '%SWR=@'
3701  017646     100
3702  017647     040  020040  020040  $VALUE:  ASCII  '          NEW=@'
3703  017654  020040  020040  047040
3704  017662  053505  040075
3705  017666  044445  041516  051117  $CTLU    ASCII  '%INCORRECT INPUT, TRY AGAIN!'
3706  017674  042522  052103  044440
3707  017702  050116  052125  020054
3708  017710  051124  020131  043501
3709  017716  044501  020516
3710  017722  036445     100          ASCII  '%=@'
3711  017725     045  047125  052111  WHICH:  ASCII  '%UNIT#(8)?@'
3712  017732  024043  024470  040077
3713  017740  041445  040510  020122  LEVEL   ASCII  '%CHAR LNGTH@'
3714  017746  047114  052107  040110
3715  017754  042445  051122  051440  ERDAT   ASCII  '%ERR S/B  '
3716  017762  041057  020072
3717  017766  020040  020040  020040  AASB:   ASCII  '       WAS  '
3718  017774  053440  051501  020072
3719  020002  020040  020040  020040  AWAS    .ASCII  '      @'
3720  020010     100
3721  020011     045  051120  021507  M0:     .ASCII  '%PRG#@'
3722  020016     100
3723  020017     045  040077          M1:     .ASCII  '%?@'
3724  020022  042445  042116  040040  M2:     .ASCII  '%END @'
3725  020030  051445  036522  037460  M3:      ASCII  '%SR=0? GO @'
3726  020036  043440  027117     100
3727  020043     045  042114  041440  M4:     .ASCII  '%LD CHAR IN SR0-7,DLY IN SR8-15@'
3728  020050  040510  020122  047111
3729  020056  051440  030122  033455
3730  020064  042073  054514  044440
3731  020072  020116  051123  026470
3732  020100  032461     100
3733  020103     045  047514  044507  PRGOM:  .ASCII  '%LOGIC TSTS@'
3734  020110  020103  051524  051524
3735  020116     100
3736  020117     045  046630  052111  PRG1M:  .ASCII  '%XMITTER LOOP@'
3737  020124  042524  020122  047514
3738  020132  050117     100
3739  020135     045  046630  052111  PRG2M:  .ASCII  '%XMIT/REC LOOP@'
3740  020142  051057  041505  046040
3741  020150  047517  040120
3742  020154  052046  050131  046040  LINPAR: .ASCII  '%TYP LINES TO TST @'
3743  020162  047111  051505  052040
3744  020170  020117  051524  020124
3745  020176     100
3746  020177     045  047443  020106  HOWMAN: .ASCII  '%#OF CHARS?@'
3747  020204  044103  051101  037523
3748  020212     100
3749  020213     045  020122          EMO:    .ASCII  '%R '
3750  020216  020040  050040  036503  ATNUMB: .ASCII  '   PC='
3751  020224  020040  020040  020040  APC:    .ASCII  '      @'
3752  020232     100
```

```
3753  020233    015     012           MSG1    .BYTE   15,12
3754  020235    124   042510  050440          ASCII  'THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890'
3755  020242  044525  045503  041040
3756  020250  047522  047127  043040
3757  020256  054117  045040  046525
3758  020264  042520  020104  053117
3759  020272  051105  052040  042510
3760  020300  046040  055101  020131
3761  020306  047504  051507  041040
3762  020314  041501  020113  031061
3763  020322  032063  033065  034067
3764  020330  030071
3765          000001                          END
```

```
A       = 000000   526#  2341#  2855#  3033#
AASB      017766   802   3717#
APC       020224   771   3751#
APCADO    002102   736#   761#   764#   770
AREA      013526  2689  2700   2719#  2720   2730   2740#
ATNUMB    020216   775   3750#
AWAS      020002   806   3719#
A12K      013546  2749#
A16K      013552  2751#
A20K      013556  2753#
A24K      013562  2755#
A28K      013566  2757#
A8K       013536  2744#
BAR       001544   688#   882#  1033#  1131#  1245   1435   1523#  2008   2036#  2038   2042#  2043#  2044
                  2081#  2082#  2083   2086   2089#  2543#  2547   2551#  2589#  2592#  2653#  2692#  2723#
                  2787   2789   2801   2803   2833#  3244   3248#  3486#  3521#  3532   3545   3559   3579
                  3590#  3639#
BASREG    001550   690#  1009#  1520#  1951#  1952   1960#  1961   1982   1986#  1987   1993#  1994#  2009#
                  2585#  2648#  3626#
BAT       001500   684#   685
BELL    = 000007   521#   786
BIT0    = 000001   469#  1031   1132   1305   1417   1544   1698   1699   1703   2832   3234   3328   3578
BIT1    = 000002   468#  1717   1718   1722
BIT10   = 002000   459#
BIT11   = 004000   458#   890
BIT12   = 010000   457#  1261   1269   1812   1813   1817   2130   2558
BIT13   = 020000   456#   767   1332   1362   1547   1552   1568   1831   1832   1836   2131   3251
BIT14   = 040000   455#   887   1393   1547   1552   1881   1889   1915   1956   1964   1991   2553   2593
                  2665  3355
BIT15   = 100000   437    454#  1269   1308   1336   1366   1547   1556   2557
BIT2    = 000004   467#  1031   1132   1736   1737   1741   2828
BIT3    = 000010   466#
BIT4    = 000020   465#  1755   1756   1760
BIT5    = 000040   464#  1774   1775   1779
BIT6    = 000100   463#  1031   1132   1318   1326   1793   1794   1798
BIT7    = 000200   462#  1326   1355   1384   1387   1559   2777   2836   3583
BIT8    = 000400   461#   782
BIT9    = 001000   460#   865    898
BKCSR     001546   689#   884#  1381#  1388#  1876#  1877   1885#  1886   1907   1910#  1911   1917#  1918#
                  1933#  1936   2105#  2106#  2107   2110   2113#  3329#  3332#  3487#  3490#  3522#  3549
BMOVE     006224  1411   1464   1505#  1539   3227   3324   3622   3628   3634
BRKTST    005456  1380#  2865   2876   2887   2898   2909   2920   2931   2942   2953   2964   2975   2986
                  2997   3008   3019   3030
BRK0      014204  2861   2865#
BRK1      014222  2872   2876#
BRK10     014364  2949   2953#
BRK11     014402  2960   2964#
BRK12     014420  2971   2975#
BRK13     014436  2982   2986#
BRK14     014454  2993   2997#
BRK15     014472  3004   3008#
BRK16     014510  3015   3019#
BRK17     014526  3026   3030#
BRK2      014240  2883   2887#
BRK3      014256  2894   2898#
BRK4      014274  2905   2909#
```

```
BRK5    014312  2916   2920#
BRK6    014330  2927   2931#
BRK7    014346  2938   2942#
CARMSK  001572   699#  1114#  1334  1364  1603  2701  2731  3278
CAT     001400   680#   681  1009  1030#  1128#  1256  1520  1521#  2009  2534  2648  2649#  2659
CC    = 177776  2663  2689#  2720#  3483#  3515#  3626  3627#  3629  3630
CHALT = 104003   432#
CHARS   016742   509#
CLKINT  001552  3608#  3609  3632
CLKLVL  001554   691#  1061#  1129#  1317#
CNT     004574   692#  1130#
CNTLU = 104015  1175#  1192#  1211#  3692
CNTLUU  017546   519#   860  3616  3674
CNVDAT  002332   729  3680#
COUNT   002076   753   765   800#
CSR     001542   734#  1034#  1035#  1134#  1141#  1409#  1421  1531#  1535#
                 687#   883#  1031#  1081  1088  1132#  1137#  1144#  1248  1261#  1269#  1270  1305#
                1306  1308#  1310  1318#  1326#  1327  1351  1353  1355#  1380#  1382  1384#  1385
                1387#  1417#  1439  1442  1544#  1547  1549  1552  1556#  1557  1559#  1682  1698#
                1699  1703#  1704  1717#  1718  1722#  1723  1736#  1737  1741#  1742  1755#  1756
                1760#  1761  1774#  1775  1779#  1780  1793#  1794  1798#  1799  1812#  1813  1817#
                1818  1831#  1832  1836#  1837  1851#  1854  1858#  1859#  1860  2057#  2058#  2059
                2062  2065#  2069  2093  2117  2130#  2131#  2149#  2157#  2158#  2542#  2563  2567#
                2558#  2567#  2593  2617  2619#  2620  2652#  2654  2656#  2657  2690#  2693  2695
                2697#  2721#  2724  2726  2728#  2770#  2775  2777#  2781  2797  2828#  2832#  2834
                2836#  2847  2849  3234#  3249#  3251  3254#  3258#  3328#  3330  3335  3337  3485#
                3488  3503  3520#  3529  3541  3561#  3578#  3581  3583#  3589#
CURTST  002002   704#   867   873   917#
DATCHK= 104002   508#  1605
DATTST  006312  1530#  3043  3054  3065  3076  3087  3098  3109  3120  3131  3142  3153  3164
                3175  3186  3197  3208
DAT0    014544  3039  3043#
DAT1    014562  3050  3054#
DAT1AA  006316  1531#
DAT10   014724  3127  3131#
DAT11   014742  3138  3142#
DAT12   014760  3149  3153#
DAT13   014776  3160  3164#
DAT14   015014  3171  3175#
DAT15   015032  3182  3186#
DAT16   015050  3193  3197#
DAT17   015066  3204  3208#
DAT2    014600  3061  3065#
DAT3    014616  3072  3076#
DAT4    014634  3083  3087#
DAT5    014652  3094  3098#
DAT6    014670  3105  3109#
DAT7    014706  3116  3120#
DELAY = 104400   520#  1422  1431  2545  2573  2590  2598  2630  2795  3242  3333  3524  3537
                3566  3595
DISPLA  001204   678#  3657#
DISPRE  000174   666#  3657
DLY     006000   542  1448#
DLYXMT  005602  1409#  3408  3420  3432  3444  3456  3468
DMPAR   003464   831  1018#  1056
DMPARB  003746  1066#  1076
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DMPARC  004072          1095#  1108
DTCHK   002126           718    751#
EMALT = 104004           510#
EMO     020213           778   3749#
EMTINT  003100           540    922#
EMTTAB  002032           716#   928
ERDAT   017754           781   3715#
ERR     002146           717    760#
ERRA    002204           762    766#
ERRB    002246           760*   763*   779#
ERRC    002254           768    782#
ERRD    002306           783    789#
ERREX   002326           792    794#
ERRHLT  002324           790    793#
ERROR = 104001           507#  1037   1139   1220   1250   1265   1272   1314   1322   1329   1391   1395   1554
                        1562  1623   1627   1687   1701   1706   1720   1725   1739   1744   1758   1763   1777
                        1782  1796   1801   1815   1820   1834   1839   2134   2152   2161   2555   2595   2799
                        2853  3253   3265   3269   3347   3357   3367
ERROR1= 104011           515#   754   1247   1254   1259   1341   1347   1359   1370   1402   1437   1443   1580
                        1856  1862   1880   1888   1914   1938   1955   1963   1990   2022   2040   2046   2063
                        2070  2087   2094   2111   2118   2514   2564   2624   2664   2704   2734   2783   2790
                        2805  2841   3247   3282   3305   3339   3394   3497   3502   3531   3534   3543   3547
                        3551
ERRVEC= 000004           434#   820*   827*   862*  1681*  1683*  2586*  2600*  2646*  2647*  2673*  2674*  2714*
                        2737*
ERR1    002164           725   763#
ESCOPE  002700           722   880#
FJX     017624          3681  3693   3695#
FORMD   003046           864    912#
FORMDA  003072           917#
GETRDY  002600           855    859    861#   877    899    906   1671
GTBIN   006104          1474#  1533
GTLINB  007044          1235   1519   1653#
GTRDYA  002616           864#   875
GTRDYC  002640           866    869#
GTRDYD  002662           872    874#
GTRDYX  002606           862#   901
HOWMAN  020177          3606   3746#
ICTR    002010           707#   896*   915*
INBIN   006054          1463#
INBUF   017246          1543   1595   3645#  3646
INCRTN  002120           746#   876
INIT    003434           726   1009#
INITIA= 104012           516#   833    849    863    885
KBDIN = 104014           518#   766    794    881
KBDINT  017472           728   3665#
KSTART  002000           703#   861   1666*  1669*
LBIT0 = 000001           453#  1033   1131   1415   2540   2589   2653   2692   2723   2833   2866   3233   3486
                        3521
LBIT1 = 000002           452#  2877   3487   3522
LBIT10= 000400           445#  2954
LBIT11= 001000           444#  2965
LBIT12= 002000           443#  2976
LBIT13= 004000           442#  2987
LBIT14= 010000           441#  2998
LBIT15= 020000           440#  3009
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LBIT16= 040000          439#  3020
LBIT17= 100000          438#  3031
LBIT2 = 000004          451#  2888
LBIT3 = 000010          450#  2899
LBIT4 = 000020          449#  2910
LBIT5 = 000040          448#  2921
LBIT6 = 000100          447#  2932
LBIT7 = 000200          446#  2943
LENGTH  004112         1096   1100#  1101   1103*  1104   1109   1111*  1112*  1113
LENOKA  004130         1102   1104#
LENOKB  004140         1106#  1110
LENOKC  004146         1105   1109#
LENOKD  004206         1114   1120#
LEVEL   017740         1098   3713#
LINBIT  001564          696#  1415*  1427*  1523   1654*  1657*  2622   2623   2627*  2787   2808*  3233*  3239*
                       3638*
LINE    016730         1234*  1251   1302*  1335   1365   1416*  1426*  1518   1530*  1576   1578   1588   1655
                       2614*  2626*  2769*  2772   2807*  3235*  3604#  3638   3639
LINE0 = 000000          481#  2173   2351   3044
LINE1 = 000002          482#  2184   2362   3055
LINE10= 000020          489#  2261   2439   3132
LINE11= 000022          490#  2272   2450   3143
LINE12= 000024          491#  2283   2461   3154
LINE13= 000026          492#  2294   2472   3165
LINE14= 000030          493#  2305   2483   3176
LINE15= 000032          494#  2316   2494   3187
LINE16= 000034          495#  2327   2505   3198
LINE17= 000036          496#  2338   2516   3209
LINE2 = 000004          483#  2195   2373   3066
LINE3 = 000006          484#  2206   2384   3077
LINE4 = 000010          485#  2217   2395   3088
LINE5 = 000012          486#  2228   2406   3099
LINE6 = 000014          487#  2239   2417   3110
LINE7 = 000016          488#  2250   2428   3121
LINPAR  020154         3602   3742#
LOOP    016772         3558   3577   3621#
LTST0   011454         2168   2172#
LTST1   011472         2179   2183#
LTST10  011634         2256   2260#
LTST11  011652         2267   2271#
LTST12  011670         2278   2282#
LTST13  011706         2289   2293#
LTST14  011724         2300   2304#
LTST15  011742         2311   2315#
LTST16  011760         2322   2326#
LTST17  011776         2333   2337#
LTST2   011510         2190   2194#
LTST3   011526         2201   2205#
LTST4   011544         2212   2216#
LTST5   011562         2223   2227#
LTST6   011600         2234   2238#
LTST7   011616         2245   2249#
MARCHR  000004          530#
MANUAL= 100000          437#
MSG1    020233         1412   3753#
MO      020011          837   3721#
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M1      020017   747  1055  1075  1107  1207  3612  3723#
M2      020022   904  3724#
M3      020030   857  3725#
M4      020043  3615  3727#
NOP   = 000240   435#
NXTST   002006   706#  861*  874   900   912   914*
OACNV   006154   769   773   800   804  1486#  3684
OACNVA  006166  1491#  1500
OPEN  = 000000   436#   680   682   684   686   691   693   695   696   697   698   699   701
                 703    704   705   706   707   708   709   734   735   736   737   742   779
                 942    943   957   958  1004  1152  1153  1459  1460  1469  1470  1471  1644
                1645   1646  1647  1648  1649  1650  2546  2574  2591  2599  2796  3243  3334
                3525   3538  3567  3596
OUTBUF  017102  1030   1128  1255  1298*  1413  1521  1532  1594  1600  3231*  3277  3483  3515
                3621*  3623  3624  3627  3643#  3644
OVRLAY  004372  1042   1044  1156#
PARAM   016720  3557   3576  3601#
PARAMA  016732  3605#  3613
PARAMB  016762  3610   3614#
PAR0    007026  1633*  1644#
PAR1    007030  1634*  1645#
PAR2    007032  1635*  1646#
PAR3    007034  1636*  1647#
PAR4    007036  1637*  1648#
PAR5    007040  1638*  1649#
PAR6    007042  1639*  1650#
PASS    002116   742#   894   902*
PCADD   002100   735#   761   764   924*
PFAIL   004576   842    846  1214#
POPSP = 005726   470#  1444  1629
POPSP2= 022626   471#  1149  2736
PRELIM  002014   709#   840
PRGNUM  002454   835    839#  840*  841*  844   850
PRGTAB  002016   710#   845
PRG0    007076   710   1664#
PRG0M   020103  1665   3733#
PRG0R   007120   713   1669#
PRG1    016614   711   3554#
PRG1B   016630  3559#  3560
PRG1C   016636  3561#
PRG1D   016670  3562*  3563*  3564*  3565*  3567#
PRG1M   020117  3556   3736#
PRG1R   016624   714   3558#  3568
PRG2    016674   712   3573#
PRG2R   016610  3578#  3588
PRG2RA  016616  3579#  3582
PRG2B   016666  3580   3589#
PRG2C   016714  3591*  3592*  3593*  3594*  3596#
PRG2M   020135  3575   3739#
PRG2R   016604   715   3577#  3597
PRTY0 = 000000   479#
PRTY1 = 000040   478#
PRTY2 = 000100   477#
PRTY3 = 000140   476#
PRTY4 = 000200   475#  2150
PRTY5 = 000240   474#   692   694
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PRTY6 = 000300                473#
PRTY7 = 000340                472#    541     543     843     847    1010    1130    1138    1264    1268    1301    1321    1324
                             2147    2561    2568    2647
PRVCNT  002104                737#   1907*   1918    1982*   1994
PSW   = 177776                433#   1010*   1032*   1133*   1138*   1262*   1264*   1268*   1301*   1319*   1321*   1324*   2132*
                             2147*   2150*   2155*   2559*   2561*   2568*
PT0     006100               1470#   1474    1480*
PT1     006102               1471#   1474*   1475*   1478*   1479*   1480    1481
PWRUP   004606               1214    1218#
RCVDAT  001566                697#    751     805    1245*   1252*   1256*   1257   1331*   1332*   1337   1344*   1356*   1361*
                             1362*   1367    1399*   1400*   1435*   1442*   1579*   1598*   1604*   1610*   1617*   1854*   1860*
                             1877*   1878    1886*   1911*   1912    1936*   1952*   1953    1961*   1987*   1988    2021*   2038*
                             2044*   2062*   2069*   2086*   2093*   2110*   2117*   2547*   2563*   2622*   2663*   2698*   2699*
                             2702    2729*   2732    2771*   2778*   2779    2803*   2830*   2837*   3244*   3279*   3280    3304*
                             3337*   3390*   3495*   3499*   3529*   3532*   3541*   3545*   3549*
RCVTST  005034               1298#   2350    2361    2372    2383    2394    2405    2416    2427    2438    2449    2460    2471
                             2482    2493    2504    2515
RCV0    012014               2346    2350#
RCV1    012032               2357    2361#
RCV10   012174               2434    2438#
RCV11   012212               2445    2449#
RCV12   012230               2456    2460#
RCV13   012246               2467    2471#
RCV14   012264               2478    2482#
RCV15   012302               2489    2493#
RCV16   012320               2500    2504#
RCV17   012336               2511    2515#
RCV2    012050               2368    2372#
RCV3    012066               2379    2383#
RCV4    012104               2390    2394#
RCV5    012122               2401    2405#
RCV6    012140               2412    2416#
RCV7    012156               2423    2427#
RECD    004416                838    1047    1070    1099   1173#   3603    3607    3690
RIND    006076               1463*   1465    1466   1469#   1476*
RNGEN   003250                968#   1908    1983
RORPAR  006764               1571    1597    1619   1633#   1641
RP1     003316                968     972*    979    981#
RP2     003320                971     975     978*   982#
RSTART  002024                713#    851
RSTAT1  002426                670     832#
RSTAT2  002614                672     846#   1221
RSTPC   003226                946*    955     957#
RSTPSW  003230                947*    954     958#
RSTREG= 104010                514#   1501    1512
RSTRB   003172                724     946#
RTLAST= 177777                522#   3508
RTNMO   002004                705#    774     871    913*   1667*   1670*
RTO     007136               1666    1669    1673#
RTOA    007146               1676    1681#
RT1     007200               1674    1690#
RT1A    007210               1693    1698#
RT10    007646               1805    1823#
RT10A   007656               1826    1831#
RT100   014246               2881    2891#
RT101   014264               2892    2902#
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RT103	014320	2914	2924#	
RT104	014336	2925	2935#	
RT105	014354	2936	2946#	
RT106	014372	2947	2957#	
RT107	014410	2958	2968#	
RT11	007720	1824	1842#	
RT11A	007730	1845	1851#	1857
RT110	014426	2969	2979#	
RT111	014444	2980	2990#	
RT112	014462	2991	3001#	
RT113	014500	3002	3012#	
RT114	014516	3013	3023#	
RT115	014534	3024	3036#	
RT116	014552	3037	3047#	
RT117	014570	3048	3058#	
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RT12A	010020	1869	1875#	
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RT121	014624	3070	3080#	
RT122	014642	3081	3091#	
RT123	014660	3092	3102#	
RT124	014676	3103	3113#	
RT125	014714	3114	3124#	
RT126	014732	3125	3135#	
RT127	014750	3136	3146#	
RT13	010144	1867	1898#	
RT13A	010154	1901	1906#	
RT130	014766	3147	3157#	
RT131	015004	3158	3168#	
RT132	015022	3169	3179#	
RT133	015040	3180	3190#	
RT134	015056	3191	3201#	
RT135	015074	3202	3212#	
RT135A	015104	3215	3226#	
RT136	015474	3213	3314#	
RT136A	015504	3317	3322#	
RT137	016010	3315	3399#	
RT137A	016020	3402	3408#	
RT14	010256	1899	1924#	
RT14A	010266	1927	1933#	
RT140	016026	3400	3411#	
RT140A	016036	3414	3420#	
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RT141A	016054	3426	3432#	
RT142	016062	3424	3435#	
RT142A	016072	3438	3444#	
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RT144A	016126	3462	3468#	
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RT145A	016144	3474	3481#	
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RT15A	010326	1944	1950#
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RT16A	010462	1976	1981#
RT17	010570	1974	2000#
RT17A	010600	2003	2008#
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RT2A	007262	1712	1717#
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RT20A	010672	2030	2035#
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RT21A	010760	2052	2057#
RT22	011056	2050	2073#
RT22A	011066	2076	2081#
RT23	011164	2074	2097#
RT23A	011174	2100	2105#
RT24	011272	2098	2121#
RT24A	011302	2124	2129#
RT25	011336	2122	2139#
RT25A	011346	2142	2147#
RT26	011444	2140	2165#
RT27	011462	2166	2176#
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RT30	011500	2177	2187#
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RT32	011534	2199	2209#
RT33	011552	2210	2220#
RT34	011570	2221	2231#
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RT37	011642	2254	2264#
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RT41	011676	2276	2286#
RT42	011714	2287	2297#
RT43	011732	2298	2308#
RT44	011750	2309	2319#
RT45	011766	2320	2330#
RT46	012004	2331	2343#
RT47	012022	2344	2354#
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RT51	012056	2366	2376#
RT52	012074	2377	2387#
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RT54	012130	2399	2409#
RT55	012146	2410	2420#
RT56	012164	2421	2431#
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RT6	007522	1767	1785#
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RT60	012220	2443	2453#
RT61	012236	2454	2464#
RT62	012254	2465	2475#

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RT66    012346            2509    2520#
RT66A   012362            2523    2532#
RT67    012606            2521    2577#
RT67A   012616            2580    2585#
RT7     007574            1786    1804#
RT7A    007604            1807    1812#
RT70    012716             822    2578    2603#
RT70A   012726            2606    2614#
RT71    013032            2604    2634#
RT71A   013042            2637    2643#
RT72    013226            2635    2677#
RT72A   013236            2680    2687#
RT73    013572            2678    2760#
RT73A   013602            2763    2769#
RT74    014006            2761    2812#
RT74A   014016            2815    2822#
RT75    014174            2813    2858#
RT76    014212            2859    2869#
RT77    014230            2870    2880#
SAVREG= 104007             513#   1486    1505
SAVRG   003132             723     932#
SCOPE = 104006             512#   1274    1371    1403    1445    1630    1684    1707    1726    1745    1764    1783    1802
                          1821    1840    1864    1896    1922    1939    1971    1998    2019    2047    2071    2095    2119
                          2137    2163    2575    2601    2632    2675    2738    2810    2854    3312    3397    3505    3552
SCOPEA  002736             889#    897
SCOPEB  002742             888     890#
SCOPED  002776             868     891     895     898#
SCOPTR  002012             708#    886     916*
SPBOT   001200             676#    818     825     832     848    1011*   1012    1219
SRESET= 104005             511#   1853    1935    2037    3528
SRSET   002546             852#   1668
SRSETT  003232             721     961#    963*
START   002360             669     818#
SUSWR = 104013             517#    819
SUSWRR  017412             727    3649#
SVRPC   003166             932*    940     942#
SVRPSW  003170             933*    939     943#
SWR     001202             677#    767     782     791     852     865     869     887     890     898    1881    1889    1915
                          1956    1964    1991    2665    3563    3592    3621    3652    3656*   3665    3680    3694*
SWREG   000176             666#    852    3656    3665    3680    3685
TIMEA   004272            1134#   1143
TIMEB   004326            1136    1141#
TIMEC   004336            1129    1144#
TIMER   004216            1126#   1140    2532
TIME1   004366            1126*   1135*   1145    1152#   1420    1430    2572    2597    2629    3241    3322    3517    3518
TIME14  004370            1145*   1146*   1148*   1153#   2544    2588    2794
TKCSR   002066             730#   1176
TKDBR   002070             731#   1178    3670
TMP1    017604            3669*   3670*   3671*   3672    3691#   3694
TPCSR   002072             732#    784     787     996    1195    1198    1201
TPDBR   002074             733#    786*    995*   1180*   1197*   1200*
TTOAT   001562             695#   1574*   1575*   1576    1579
TUMTAB  001600             701#    702    1299*   1300*   1331    1343*   1344    1356    1361    1389    1393    1397    1400
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TYP     003322
TYPA    003332
TYPC    003350
TYPD    003366
TYPDAT  003432
TYPE  = 104000
TYPF    003404
TYPG    003416
UNIT    003766
UNTOKA  004006
UNTOKB  004036
UNTOKC  004062
VAC     001540
VECOK   003666
VECOKA  003676
VECOKB  003704
VECTOR  003650
WCT     001440
WHERE   017626
WHICH   017725
X     = 000146
XMITD   006246
XMTDAT  001570
XMTINT  001556
XMTLVL  001560
XMTTST  004622
Y     = 000020

 1537  1538*  1540  1541  1583  1585  2699  2729  2822  2827  2851  3226*  3228
 3229  3260  3273  3279  3288  3299  3323*  3325  3326  3343  3353  3363  3374
 3384  3481*  3482*  3493  3495  3499  3584  3586
  716  984*
  987*  994  1003
  989  991*
  993  995*  1000  1002
  987*  988  991  995  999*  1001*  1004*
  506*  746  777  780  836  856  903  1045  1054  1068  1074  1097  1106
 1206  1208  1664  3555  3574  3601  3605  3611  3614  3682  3688
  992  999*
 1001*
 1067  1071*  1072  1077*  1078*  1079*  1083
 1073  1077*
 1082*  1085
 1090*  1093
  686*  700
 1043  1050  1052*
 1054*  1058  1060
 1053  1057*
 1040*  1048*  1049  1051*  1052  1057  1059  1061  1062*  1063
  682*  683  1029*  1127*  1252  1522*  1589  2651*  2691*  2722*  2831*  3484*  3516*
 3632*  3633*  3635  3636
 1046  3698*
 1069  3711*
  525*  1672  1677*  1689  1694*  1708  1713*  1727  1732*  1746  1751*  1765  1770*
 1784  1789*  1803  1808*  1822  1827*  1841  1846*  1865  1870*  1897  1902*  1923
 1928*  1940  1945*  1972  1977*  1999  2004*  2026  2031*  2048  2053*  2072  2077*
 2096  2101*  2120  2125*  2138  2143*  2164  2169*  2175  2180*  2186  2191*  2197
 2202*  2208  2213*  2219  2224*  2230  2235*  2241  2246*  2252  2257*  2263  2268*
 2274  2279*  2285  2290*  2296  2301*  2307  2312*  2318  2323*  2329  2334*  2342
 2347*  2353  2358*  2364  2369*  2375  2380*  2386  2391*  2397  2402*  2408  2413*
 2419  2424*  2430  2435*  2441  2446*  2452  2457*  2463  2468*  2474  2479*  2485
 2490*  2496  2501*  2507  2512*  2518  2519  2524*  2576  2581*  2602  2607*  2633
 2638*  2676  2681*  2759  2764*  2811  2816*  2857  2862*  2868  2873*  2879  2884*
 2890  2895*  2901  2906*  2912  2917*  2923  2928*  2934  2939*  2945  2950*  2956
 2961*  2967  2972*  2978  2983*  2989  2994*  3000  3005*  3011  3016*  3022  3027*
 3035  3040*  3046  3051*  3057  3062*  3068  3073*  3079  3084*  3090  3095*  3101
 3106*  3112  3117*  3123  3128*  3134  3139*  3145  3150*  3156  3161*  3167  3172*
 3178  3183*  3189  3194*  3200  3205*  3211  3216*  3313  3318*  3398  3403*  3410
 3415*  3422  3427*  3434  3439*  3446  3451*  3458  3463*  3470  3475*  3506  3511*
 1237  1303  1349  1418  1517*  1545  2615  2773  3236
  698*  751  801  1236*  1255*  1257  1333*  1334*  1335*  1336*  1337  1346*  1358*
 1363*  1364*  1365*  1366*  1367  1401*  1410*  1441*  1578*  1599*  1602*  1603*  1852*
 1875*  1876  1878  1883  1884*  1891*  1892  1894*  1909*  1910  1912  1934*  1950*
 1951  1953  1958  1959*  1966*  1967  1969*  1985*  1986  1988  2020*  2024*  2035*
 2061*  2068*  2085*  2092*  2109*  2116*  2549*  2562*  2623*  2662*  2700*  2701*  2702
 2730*  2731*  2732  2772*  2789*  2804*  2829*  2838*  2845  3246*  3277*  3278*  3280
 3296*  3300  3310*  3338*  3389*  3496*  3501*  3519*
  693*  1063*  1260*  2129*  2148*  2156*  2541*
  694*  2155
 1234*  2172  2183  2194  2205  2216  2227  2238  2249  2260  2271  2282  2293
 2304  2315  2326  2337
  524*  2164  2174*  2175  2185*  2186  2196*  2197  2207*  2208  2218*  2219  2229*
 2230  2240*  2241  2251*  2252  2262*  2263  2273*  2274  2284*  2285  2295*  2296
 2306*  2307  2317*  2318  2328*  2329  2339*  2340*  2342  2352*  2353  2363*  2364
```

```
                    2374#  2375   2385#  2386   2396#  2397   2407#  2408   2418#  2419   2429#  2430   2440#
                    2441   2451#  2452   2462#  2463   2473#  2474   2484#  2485   2495#  2496   2506#  2507
                    2517#  2856#  2857   2867#  2868   2878#  2879   2889#  2890   2900#  2901   2911#  2912
                    2922#  2923   2933#  2934   2944#  2945   2955#  2956   2966#  2967   2977#  2978   2988#
                    2989   2999#  3000   3010#  3011   3021#  3022   3032#  3034#  3035   3045#  3046   3056#
                    3057   3067#  3068   3078#  3079   3089#  3090   3100#  3101   3111#  3112   3122#  3123
                    3133#  3134   3144#  3145   3155#  3156   3166#  3167   3177#  3178   3188#  3189   3199#
                    3200   3210#
$CTLU     017666    1209   3705#
$ENDAD    003036     659    908#
$SWREG    017641   3683   3700#
$VALUE    017647   3686   3689   3702#
      = 020332     527#   528    530    532    534    536    538    544    546    548    550    552    554
                    556    558    560    562    564    566    568    570    572    574    576    578    580
                    582    584    586    588    590    592    594    596    598    600    602    604    606
                    608    610    612    614    616    618    620    622    624    626    628    630    632
                    634    636    638    640    642    644    646    648    650    652    654    658#   660#
                    664#   668#   675#   679#   681#   683#   685#   700#   702#   785    788    824    997
                   1142   1242   1307   1352   1354   1383   1386   1456   1477   1558   1561   1590   2618
                   2655   2658   2694   2696   2725   2727   2848   2850   3331   3489   3504   3585   3644#
                   3646#
 BAR      002110     739#  2090*
.BASRE    002114     741#
.BKCSR    002112     740#  2114*
.CSR      002106     738#  1089   2066*

  ABS.    020332      000

ERRORS DETECTED:  0

DSKZ:CZDMAD,DSKZ:CZDMAD.SEQ=DSKZ:CZDMAD.P11
RUN-TIME:  7 11 1 SECONDS
RUN-TIME RATIO:  322/20=15.8
CORE USED:  13K  (25 PAGES)

DOCUMENT PAGES:  85
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