DM11

LOGIC TESTS

MD-11-DZDMA-C

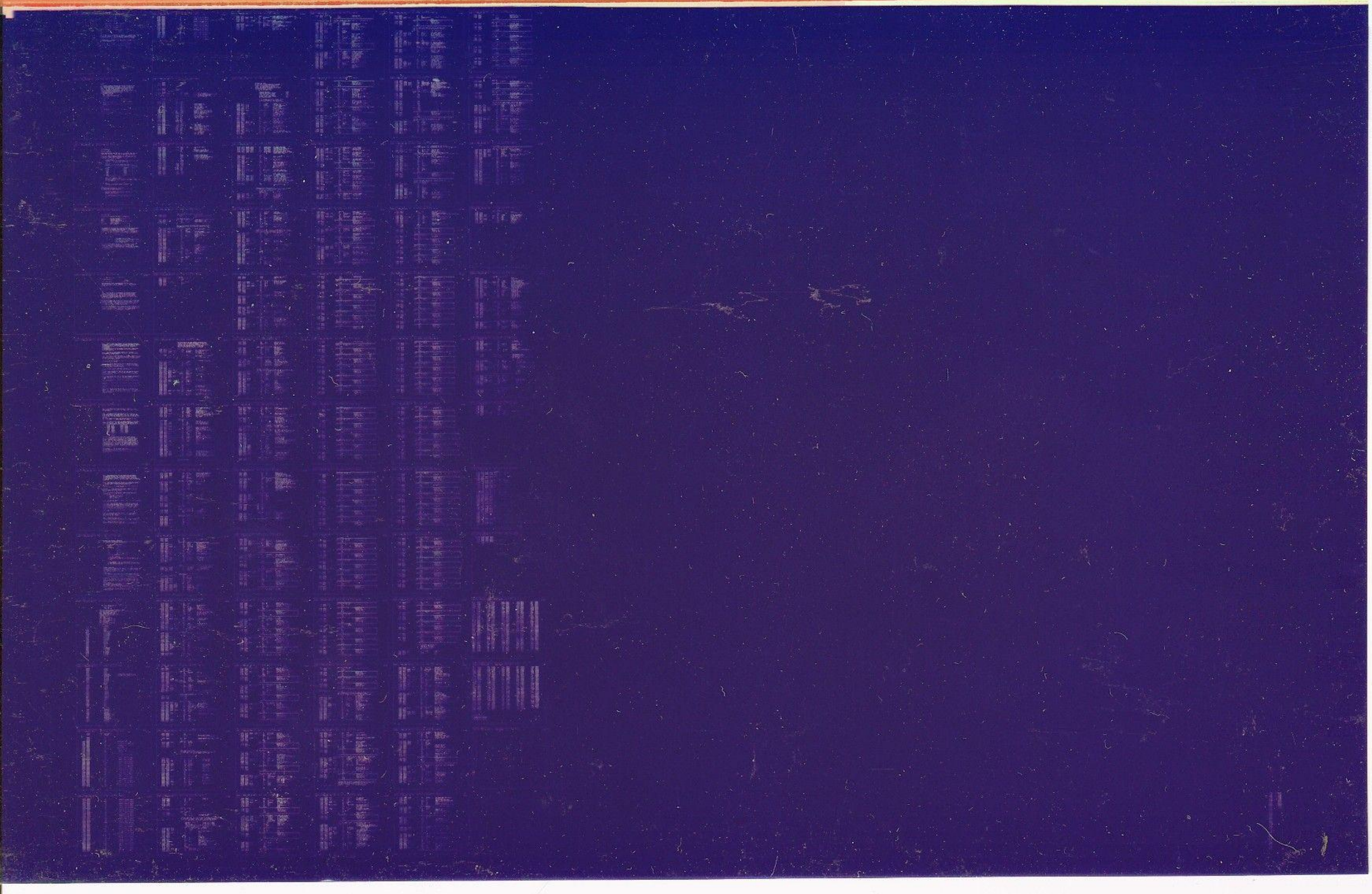
EP-DZDMA-C-DL

FICHE 1 OF 1

JAN 1978

digital

MADE IN USA



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IDENTIFICATION

PRODUCT CODE	MAINDEC-11-DZDMA-C-D
PRODUCT NAME	DM11 LOGIC TESTS
DATE RELEASED	NOVEMBER, 1977
MAINTAINER	DIAGNOSTIC GROUP

1 ABSTRACT

THIS SEPARATE DIAGNOSTIC PROGRAMS ARE PROVIDED FOR TESTING THE
DM11 (ASYNCHRONOUS DATA MULTIPLEXER), MAINDEC-11-DZDMA (DM11
LOGIC TESTS), AND MAINDEC-11-DZDMB (DM11 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 LOG C TESTS
THE AVAILABLE TESTS ARE
    PRG0 - LOGIC TEST
    PPG1 - TRANSMITTER SCOPE LOOP
    PRG2 - TRANSM T/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 N 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 CLOCK 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?
RESPONSE CHARACTER LENGTH REFERS TO THE NUMBER OF DATA BITS PER CHARACTER (5-8) CARRIAGE RETURN SELECTS 8 DATA BITS PER CHARACTER

D PPG #
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 POUT NE ONCE)
SR 13	INHIBIT PRINTOUT
SR 14	SCOPE (LOOP ROUTINE)
SR 15	HALT ON ERROR

TH S 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 POUTINE DESCRIPTION

ROUTINE TESTS

RTO TESTS THE ABILITY TO REFERENCE THE FOUR DM11 REGISTERS CONTROL STATUS REGISTER (CSR), BUFFER ACT VE 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 EX STS
RTO PC=XXXXXX

PT1-RT10 BIT 'BANGS' THE CSR (BITS 0,1,2,4,5,6,12,13). TESTING THAT EACH BIT IN THE CSR CAN BE IND VIDUALLY SET AND CLEARED TWO ERROR TYPES ARE DETECTED IN THESE TESTS, A BIT FAILED TO SET, AND/OR A B T 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 'S 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 PREV OUSLY LOADED NUMBER
 F 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 ERROP 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 BAP 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 POUTINES TEST THE BASIC TRANSMITTER FUNCTIONS ON EACH LINE

RT46-RT65 THESE ROUTINES TEST THE BASIC PECEIVER 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 B T 14) SETS WHEN THE DM11 TRIES TO REFERENCE THE TUMBLE TABLE THAT S IN NON-EXISTANT MEMORY

RT70 THIS ROUTINE TESTS THAT WHEN THE GO B T (CSR BIT 0) S CLEAR THAT NO DATA IS RECEIVED ON ANY LINE ALL LINES ARE TRANS-MITTED 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 RECE VED 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 NTO 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 TRANS-MITTING 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 TRANSMIT-TING FROM WHEN ERROR OCCURRED, FOR ERRORS IN OTHER 4K BLOCKS THE CORRECT RESULT CORRELATES TO THE ADDRESS WHERE THE ERROR OCCUR-RED 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 LOCAT ON 20000
THE TEST IS ABORTED BEFORE TRANSMITTING F THE CORE LOCAT ON 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 PO NTER RETURNS TO THE TOP
OF THE TABLE WHEN 64 CHARACTERS HAVE BEEN RECE VED

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

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

RT131 TH S ROUTINE SIMULTANEOUSLY TRANSMITS AND RECEIVES A
CHARACTER (ALL 1'S) ON THE 16 DM11 L NES 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 TRANSM TS 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

PPG1- TRANSMITTER SCOPE LOOP
PROGRAM 1 ALLOWS THE USER TO SCOPE THE DM11 TRANSMITTER FUNCTIONS
WITH THE DM11 CONTINUOSLY RUNNING UNDER USER SUPPLIED PARAMETERS

PRG2- TRANSMITTER/RECEIVER SCOPE LOOP
PROGRAM 2 ALLOWS THE USER TO SCOPE THE DM11 RECEIVER FUNCTIONS WITH
THE DM11 CONTINUOULY 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
17777	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
 F 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
P144 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

```
                                                K  1
                        %
                                TITLE  MAINDEC-11-DZDMA-C  DM11 LOGIC TESTS
                                NLIST  MC,MD,CND
                                LIST   ME
                                ENABLE ABS,AMA

                        ,DM11 LOGIC TESTS DIAGNOSTIC (MAINDEC-11-DZDMA)
                        ,COPYRIGHT 1972,1977 DIGITAL EQUIPMENT CORP , MAYNARD, MASS  01754
                        ,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
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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
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```
                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  002606                  EMTINT                   ;EMT TRAP
        000032  000340                  PRTY7
        000034  005506                  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
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                                                    N  1
000140  000142                  +2
000142  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000144  000146                  +2
000146  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000150  000152                  +2
000152  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000154  000156                  +2
000156  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000160  000162                  +2
000162  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000164  000166                  +2
000166  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000170  000172                  +2
000172  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000174  000176                  +2
000176  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000200  000202                  +2
000202  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000204  000206                  +2
000206  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000210  000212                  +2
000212  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000214  000216                  +2
000216  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000220  000222                  +2
000222  000000                  HALT             TRAPPED TO PREVIOUS ADDRESS
000224  000226                  +2
000226  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000230  000232                  +2
000232  000000                  HALT             TRAPPED TO PREVIOUS ADDRESS
000234  000236                  +2
000236  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000240  000242                  +2
000242  000000                  HALT             TRAPPED TO PREVIOUS ADDRESS
000244  000246                  +2
000246  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000250  000252                  +2
000252  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000254  000256                  +2
000256  000000                  HALT             TRAPPED TO PREVIOUS ADDRESS
000260  000262                  +2
000262  000000                  HALT             TRAPPED TO PREVIOUS ADDRESS
000264  000266                  +2
000266  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000270  000272                  +2
000272  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000274  000276                  +2
000276  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000300  000302                  +2
000302  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000304  000306                  +2
000306  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000310  000312                  +2
000312  000000                  HALT            ,TRAPPED TO PREVIOUS ADDRESS
000314  000316                  +2
000316  000000                  HALT             TRAPPED TO PREVIOUS ADDRESS
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000320  000322                  +2
000322  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000324  000326                  +2
000326  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000330  000332                  +2
000332  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000334  000336                  +2
000336  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000340  000342                  +2
000342  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000344  000346                  +2
000346  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000350  000352                  +2
000352  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000354  000356                  +2
000356  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000360  000362                  +2
000362  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000364  000366                  +2
000366  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000370  000372                  +2
000372  000000                  HALT                    ;TRAPPED TO PREVIOUS ADDRESS
000374  000376                  +2
000376  000000                  HALT                    ;TRAPPED TO PPEVIOUS ADDRESS
```

```
                000046                          =46
000046  002544                          $ENDAD
                000052                          =52
000052  060000                          60000


                000174                          =174
000174  000000                  DISPREG 0
000176  000000                  SWREG   0

                000200                          =200
000200  000137  002066                  JMP     @#START         ;GO TO START OF DIAGNOSTIC
000204  000137  002134                  JMP     @#RSTAT1                ;GO GET PROGRAM # & RESTART PPOGRAM
                                                                ;USING PREVIOUS DM11 PARAMETERS
000210  000137  002222                  JMP     @#RSTAT2                ;RESTART PREVIOUS PROGRAM USING
                                                                ;PREVIOUS DM11 PARAMETERS

                001100                          =1100
001100  000000                  SPBOT   0

001102  177570                  SWR     177570
001104  177570                  DISPLAY 177570
001106  000000                  CAT     OPEN                    ;STARTING ADDRESS OF
                001146                          =CAT+32         ;CURRENT ADDRESS TABLE
001146  000000                  WCT     OPEN                    ;STARTING ADDRES OF
                001206                          =WCT+32         ;WORD COUNT TABLE
001206  000000                  BAT     OPEN                    ;STARTING ADDRESS OF
                001246                          =BAT+32         ;BIT ASSEMBLY TABLE
001246  000000                  VAC     OPEN                    ;32  SPARE WORDS
001250  175000                  CSR     175000                  ;ADDRESS OF CLOCK STATUS REGISTER
001252  175002                  BAR     175002                  ;ADDRESS OF BUFFER ACTIVE REGISTER
001254  175004                  BKCSR   175004                   ADDRESS OF BREAK STATUS REGISTER
001256  175006                  BASREG  175006                  ;ADDRESS OF BASE REGISTER
001260  000000                  CLKINT  OPEN                    ;DM11 VECTOR ADDRESS (RECEIVER)
001262  000240                  CLKLVL  PRTY5                   ;PRIORITY LEVEL
001264  000000                  XMTINT  OPEN                    ;DM11 VECTOR ADDRESS (TRANSMITTER)
001266  000240                  XMTLVL  PRTY5                   ;TRANSMITTER PRIORITY LEVEL
001270  000000                  TTDAT   OPEN                    ;TUMBLE TABLE DATA
001272  000000                  LINBIT  OPEN                     LINE B T (FOR BAR)
001274  000000                  RCVDAT  OPEN
001276  000000                  XMTDAT  OPEN
001300  000000                  CARMSK  OPEN
                001306                          =VAC+32
001306  000000                  TUMTAB  OPEN                    ;STARTING ADDRESS OF
                001506                          =TUMTAB+100     ;TUMBLE TABLE
001506  000000                  KSTART  OPEN                    ;CURRENT PROGRAM START ADDRESS
001510  000000                  CURTST  OPEN                    ;CONTAINS ADDR OF CURRENT TEST
001512  000000                  RTNNO   OPEN                    ;CONTAINS CURRENT TEST #
001514  000000                  NXTST   OPEN                    ;CONTAINS ADDR OF NEXT TEST
001516  000000                  ICTR    OPEN                    ;CONTAINS CURRENT ITERATION COUNT
001520  000000                  SCOPTR  OPEN                    ;CONTAINS CURRENT SCOPE POINTER
001522  000000                  PPGLIM  OPEN
001524  006604                  PPGTAB  PRG0                    ;PRG0 START ADDRESS
001526  016222                          PRG1                    ;PRG1 START ADDRESS
001530  016270                          PRG2                     PRG2 START ADDRESS
```

```
001532  006626                  RSTART  PRGOR           ,PRGO RESTART ADDRESS
001534  016232                          PRG1R           ,PRG1    "       "
001536  016300                          PRG2R           ,PRG2    "       "
001540  003030                  EMTTAB  TYP             ,POINTER TO TYPEOUT ROUTINE
001542  001654                          ERR             ,POINTER TO ERROR ROUTINE
001544  001634                          DTCHK           ,POINTER TO DATA COMPARISON ROUTINE
001546  000000                          0
001550  000000                          0
001552  002740                          SRSETT          ,POINTER TO RESET ROUTINE
001554  002406                          ESCOPE          ,POINTER TO SCOPE ROUTINE
001556  002640                          SAVRG           ,POINTER TO SAVE REGISTERS ROUTINE
001560  002700                          RSTRG           ,POINTER TO RESTORE REGISTERS ROUTINE
001562  001672                          ERR1            ,POINTER TO ERROR1 ROUTINE
001564  003142                          INIT            ,POINTER TO INIT AL ZE ROUTINE
001566  017074                          SUSWRP
001570  017154                          KBDINTT
001572  017230                          CNTLUU
001574  177560                  TKCSR   177560
001576  177562                  TKDBR   177562
001600  177564                  TPCSR   177564
001602  177566                  TPDBR   177566
001604  000000                  COUNT   OPEN
001606  000000                  PCADD   OPEN
001610  000000                  APCADD  OPEN
001612  000000                  PRVCNT  OPEN
001614  175001                   CSR    175001
001616  175003                   BAR    175003
001620  175005                   BKCSR  175005
001622  175007                   BASREG 175007
001624  000000                  PASS    OPEN
```

```
                                ;ROUTINE TO TYPE OUT INCORRECT ROUTINE SELECTED
001626  104000                  INCRTN  TYPE
001630  017444                          M1                      ;TYPE INCORRECT ROUTINE SELECTED
001632  000207                          RTS     %7              ;EXIT

                                ;DATA COMPARISON ROUTINE
001634  123737  001274  001276  DTCHK   CMPB    RCVDAT,XMTDAT   ;COMPARE RECEIVED & TRANSMITTED DATA
001642  001403                          BEQ     1$              ;CHARS  BRANCH IF SAME
001644  004737  002040                  JSR     7,CNVDAT        ;CONVERT RCVDAT & XMTDAT TO ASCII
001650  104011                          ERROR1
001652  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
001654  012737  000402  001754  ERR     MOV     #402,ERRB       ;MOV BR  +6 TO ERRB
001662  013737  001606  001610          MOV     PCADD,APCADD    ;GET PC WHERE ERROR OCCURRED
001670  000410                          BR      EPRA
001672  012737  000240  001754  ERR1    MOV     #240,ERRB       ;MOVE NOP TO ERRB
001700  013737  001606  001610          MOV     PCADD,APCADD    ;GET PC WHERE ERROR OCCURRED
001706  004737  002040                  JSR     7,CNVDAT        ;CONVERT RCVDAT & XMIT DAT TO ASCII
001712  104014                  EPRA    KBDIN                   ;GO CHECK FOR  G
001714  032777  020000  177160          BIT     #BIT13,@SWR     ;ERROR PRINTOUT DESIRED
001722  001017                          BNE     ERRC            ;BRANCH IF NO PRINTOUT
001724  004537  005662                  JSR     5,OACNV         ;CONVERT
001730  001610                          APCADD                  ;DATA
001732  017650                          APC                     ;TO
001734  000006                          6                       ;ASCII
001736  004537  005662                  JSR     5,OACNV         ;FOR
001742  001512                          RTNNO                   ;PRINTOUT
001744  017642                          ATNUMB
001746  000003                          3
001750  104000                          TYPE                    ;TYPE ERROR
001752  017637                          EMO                     ;MESSAGE
001754  000000                  ERRB    OPEN                    ;NOP IF ERROR1, BR  +6 IF ERROR
001756  104000                          TYPE                    ;TYPE ANOTHER MESSAGE
001760  017401                          ERDAT                   ;IF ERROR 1
001762  032777  000400  177112  ERRC    BIT     #BIT8,@SWR      ;RING BELL ON ERROR?
001770  001411                          BEQ     ERRD            ;BRANCH IF NO BELL ON ERROR
001772  105777  177602                  TSTB    @TPCSR          ;TELEPRINTER
001776  100375                          BPL      -4             ;READY?
002000  012777  000007  177574          MOV     #BELL,@TPDBR    ;RING THE BELL
002006  105777  177566                  TSTB    @TPCSR          ;WAIT FOR THE BELL TO RING
002012  100375                          BPL      -4
002014  023737  000042  000046  ERRD    CMP     @#42,@#46       ;ACT11?
002022  001403                          BEQ     EPRHLT
002024  005777  177052                  TST     @SWR            ;HALT ON ERROR
002030  100001                          BPL     ERREX           ;GO TO EXIT IF NO HALT ON ERROR
002032  000000                  EPRHLT  HALT
002034  104014                  ERREX   KBDIN                   ;CHECK FOR   G
002036  000002                          RTI                     ;RETURN

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

```
                                        ,IN MESSAGE
        002040  004537  005662          CNVDAT  JSR     5,DACNV
        002044  001276                          XMTDAT
        002046  017413                          AASB
        002050  000006                          6
        002052  004537  005662                  JSR     5,DACNV
        002056  001274                          RCVDAT
        002060  017427                          AWAS
        002062  000006                          6
        002064  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

002066  012706  001100          START   MOV     #SPBOT,%6
002072  104013                          SUSWR                   ;SEE IF SWITCH-LESS PROCESSOR
002074  012737  002116  000004          MOV     #1$,@#ERRVEC    ;SET UP FOR ERROR TRAP
002102  005737  172300                  TST     @#172300        ;TEST FOR KT11
002106  012737  012424  012036          MOV     #RT70,@#RT65+2  ;KT11 PRESENT, SET UP TO
                                                                ;SKIP RT66 AND RT67
002114  000402                          BR       +6
002116  012706  001100          1$      MOV     #SPBOT,%6       ;TRAP OCCURRED, NO KT11 PRESENT,
                                                                ;RESET STACK
002122  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC      ;RESET ERROR TRAP


                                                                ;OUT INTERRUPTS (SET PRIORITY LEVEL 7)
002130  004737  003172                  JSR     7,@#DMPAR               ;GET DM11 PARAMETERS
002134  012706  001100          RSTAT1  MOV     #SPBOT,%6
002140  104012                          INITIALIZE
002142  023737  000042  000046          CMP     @#42,@#46       ;ACT11?
002150  001405                          BEQ     PRGNUM+2
002152  104000                          TYPE
002154  017436                          MQ
002156  004537  004124                  JSR     5,RECD          ;GET PRGNUM AND PUT IT
002162  000000          PRGNUM  0                               ;HERE
002164  043737  001522  002162          BIC     PRGLIM,PRGNUM   ;MASK OFF UNUSED BITS
002172  006337  002162                  ASL     PRGNUM          ;SHIFT PROGRAM #
002176  012737  004304  000024          MOV     #PFAIL,24
002204  012737  000340  000026          MOV     #PRTY7,26
002212  013700  002162                  MOV     PRGNUM,%0       ;GET PROGRAM #
002216  000170  001524                  JMP     @PRGTAB(0)      ;GO START PROGRAM
002222  012737  004304  000024  RSTAT2  MOV     #PFAIL,24
002230  012737  000340  000026          MOV     #PRTY7,26
002236  012706  001100                  MOV     #SPBOT,%6
002242  104012                          INITIALIZE
002244  013700  002162                  MOV     PRGNUM,%0       ;GET PROGRAM #
002250  000170  001532                  JMP     @RSTART(0)      ;GO RESTART PROGRAM
002254  022737  000176  001102  SRSET   CMP     #SWREG,SWR
002262  001410                          BEQ     1$
002264  023737  000042  000046          CMP     @#42,@#46       ;ACT11?
002272  001405                          BEQ     GETRDY
002274  104000                          TYPE                    ;TYPE MESSAGE TO REQUEST SWITCH
002276  017454                          M3                       REGISTER SETTINGS
002300  000000                          HALT                    ;WAIT FOR OPERATOR TO SET SWITCHES
002302  000401                          BR      GETRDY
002304  104015          1$      CNTLU                           ;GO GET SWREG SETTINGS
002306  013737  001506  001514  GETRDY  MOV     KSTART,NXTST    ;ADDR OF 1ST ROUTINE TO NXTST
002314  012737  000006  000004  GTRDYX  MOV     #6,@#ERRVEC             ;RESET ERROR TRAP VECTOR
002322  104012                          INITIALIZE
002324  004737  002554          GTRDYA  JSR     %7,FORWD        ;ROLL FORWARD TO "NEXT" ROUTINE
002330  032777  001000  176544          BIT     #BIT9,@SWR      ;CHECK SELECT ROUTINE SWITCH
002336  001003                          BNE     GTRDYC          ;BRANCH IF SELECT ROUTINE SWITCH IS SET
```

```
002340  000177  177144                    JMP     @CURTST         ;GO RUN CURRENT ROUTINE
002344  000457                            BR      SCOPED          ;NO GO  MANUAL RTN BYPASSED
002346  017700  176530            GTRDYC  MOV     @SWR,%0         ;(SR) TO R0
002352  042700  177600                    BIC     #177600,%0      ;MASK UNDESIRED BITS
002356  123700  001512                    CMPB    RTNNO,%0        ;COMPARE RTNNO TO (R0)
002362  001002                            BNE     GTRDYD          ;BRANCH IF ROUTINE NOT FOUND YET
002364  000177  177120                    JMP     @CURTST         ;GO RUN ROUTINE
002370  022737  177777  001514    GTRDYD  CMP     #-1,NXTST       ;NO  CHECK FOR LAST ROUTINE
002376  001352                            BNE     GTRDYA          ;BRANCH IF NOT LAST ROUTINE
002400  004737  001626                    JSR     %7,INCRTN       ;YES  INCORRECT ROUTINE SELECTED
002404  000740                            BR      GETRDY          ;START OVER

                                ;SCOPE SERVICE ROUTINE
002406  000240                ESCOPE  NOP
002410  104014                        KEDIN                       ;CHECK FOR  G
002412  005077  176634                CLR     @BAR            ;CLEAR ALL DM11 REGISTERS
002416  005077  176626                CLR     @CSR            ;AND SET BASE REGISTER
002422  005077  176626                CLR     @BKCSR          ;AT THE STARTING ADDRESS
002426  104012                        INITIALIZE
002430  013716  001520                MOV     SCOPTR,(SP)
002434  032777  040000  176440        BIT     #BIT14 @SWR     ;CHECK FOR SCOPE OPTION
002442  001402                        BEQ     SCOPEB          ;BRANCH IF SCOPE SW NOT SET
002444  000176  000000    SCOPEA      JMP     @(SP)           ;RETURN TO ROUTINE
002450  032777  004000  176424    SCOPEB  BIT     #BIT11,@SWR     ;TEST INHIBIT ITERATION SWITCH
002456  001012                        BNE     SCOPED          ;BRANCH IF INHIBIT ITERATION SW SET
002460  023737  000042  000046        CMP     @#42,@#46       ;ACT11?
002466  001003                        BNE     1$              ;BR IF NO
002470  005737  001624                TST     @#PASS          ;1ST PASS?
002474  001403                        BEQ     SCOPED          ;BR IF YES
002476  005337  001516            1$  DEC     ICTR            ;DECREMENT ITERATION COUNT
002502  001360                        BNE     SCOPEA          ;BRANCH IF COUNT NOT 0
002504  032777  001000  176370    SCOPED  BIT     #BIT9,@SWR      ;CHECK SELECT ROUTINE SWITCH
002512  001275                        BNE     GETRDY          ;BRANCH IF SELECT RTN SW SET
002514  022737  177777  001514        CMP     #-1,NXTST       ;LAST TEST?
002522  001274                        BNE     GTRDYX          ;BRANCH IF NOT LAST TEST
002524  005237  001624                INC     @#PASS
002530  104000                        TYPE                    ;TYPE
002532  017447                        M2                      ;'PRGEND'
002534  013700  000042                MOV     @#42,%0         ;CHECK XXDP/ACT11 MONITOR HOOK
002540  001662                        BEQ     GETRDY
002542  000005                        RESET
002544  004710                SENDAD  JSR     7,(0)           ;RETURN TO XXDP/ACT11 MONITOR
002546  000240                        NOP
002550  000240                        NOP
002552  000240                        NOP
002554  013705  001514            FORWD   MOV     NXTST,%5        ;ADDR OF NEXT ROUTINE TO R5
002560  012537  001512                    MOV     (5)+,RTNNO      ;GET NEXT ROUTINE NUMBER
002564  012537  001514                    MOV     (5)+,NXTST      ;GET ADDR OF NEXT "NEXT" ROUTINE
002570  012537  001516                    MOV     (5)+,ICTR       ;GET ITERATION COUNT
002574  012537  001520                    MOV     (5)+,SCOPTR     ;GET SCOPE LOOP ENTRY POINTER
002600  010537  001510            FORWDA  MOV     %5,CURTST       ;ADDR OF NOW CURRENT TEST TO CURTST
002604  000207                        RTS     %7              ;EXIT FORWD SUBROUTINE


                                ;EMT TRAP INTERPRETER
002606  011646                EMTINT  MOV     (6) - 6)        ;GET P  F NE.T  NSTR_ T  N
```

```
002610  162716  000002          SUB     #2,(6)          ;FORM PC OF EMT INSTRUCTION
002614  011637  001606          MOV     (6),PCADD       ;GET PC OF EMT INSTRUCTION
002620  017616  000000          MOV     @(6),(6)        ;GET EMT INSTRUCTION
002624  105066  000001          CLRB    1(6)            ;CLEAR MSH OF EMT INSTRUCTION
002630  006316                  ASL     (6)             ;SHIFT EMT IDENTIFIER
002632  062716  001540          ADD     #EMTTAB,(6)
002636  013607                  MOV     @(6)+,%7        ;GO TO PROPER EMT

                        ;SAVE REGS 0 TO 4 SUBROUTINE
002640  012637  002674  SAVRG   MOV     (6)+,SVRPC      ;SAVE PC AND PSW
002644  012637  002676          MOV     (6)+,SVRPSW
002650  010446                  MOV     %4,-(6)         ;SAVE REGS 0 - 4
002652  010346                  MOV     %3,-(6)         ;IN STACK
002654  010246                  MOV     %2,-(6)
002656  010146                  MOV     %1,-(6)
002660  010046                  MOV     %0,-(6)
002662  013746  002676          MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW
002666  013746  002674          MOV     SVRPC -(6)
002672  000002                  RTI                     ;EXIT
002674  000000  SVRPC   OPEN
002676  000000  SVRPSW  OPEN

                        ;RESTORE REGS 0 TO 4 SUBROUTINE
002700  012637  002734  RSTRG   MOV     (6)+,RSTPC      ;SAVE PC AND PSW
002704  012637  002736          MOV     (6)+,RSTPSW
002710  012600                  MOV     (6)+,%0         ;RESTORE REGS 0 - 4
002712  012601                  MOV     (6)+,%1         ;FROM STACK
002714  012602                  MOV     (6)+,%2
002716  012603                  MOV     (6)+,%3
002720  012604                  MOV     (6)+,%4

002722  013746  002736          MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW
002726  013746  002734          MOV     RSTPC,-(6)
002732  000002                  RTI                     ;EXIT
002734  000000  RSTPC   OPEN
002736  000000  RSTPSW  OPEN

                        ;ROUTINE TO ISSUE RESET
002740  012700  052525  SRSETT  MOV     #52525,%0       ;DATA TO R0
002744  005100                  COM     %0              ;COMPLEMENT (R0)
002746  010037  002742          MOV     %0,SRSETT+2     ;(R0) TO SRSETT+2
002752  000005                  RESET                   ;ISSUE RESET  (R0) IS
002754  000002                  RTI                     ;DISPLAYED  EXIT

                        ;RANDOM NUMBER GENERATOR  ROUTINE EXITS WITH NUMBER IN REGISTER 0
002756  013700  003024  RNGEN   MOV     RP1,%0
002762  006100                  ROL     %0
002764  006100                  ROL     %0
002766  063700  003026          ADD     RP2,%0
002772  010037  003024          MOV     %0,RP1
002776  006100                  ROL     %0
003000  006100                  ROL     %0
003002  063700  003026          ADD     RP2,%0
003006  006100                  ROL     %0
003010  006100                  ROL     %0
003012  010037  003026          MOV     %0,RP2
```

```
                                                                J  2
003016  013700  003024                    MOV     RP1,%0
003022  000207                            RTS     %7              ;EXIT  NUMBER IN R0
003024  001233                    RP1     1233
003026  007622                    RP2     7622
                                ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER
003030  011600                    TYP     MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
003032  062716  000002                    ADD     #2,@%6          ;SET UP EXIT
003036  011000                            MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0
003040  112037  003140            TYPA    MOVB    (0)+,TYPDAT     ;GET CHARACTER
003044  122737  000100  003140            CMPB    #100,TYPDAT     ;CHECK FOR"@"CHARACTER
003052  001001                            BNE     TYPC            ;BRANCH IF NOT'@"
003054  000002                            RTI                     ;TERMINATOR CHAR  DONE  EXIT
003056  122737  000045  003140  TYPC      CMPB    #45,TYPDAT      ;CHECK FOR"%"
003064  001412                            BEQ     TYPF            ;BRANCH IF"%"
003066  004737  003074                    JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
003072  000762                            BR      TYPA
003074  113777  003140  176500  TYPD      MOVB    TYPDAT,@TPDBR   ;OUTPUT CHARACTER TO PRINTER
003102  105777  176472                    TSTB    @TPCSR          ;WAIT FOR DONE FLAG
003106  100375                            BPL     .-4
003110  000207                            RTS     %7              ;EXIT
003112  112737  000015  003140  TYPF      MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
003120  004737  003074                    JSR     %7,TYPD         ;GO TYPE CHAR
003124  112737  000012  003140  TYPG      MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT
003132  004737  003074                    JSR     %7 TYPD         ;GO TYPE CHAR
003136  000740                            BR      TYPA
003140  000000                    TYPDAT  OPEN


                                ;SUBROUTINE TO INITIALIZE STACK POINTER AND SET PROCESSOR PRIORITY
                                ;LEVEL 7
003142  012777  001106  176106    INIT    MOV     #CAT,@BASREG    ;INITIALIZE THE BASE REGISTER
003150  012737  000340  177776            MOV     #PRTY7,PSW              ;SET PRIORITY LEVEL 7
003156  011637  001100                    MOV     (SP),SPBOT       GET RETURN ADDRESS
003162  012706  001100                    MOV     #SPBOT,SP       ;SET BOTTOM OF THE STACK
003166  000176  000000                    JMP     @(SP)           ;RETURN


                                ;SUBROUTINE TO GET DM11 PARAMETERS
                                ;VECTOR ADDRESS
003172  023737  000042  000046  DMPAR   CMP     @#42,@#46       ;ACT11?
003200  001060                            BNE     6$              ;BR IF NO
                                ;SIZE FOR INTERRUPT VECTOR IN AUTO MODE
003202  012700  000302                    MOV     #302,R0         ;SET UP FLOATING VECT AREA
003206  010060  177776            4$      MOV     R0,-2(R0)
003212  012720  000003                    MOV     #3,(R0)+
003216  005720                            TST     (R0)+
003220  022700  000776                    CMP     #776,R0
003224  100370                            BPL     4$
003226  012737  003316  000014            MOV     #5$,@#14        ;SET BPT VECT
003234  012737  000340  000016            MOV     #340,@#16       ;& PSW
003242  012737  177777  001146  3$        MOV     #-1,WCT         ;SET TO XMIT 1 CHAR
003250  012737  016564  001106            MOV     #OUTBUF,CAT
003256  012777  000105  175764            MOV     #BIT6+BIT2+BIT0,@CSR    ;SET IE
003264  005037  177776                    CLR     @#PSW           ;LVL 0
003270  012777  000001  175754            MOV     #LBIT0,@BAR     ;XMIT
003276  012737  177777  001604            MOV     #-1,COUNT       ;WAIT
```

```
                                                        K  2
003304  005337  001604          2$      DEC     COUNT
003310  001375                          BNE     2$
003312  104001                          ERROR                   ;NO INT OCCURRED
003314  000752                          BR      3$              ;REPEAT IT
003316  162716  000004          5$      SUB     #4,(SP)         ;CALC INT VECT
003322  011637  003356                  MOV     (SP),@#VECTOR   ;STORE IT
003326  012737  000016  000014          MOV     #16,@#14        ;RESTORE BPT VECT
003334  004737  004100                  JSR     7,OVRLAY        ; +2, HALT IN VECT AREA
003340  000415                          BR      VECOK
003342  004737  004100          6$      JSR     7,OVRLAY        ;PUT HALT, +2 IN VECTOR AREA
003346  104000                          TYPE                    ;ASK USER FOR RECEIVER INT  VECTOR
003350  017310                          WHERE                   ;OF UNIT UNDER TEST
003352  004537  004124                  JSR     5,RECD          ;GET VECTOR AND PUT IT
003356  000000                  VECTOR  0                       ;HERE
003360  005737  003356                  TST     VECTOR
003364  001003                          BNE     VECOK
003366  012737  000300  003356          MOV     #300,VECTOR     ;SET VECTOR = TO 0300
003374  023727  003356  000300  VECOK   CMP     VECTOR,#300     ;IS VECTOR HIGHER OR
003402  103003                          BHIS    VECOKB          ;EQUAL TO 0300
003404  104000                  VECOKA  TYPE                    ;TYPE '?'
003406  017444                          M1
003410  000670                          BR      DMPAR           ;ASK FOR ANOTHER VECTOR
003412  023727  003356  000770  VECOKB  CMP     VECTOR,#770     ;IS VECTOR = TO OR
003420  101371                          BHI     VECOKA          ;LESS THAN 770
003422  032737  000007  003356          BIT     #7,VECTOR       ;LSB OF VECTOR MUST BE ALL 0'S
003430  001365                          BNE     VECOKA
003432  013737  003356  001260          MOV     VECTOR,CLKINT
003440  062737  000004  003356          ADD     #4,VECTOR
003446  013737  003356  001264          MOV     VECTOR,XMTINT

                                .UNIT NUMBER
003454  023737  000042  000046  DMPARB  CMP     @#42,@#46       ;ACT11?
003462  001405                  .       BEQ     UNIT+2          ;BP IF YES
003464  104000                          TYPE
003466  017352                          WHICH
003470  004537  004124                  JSR     5,RECD          ;GET UNIT AND PUT IT
003474  000000                  UNIT    0                       ;HERE
003476  023727  003474  000017          CMP     UNIT,#17        ;UNIT SELECTED MUST BE
003504  101403                          BLOS    UNTOKA          ;BETWEEN 0 & 17
003506  104000                          TYPE
003510  017444                          M1
003512  000760                          BR      DMPARB
003514  006337  003474          UNTOKA  ASL     UNIT
003520  006337  003474                  ASL     UNIT
003524  006337  003474                  ASL     UNIT
003530  012702  000004                  MOV     #4,%2
003534  012701  001250                  MOV     #CSR,%1
003540  042711  000370          UNTOKB  BIC     #370,(1)        ;FORM ADDRESSES OF
003544  063721  003474                  ADD     UNIT,(1)+       ;REGISTERS OF UNIT SELECTED
003550  005302                          DEC     %2
003552  001372                          BNE     UNTOKB

003554  012702  000004                  MOV     #4,%2
003560  012703  001250                  MOV     #CSR,%3
003564  012701  001614                  MOV     #CSR,%1
003570  012311                  UNTOKC. MOV     (3)+,(1)        ;FORM ODD BYTE ADDRESSES
```

```
003572  005221                          INC     (1)+
003574  005302                          DEC     %2
003576  001374                          BNE     UNTOKC
                                ;CHARACTER LENGTH
003600  023737  000042  000046  DMPARC  CMP     @#42,@#46       ;ACT11?
003606  001405                          BEQ     LENGTH+2        ;BR IF YES
003610  104000                          TYPE
003612  017365                          LEVEL
003614  004537  004124                  JSR     5,RECD          ;GET LENGTH AND PUT IT
003620  000000          LENGTH  0                               ;HERE
003622  005737  003620                  TST     LENGTH
003626  001003                          BNE     LENOKA
003630  012737  000010  003620          MOV     #8 ,LENGTH
003636  023727  003620  000005  LENOKA  CMP     LENGTH,#5       ;CHARACTER LENGTH SELECTED MUST
003644  103003                          BHIS    LENOKC          ;BE BETWEEN 5-8
003646  104000          LENOKB  TYPE                            ;CARRIAGE RETURN SELECTS 8
003650  017444                          M1
003652  000752                          BR      DMPARC
003654  023727  003620  000010  LENOKC  CMP     LENGTH,#8
003662  101371                          BHI     LENOKB
003664  162737  000005  003620          SUB     #5,LENGTH
003672  006337  003620                  ASL     LENGTH
003676  013701  003620                  MOV     LENGTH,%1
003702  016137  003714  001300          MOV     LENOKD(1) @#CAPMSK      ;SET CHARACTER LENGTH MASK
003710  000240                          NOP
003712  000207                          RTS     7               ;EXIT PARAMETERS ROUTINE

                                ;THE BELOW TABLE REPRESENTS THE CHARACTER LENGTH MASK FOR 5,6,7, AND 8
                                ;BITS PER CHARACTER RESPECTIVELY
003714  177740          LENOKD  177740
003716  177700                  177700
003720  177600                  177600
003722  177400                  177400

                                ;CALCULATE MACHINE TIME TO TRANSMIT ONE CHARACTER
003724  005037  004074          TIMER   CLR     TIME1
003730  012737  177777  001146          MOV     #-1,WCT         ;SET UP TO TRANSMIT
003736  012737  016564  001106          MOV     #OUTBUF,CAT     ;1 CHARACTER ON LINE 1
003744  012777  004044  175306          MOV     #TIMEC,@CLKINT  ;LOAD RECEIVER INTERRUPT
003752  012777  000340  175302          MOV     #PRTY7,@CLKLVL  ;AND PRIORITY
003760  012777  000001  175264          MOV     #LBIT0,@BAR     ;START TRANSMITTING
003766  012777  000105  175254          MOV     #BIT6+BIT2+BIT0 @CSR    ;SET IE BIT
003774  005037  177776                  CLR     @#PSW           ;SET PROCESSER PRIORITY LEVEL = 0
004000  012737  000044  001604  TIMEA   MOV     #44,COUNT
004006  062737  000001  004074          ADD     #1,TIME1        ;INCREMENT MACH  TIME TO TRANSMIT
004014  001007                          BNE     TIMEB
004016  005077  175226                  CLR     @CSR
004022  012737  000340  177776          MOV     #PRTY7,PSW      ;SET PROCESSER PRIORITY LEVEL = 7
004030  104001                          ERROR                   ;TRANSMITTER FAILED TO INTERRUPT
004032  000734                          BR      TIMER
004034  005337  001604  TIMEB   DEC     COUNT
004040  001375                          BNE     -4
004042  000756                          BR      TIMEA
004044  005077  175200  TIMEC   CLR     @CSR
004050  013737  004074  004076          MOV     TIME1,TIME14
004056  006037  004076                  ROR     TIME14
```

```
004062  000241                          CLC
004064  006037  004076                  ROR     TIME14
004070  022626                          POPSP2                  ;RESTORE STACK POINTER
004072  000207                          RTS     7               ;EXIT TIME CALCULATION ROUTINE

004074  000000                  TIME1   OPEN                    ;CONTAINS MACHINE TIME TO XMIT 1 CHAR
004076  000000                  TIME14  OPEN                    ;CONTAIN TIME TO XMIT 1/4 CHAR

                                ;SUBROUTINE TO PUT HALT, +2 IN VECTOR AREA (0300-1000)
004100  012702  000302          OVRLAY  MOV     #302,R2
004104  010262  177776          1$      MOV     R2,-2(R2)
004110  005022                          CLR     (R2)+
004112  005722                          TST     (R2)+
004114  022702  000776                  CMP     #776,R2
004120  100371                          BPL     1$
004122  000207                          RTS     7


                                ;SUBROUTINE TO RECEIVE DATA
                                ;THIS SUBROUTINE RECEIVES DATA FROM THE KEYBOARD (UP TO SIX OCTAL
                                ;DIGITS AND PLACES THEM INTO THE ADDRESS FOLLOWING THE SUBROUTINE
                                ;CALL (JSR 5,RECD)   NO REGISTER CONTENTS ARE DISTURBED


                                ;SUBRCUTINE TO INPUT DATA FROM TTY

004124  010046                  RECD    MOV     R0,-(SP)
004126  005015                  1$      CLR     (5)                     ;CLEAR OLD DATA
004130  012737  000007  004202          MOV     #7,CNT                  ;SET CHAR COUNT
004136  105777  175432          2$      TSTB    @TKCSR                  ;WAIT FOR CHAR
004142  100375                          BPL     2$
004144  117700  175426                  MOVB    @TKDBR,R0
004150  142700  000200                  BICB    #200,R0                 ;STRIP OFF PARITY
004154  110077  175422                  MOVB    R0,@TPDBR               ;ECHO CHARACTER
004160  122700  000025                  CMPB    #25,R0                  ;IS IT A  U
004164  001443                          BEQ     5$                      ;BRANCH IF YES
004166  122700  000015                  CMPB    #15,R0                  ;IS IT A <CR>
004172  001415                          BEQ     6$                      ;BRANCH IF YESS
004174  142700  000060                  BICB    #60,R0
004200  132700  000110                  BITB    #110,R0                 ;CHECK FOR 0-7 (8)
004204  001031                          BNE     7$                      ;BRANCH IF NOT
004206  006315                          ASL     (5)
004210  006315                          ASL     (5)
004212  006315                          ASL     (5)                     ;SHIFT DATA
004214  150015                          BISB    R0,(5)                  ;INSET NEW CHAR
004216  005337  004302                  DEC     CNT
004222  001422                          BEQ     7$                      ;ONLY 6 CHAR'S PLEASE
004224  000744                          BR      2$                      ;NEXT CHARACTER
004226  105777  175346          6$      TSTB    @TPCSR
004232  100375                          BPL     6$                      ;WAIT FOR READY
004234  012777  000012  175340          MOV     #12,@TPDBR              ;TYPE <LF>
004242  105777  175332          8$      TSTB    @TPCSR
004246  100327                          BPL     1$                      ;WAIT FOR READY
004250  005077  175326                  CLR     @TPDBR                  LOAD CHAR
004254  105777  175320          9$      TSTB    @TPCSR
004260  100375                          BPL     9$
```

```
004262  005725                          TST     (R5)+                   ;ADJUST R5
004264  012600                          MOV     (SP)+,R0                ;RESTORE R0
004266  000205                          RTS     R5
004270  104000                  7$      TYPE
004272  017444                          M1
004274  104000                  5$      TYPE
004276  017350                          $CTLU
004300  000712                          BR      1$                      ;START OVER
004302  000000                  CNT     0

                                ;POWER FAIL ROUTINE
004304  012737  004314  000024 PFAIL   MOV     #PWRUP,24
004312  000000                          HALT

                                ;POWER UP SUBROUTINE
004314  000005                  PWRUP   RESET                           ;GIVE TELEPRINTER TIME TO START
004316  012706  001100                  MOV     #SPBOT,%6
004322  104001                          ERROR                           ;TYPE POWER FAIL ERROR
004324  000137  002222                  JMP     @#RSTAT2                ;GO RESTART PROGRAM

                                ;LINE TEST SUBROUTINE  THIS LINE TEST PROVIDES SEVERAL TESTS ON A DM11 L
                                ;THE SUBROUTINE IS CALLED BY JSR 5, LNTST   THIS INSTRUCTION PROVIDES THE
                                ;LINE BIT AND LINE NUMBER   THE FOLLOWING LINE TESTS ARE PERFORMED
                                 WA TS UNTIL CHARACTER SHOULD HAVE BEEN TRANSMITTED, THEN TESTS

                                        ;THAT BAR BIT CLEARED            ;DO NEXT TEST IF ERROR
                                        ;READY SET                       ;DO NEXT TEST IF ERROR
                                        ;WORD COUNT WENT TO 0            ;DO NEXT TEST IF ERROR
                                        ;CURRENT ADDRESS DID NOT INCREMENT ;DO NEXT TEST IF ERROR
                                        ;INTERRUPTS TO CORRECT VECTOR    ;DO NEXT TEST IF ERROR (NO INTERRUPT)
                                        ;READY BIT CAN BE CLEARED        ;END OF TEST
004330  012537  016412          XMTTST  MOV     (5)+,@#LINE             ;GET LINE NUMBER
004334  004737  006552                  JSR     ?,GTLINB                ;GO FORM LINE BIT (FOR BAR)
004340  005037  001276                  CLR     XMTDAT
004344  004537  005754          1$      JSR     5,@#XMITC               ;GO TO TRANSMIT SUBROUTINE
004350  177777                          -1                              ;TRANSMIT ONE CHARACTER
004352  012703  000010                  MOV     #10,%3                  ;WAIT IN
004356  005002                          CLR     %2                      ;THIS
004360  005302                  2$      DEC     %2                      ;LOOP
004362  001376                          BNE      -2                     ;UNTIL THE
004364  005303                          DEC     %3                      ;TRANSMITTER
004366  001374                          BNE     2$                      ;IS FINISHED
004370  017737  174656  001274         MOV     @BAR,RCVDAT             ;BAR SHOULD NOW BE CLEAR
004376  001401                          BEQ     3$                      ;BRANCH IF IT IS
004400  104011                          ERROR1                          ;ERROR! BAR BIT FAILED TO CLEAR
004402  005777  174642          3$      TST     @CSR                    ;TEST READY BIT SHOULD BE SET
004406  100401                          BMI     4$                       BRANCH IF SET
004410  104001                          ERROR                           ;ERROR! READY NOT SET
004412  013701  016412          4$      MOV     @#LINE,%1               ;GET LINE NUMBER
004416  016137  001146  001274         MOV     WCT(1),RCVDAT           ;WORD COUNT SHOULD BE 0
004424  001401                          BEQ     5$
004426  104011                          ERROR1                          ;ERROR! WORD COUNT NOT EQUAL TO 0
004430  012737  016564  001276  5$      MOV     #OUTBUF,XMTDAT          ;
004436  016137  001106  001274         MOV     CAT(1),RCVDAT           ;CURRENT ADDRESS SHOULD NOT HAVE INCREMENTED
004444  023737  001274  001276         CMP     RCVDAT,XMTDAT           ;
004452  001401                          BEQ     6$
```

```
                                                                    B  3
004454  104011                          ERROR1                      ;ERROR! CURRENT ADDR  DID NOT INCREMENT
004456  012777  004510  174600  6$      MOV     #7$,@XMTINT         ;LOAD TRANSMITTER INTERRUPT VECTOR
004464  052777  010000  174556          BIS     #BIT12,@CSR         ;ENABLE TRANSMITTER INTERRUPT
004472  005037  177776                  CLR     @#PSW               ;SET PROCESSOR PRIORITY =0
004476  000240                          NOP
004500  012737  000340  177776          MOV     #PRTY7,@#PSW        ;LOCK OUT INTERRUPTS
004506  104001                          ERROR                       ;TRANSMITTER FAILED TO INTERRUPT OR
                                ;INTERRUPTED TO WRONG LOCATION AND HALTED WITH ADDRESS +2 DISPLAYED
004510  022626                  7$      CMP     (6)+,(6)+           ;RESET STACK PTR
004512  012737  000340  177776          MOV     #PRTY7,@#PSW        ;LOCK OUT INTERRUPTS
004520  042777  110000  174522          BIC     #BIT12+BIT15,@CSR       ;CLEAR XMIT IE & READY B TS
004526  005777  174516                  TST     @CSR                ;TEST THAT READY CLEARED
004532  100001                          BPL     8$                  ;GO TO EXIT
004534  104001                          ERROR                       ;ERROR! READY FAILED TO CLEAR
004536  005726                  8$      TST     (6)+                ;RESET STACK PTR
004540  104006                          SCOPE                       ;SCOPE
```

```
                        ;RECEIVER LINE TESTS
                        ;THE RECEIVER LINE TEST SUBROUTINE IS ENTERED WITH
                        ;A JSP 5, RCVTST INSTRUCTION FOLLOWED BY THE
                        ;LINE BIT AND LINE NUMBER OF THE LINE TO BE
                        ;TESTED   THE SUBROUTINE PERFORMS THE FOLLOWING
                        ;TEST AS SHOWN BELOW   IN THE EVENT OF AN ERROR
                        ;THE REMAINING TESTS ARE ABORTED
                        ;TEST SEQUENCE AND ADDRESS TAG
                        ;
                        ;       CHARACTER DONE SETS                             RTSTA
                        ;       CHARACTER DONE CAUSES INTERRUPT                 RTSTB
                        ;       CHARACTER DONE CAN BE CLEARED                   RTSTC
                        ;       TUMBLE TABLE ENTRY IS CORRECT                   RTSTD
                        ;       NO ENTRY IN NEXT TABLE ADDRESS                  RTSTE
                        ;       HARDWARE TABLE POINTER INCREMENTED              RTSTF
                        ;       NEXT ENTRY WAS CORRECT                          RTSTG
                        ;
                        ;NOTES  IF THE HARDWARE PROVIDES AN INCORRECT VECTOR
                        ;       ADDRESS THE PROGRAM WILL HALT AND DISPLAY
                        ;       THE INCORRECT VECTOR+2 IN THE ADDRESS LIGHTS

004542  012737  177777  016564  RCVTST  MOV     #-1,OUTBUF      ;LOAD ALL 1'S INTO OUTPUT BUFFER
004550  005037  001306          CLR     TUMTAB          ;CLEAR THE FIRST
004554  005037  001310          CLR     TUMTAB+2        ; TWO TUMBLE TABLE ADDRESSES
004560  012737  000340  177776  MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
004566  012537  016412          MOV     (5)+,LINE       ;GET LINE NUMBER
004572  004537  005754          JSP     5,@#XMITD       ;TRANSMIT 1 CHARACTER (0'S)
004576  177777                  -1                      ;ON LINE SPECIFIED BY JSR
004600  052777  000001  174442  BIS     #BIT0,@CSP      ;SET GO BIT
004606  005777  174436          TST     @CSR            ;WAIT FOR TRANSMITTER
004612  100375                  BPL     -4              ; TO TRANSMIT 1 CHAR
004614  042777  100000  174426  BIC     #BIT15,@CSR     ;CLEAR TRANSMITTER READY FLAG
004622  005046                  CLR     -(SP)           ;SET WATCH DOG TIMER
004624  105777  174420      1$  TSTB    @CSR            ;TEST CHAR  DONE FLAG
004630  100404                  BMI     2$              ;BRANCH IF SET
004632  005216                  INC     (SP)            ;WAIT FOR THE FLAG
004634  001373                  BNE     1$
004636  104001                  ERROR                   ;ERROR! CHAR  DONE FLAG FAILED TO SET
004640  000550                  BR      8$              ;GO TO EXIT
004642  005726              2$  TST     (SP)+           ;RESTORE STACK PTR
004644  012777  004700  174406  MOV     #3$,@CLKINT     ;LOAD RECEIVER INTERRUPT VEC  ADRS
004652  052777  000100  174370  BIS     #BIT6 @CSR      ;SET RECEIVER IE BIT
004660  005037  177776          CLR     @#PSW           ;ENABLE INTERRUPTS
004664  000240                  NOP
004666  012737  000340  177776  MOV     #PRTY7,PSW      ;LOCK OUT INTERRUPTS
004674  104001                  ERROR                   ;RECEIVER FAILED TO INTERRUPT
004676  000531                  BR      8$              ;GO TO EXIT
004700  012737  000340  177776  3$  MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
004706  022626                  CMP     (6)+,(6)+
004710  042777  000300  174332  BIC     #BIT7+BIT6,@CSR  CLEAR CHAR  DONE FLAG
004716  105777  174326          TSTB    @CSR            ;TEST THAT CHAR DONE FLAG CLEARED
004722  100002                  BPL     4$              ;BRANCH IF CHAR  DONE FLAG CLEARED
004724  104001                  ERROR                   ;ERROR! CHAR  DONE FAILED TO CLEAR
004726  000515                  BR      8$               GO TO EXIT
```

```
                                                        D  3
004730  013737  001306  001274  4$      MOV     TUMTAB,RCVDAT   ;GET TUMBLE TABLE ENTRY
004736  042737  020000  001274          BIC     #BIT13,RCVDAT   ;CLEAR PARITY INDICATOR
004744  012737  000377  001276          MOV     #377,XMTDAT     ;LOAD XMTDAT WITH  TRANSMITTED DATA
004752  043737  001300  001276          BIC     CARMSK,XMTDAT   ;CLEAR NON TRANSMITTED BITS
004760  153737  016412  001277          BISB    LINE,XMTDAT+1   ;LOAD XMTDAT WITH PROPER LINE #
004766  052737  100000  001276          BIS     #BIT15,XMTDAT   ;SET VALID DATA ENTRY BIT IN XMTDAT
004774  023737  001274  001276          CMP     RCVDAT,XMTDAT   ;COMPARE TUMBLE TABLE ENTRY (RCVDAT) &
                                                                ;CORRECT RESULT (XMTDAT)

005002  001402                          BEQ     5$
005004  104011                          ERROR1                  ;ERROR  INCORRECT TUMBLE TABLE
005006  000465                          BR      8$              ;ENTRY, GO TO EXIT
005010  005037  001306          5$      CLR     TUMTAB
005014  013737  001310  001274          MOV     TUMTAB+2,RCVDAT ;GET NEXT ENTRY
005022  001404                          BEQ     6$              ;BRANCH IF ALL 0'S
005024  005037  001276                  CLR     XMTDAT
005030  104011                          ERROR1                  ;ERROR! FALSE ENTRY IN NEXT
005032  000453                          BR      8$              ;TUMBLE TABLE ADDRESS
005034  004537  005754          6$      JSR     5,@#XMITD       ;TRANSMIT 1 CHARACTER (ALL 1 S)
005040  177777                          -1                      ;ON LINE SPECIFIED BY JSR
005042  005777  174202                  TST     @#TPB           ;WAIT FOR TRANSMITTER
005046  100375                          BPL     -4              ;READY FLAG
005050  105777  174174                  TSTB    @#CSR           ;TEST FOR THE DONE FLAG
005054  100375                          BPL     -4
005056  042777  000200  174164          BIC     #BIT7,@#CSR     ;CLEAR CHAR  DONE FLAG
005064  013737  001306  001274          MOV     TUMTAB,RCVDAT   ;TEST THAT HARDWARE TUMBLE
005072  001404                          BEQ     7$              ;TABLE POINTER INCREMENTED (+2)
005074  005037  001276                  CLR     XMTDAT
005100  104011                          ERROR1                  ;ERROR! TUMBLE TABLE POINTER DID
005102  000427                          BR      8$              ;NOT INCREMENT, GO TO EXIT
005104  013737  001310  001274  7$      MOV     TUMTAB+2,RCVDAT ;GET TUMBLE TABLE ENTRY
005112  042737  020000  001274          BIC     #BIT13,RCVDAT   ;CLEAR PARITY INDICATOR
005120  012737  000377  001276          MOV     #377,XMTDAT     ;LOAD XMTDAT WITH TRANSMITTED DATA
005126  043737  001300  001276          BIC     CARMSK,XMTDAT   ;CLEAR NON-TRANSMITTED BITS
005134  153737  016412  001277          BISB    LINE,XMTDAT+1   ;LOAD LINE # INTO XMTDAT
005142  052737  100000  001276          BIS     #BIT15 XMTDAT   ;SET VALID DATA ENTRY BIT INTO XMTDAT
005150  023737  001274  001276          CMP     RCVDAT,XMTDAT   ;COMPARE TUMBLE TABLE ENTRY (RCVDAT) &
                                                                ;CORRECT RESULT (XMTDAT)
005156  001401                          BEQ     9$
005160  104011                          ERROR1                   ERROR! 2ND TUMBLE TABLE ENTRY
005162  104006                  8$      SCOPE                    WAS INCORRECT, SCOPE


                        ;SUBROUTINE TO TEST BREAK OPERATION
                        ;THE TRANSMITTER WILL TRANSMIT THE BREAK FOR TWO CHARACTER
                        ;TIMES AND THEN THE FOLLOWING TESTS WILL BE PERFORMED
                        ;       A VALID DATA ENTRY WAS MADE     BKTSTB
                        ;       BREAK BIT SET                   BKTSTC
                        ;       DATA WAS ALL 0'S                        BKTSTD
005164  012777  000001  174056  BRKTST  MOV     #1,@#CSR        ;SET THE GO BIT
005172  011577  174056                  MOV     (5),@#BKCSR     ;SET THE BREAK BIT
005176  105777  174046                  TSTB    @#CSR           ;WAIT FOR THE RECEIVER TO
005202  100375                          BPL     -4              ;RECEIVE BREAK
005204  042777  000200  174036          BIC     #BIT7,@#CSR     ;CLEAR FLAG
005212  105777  174032                  TSTB    @#CSR           ;WAIT FOR THE RECEIVER TO
005216  100375                          BPL     -4              ;TO RECEIVE BREAK
```

```
005220  042777  000200  174022          B C     #BIT7,@CSR      ;CLEAR FLAG
005226  005077  174022                  CLR     @BKCSR          ;CLEAR BREAK BIT
005232  005737  001306          1$      TST     TUMTAB          ;TEST FOR VALID DATA ENTRY
005236  100402                          BM      2$
005240  104001                          ERROR                   ;ERROR! NO VALID DATA ENTRY
005242  000421                          BR      4$              ;GO TO EXIT
005244  032737  040000  001306  2$      BIT     #BIT14,TUMTAB   ;TEST THAT BREAK BIT  S SET
005252  001002                          BNE     3$              ;IN TUMBLE TABLE
005254  104001                          ERROR                   ;ERROR! BREAK BIT FAILED TO SET
005256  000413                          BR      4$              ;GO TO EXIT
005260  105737  001306          3$      TSTB    TUMTAB          ;TEST THAT DATA IS ALL 0'S
005264  001410                          BEQ     4$
005266  005037  001274                  CLR     RCVDAT
005272  113737  001306  001274          MOVB    TUMTAB,RCVDAT   ;GET RECEIVED DATA
005300  005037  001276                  CLR     XMTDAT
005304  104011                          ERROR1                  ;ERROR! DATA WAS NOT ALL 0'S
005306  104006          4$              SCOPE                   ;SCOPE


                                ;SUBROUTINE TO TRANSMIT & RECEIVE ON ALL LINES THE DELAY BETWEEN
                                ;TRANSMITTING ON A LINE IS SUPPLIED BY THE CALLING JSR INSTRUCTION
                                ;NOTE NO DATA CHECKING IS PERFORMED BY THIS TEST
005310  012537  001604          DLYXMT  MOV     (5)+,@#COUNT    ;GET CHARACTER DELAY COUNT
005314  005037  001276                  CLR     XMTDAT
005320  004537  005722                  JSR     5,BMOVE         ;LOAD OUTPUT BUFFER WITH DATA
005324  017657                          MSG1                    ;TO BE TRANSMITTED
005326  016564                          OUTBUF
005330  000100                          64
005332  012737  000001  001272          MOV     #LBIT0,@#LINBIT
005340  005037  016412                  CLR     @#LINE
005344  012777  000001  173676  1$      MOV     #BIT0,@CSR      ;SET THE GO BIT
005352  004537  005754          2$      JSR     5,@#XMITD       ;TRANSMIT 64  CHAR
005356  177700                          -64                     ;ON A LINE
005360  013737  004074  005374          MOV     @#TIME1,4$
005366  013704  001604                  MOV     @#COUNT,%4      ;GET CHAPACTER DELAY COUNT
005372  104400          3$              DELAY
005374  000000          4$              0
005376  005304                          DEC     %4
005400  001374                          BNE     3$
005402  062737  000002  016412          ADD     #2,LINE         ;FORM NEXT LINE NUMBER
005410  006337  001272                  ASL     LINBIT          ;SHIFT LINE BIT
005414  103356                          BCC     2$              ;BRANCH IF ALL LINES NOT DONE
005416  012704  000100                  MOV     #64.,%4
005422  013737  004074  005432          MOV     TIME1,6$
005430  104400          5$              DELAY
005432  000000          6$              0
005434  005304                          DEC     %4
005436  001374                          BNE     5$
005440  017737  173606  001274          MOV     @BAR,RCVDAT     ;GET & TEST BAR DATA
005446  001402                          BEQ     7$              ;EXIT IF DONE
005450  104011                          ERROR1                  ;ERROR! BAR SHOULD'VE BEEN CLEAR
005452  000413                          BR      8$
005454  022777  100201  173566  7$      CMP     #100201,@CSR    ;TEST THAT ONLY DONE,GO & READY BITS ARE SET
005462  001407                          BEQ     8$
005464  012737  100201  001276          MOV     #100201,XMTDAT
005472  017737  173552  001274          MOV     @CSR,RCVDAT     GET CSR CONTENTS
```

```
005500  104011                          ERROR1                  ;INCORRECT CSR COMTENTS
005502  005726                  8$      POPSP                   ;RESET THE STACK
005504  104006                          SCOPE                   ;SCOPE

                                ;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
005506  011637  005556          DLY     MOV     (6),3$          ;GET DELAY COUNT ADDRESS
005512  062716  000002                  ADD     #2,(6)          ;SET UP EXIT ADDRESS
005516  017737  000034  005556          MOV     @3$,3$          ;GET DELAY COUNT
005524  001413                          BEQ     2$              ;EXIT IF NO DELAY
005526  012737  000050  005560  1$      MOV     #50,4$
005534  162737  000001  005556          SUB     #1,3$
005542  001404                          BEQ     2$
005544  005337  005560                  DEC     4$
005550  001375                          BNE      -4
005552  000765                          BR      1$
005554  000002                  2$      PT                      ;EXIT
005556  000000                  3$      OPEN                    ;CONTAINS DELAY COUNT
005560  000000                  4$      OPEN                    ;CONTAINS DELAY ROUTINE CONSTANT

                                 SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
005562  012737  177777  005604  INB N   MOV     #-1,RIND        ;SET ALL VARIABLES
005570  004537  005722                  JSP     %5,BMOVE        ;TO MINUS 1
005574  005604                          RIND
005576  005605                          RIND+1
005600  000005                          5
005602  000207                          RTS     %7              EXIT
005604  000000                  R ND    OPEN
005606  000000                  PTO     OPEN
005610  000000                  PT1     OPEN

                                 SPECIAL BINARY COUNT PATTERN SUBROUTINE  EXITS WITH BIN CHAR IN R1
005612  013737  005606  005610  GTBIN   MOV     PTO PT1         PREVIOUS BIN CHAR TO PT1
005620  005137  005610                  COM     PT1
005624  005137  005604                  COM     RIND
005630  001002                          BNE      +6
005632  005237  005610                  INC     PT1
005636  042737  177400  005610          BIC     #177400 PT1     ;MASK TO 8 BITS
005644  013737  005610  005606          MOV     PT1,PTO         ;SAVE BIN CHAR IN PTO
005652  013701  005610                  MOV     PT1,%1          ;BIN CHAR TO R1
005656  000240                          NOP
005660  000207                          RTS     %7              EXIT

                                 OCTAL TO ASCII CONVERT ROUTINE
005662  104007                  OACNV   SAVREG                  ;SAVE REGISTERS ON THE STACK
005664  013504                          MOV     @(5)+,%4        ;GET OCTAL VALUE
005666  012501                          MOV     (5)+,%1         ;GET DESTINATION ADDR
005670  012502                          MOV     (5)+,%2          GET CONVERT COUNT
005672  060201                          ADD     %2,%1           ;DEVELOP ADDR TO STORE 1ST CHAR
005674  010403                  OACNVA  MOV     %4,%3
005676  042703  177770                  BIC     #177770 %3      ;ISOLATE LEAST SIGNIFICANT DIGIT
005702  062703  000060                  ADD     #60,%3          ;CONVERT DIGIT TO ASCII
005706  110341                          MOVB    %3,-(1)         ;STORE ASCII CHARACTER
005710  042704  000007                  BIC     #7,%4
005714  006004                          ROR     %4
005716  006004                          ROR     %4
005720  006004                          ROR     %4
```

```
005722  005302                          DEC     %2              ;DONE ALL DIGITS?
005724  001363                          BNE     DACNVA          ;BRANCH IF NOT DONE
005726  104010                          RSTREG                  ;RESTORE THE REGISTERS
005730  000205                          RTS     %5              ;DONE  EXIT

                                ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES
005732  104007                  BMOVE   SAVREG                  ;SAVE REGS
005734  012501                          MOV     (5)+,%1         ;GET"FROM"ADDRESS
005736  012502                          MOV     (5)+,%2         ;GET"TO"ADDRESS
005740  012503                          MOV     (5)+,%3         ;GET COUNT
005742  112122                  1$      MOVB    (1)+,(2)+       ;MOVE BYTE
005744  005303                          DEC     %3              ;DECREMENT COUNT
005746  001375                          BNE     1$              ;BRANCH IF NOT DONE
005750  104010                          RSTREG                  ;RESTORE REGS
005752  000205                          RTS     %5              ;DONE EXIT

                                ;SUBROUTINE TO TRANSMIT DATA   SUBROUTINE CALLED BY
                                 JSR 5,XMITD
005754  010046                  XMITD   MOV     %0,-(SP)        ;SAVE R0 ON THE STACK
005756  013700  016412                  MOV     @#LINE,%0       ;GET LINE
005762  004737  006552                  JSR     7,@#GTLINB      ;FORM LINE BIT (FOR BAR)
005766  012777  001106  173062          MOV     #CAT,@BASREG    ;INITIALIZE BASE REGISTER
005774  012760  016564  001106          MOV     #OUTBUF,CAT(0)  ;LOAD FIRST CHAR ADDRESS IN CAT
006002  012560  001146                  MOV     (5)+,WCT(0)     ;GET WORD COUNT
006006  052777  001272  173036          BIS     @#LINBIT,@BAR   ;LOAD LINE POSITION INTO BAR
006014  012600                          MOV     (SP)+,%0        ;RESTORE R0
006016  000205                          RTS     5               ;EXIT

                                ;ROUTINE TO TEST A LINE
                                ;THE LINE TO BE TESTED IS PROVIDED BY THE JSR CALL TO THE ROUTINE
                                ;100  CHARACTERS ARE TRANSMITTED,RECEIVED AND CHECKED BY THIS ROUTINE
006020  012537  016412          DATTST  MOV     (5)+,@#LINE     ;GET LINE NUMBER
006024  012737  000144  001604  DAT1AA  MOV     #100,COUNT      ;GET CHARACTER COUNT
006032  012702  016564                  MOV     #OUTBUF,%2      ;GET ADDRESS OF OUTPUT BUFFER
006036  004737  005612          1$      JSR     7,@#GTBIN       ;GET DATA
006042  110122                          MOVB    %1,(2)+         ;LOAD OUTPUT BUFFER WITH DATA
006044  005337  001604                  DEC     COUNT           ;GOT ALL DATA?
006050  001372                          BNE     1$              ;
006052  012701  001306                  MOV     #TUMTAB,%1      ;LOAD TUMBLE TABLE POINTER
006056  005037  001306                  CLR     TUMTAB          ;
006062  004537  005732                  JSR     5,BMOVE         ;CLEAR
006066  001306                          TUMTAB                  ;TUMBLE
006070  001307                          TUMTAB+1                ;TABLE
006072  000177                          177                     ;64 WORDS
006074  012702  016730                  MOV     #INBUF,%2       ;SETUP INPUT BUFFER POINTER
006100  052777  000001  173142          BIS     #BIT0,@CSR      ;SET THE GO BIT
006106  004537  005754                  JSR     5,@#XMITD       ;TRANSMIT
006112  177634                          -100                    ;100  CHARACTERS
006114  032777  160000  173126  2$      BIT     #BIT15+BIT14+BIT13,@CSR ;TEST IF READY OR ANY ERROR
006122  001004                          BNE     3$              ;FLAGS ARE SET
006124  105777  173120                  TSTB    @CSR            ;WAIT FOR THE RECEIVER
006130  100371                          BPL     2$              ;TO RECEIVE A CHARACTER
006132  000415                          BR      5$              ;
006134  032777  060000  173106  3$      BIT     #BIT14+BIT13,@CSR ;TEST FOR ERROR FLAGS
006142  001403                          BEQ     4$              ;BRANCH NO ERROR
006144  104001                          ERROR                   ;
```

```
006146  000137  006466                  JMP     15$             ,GO EXIT
006152  042777  100000  173070  4$      BIC     #BIT15,@CSR     ,CLEAR TRANSMITTER READY FLAG
006160  105777  173064                  TSTB    @CSR            ,TEST FOR CHARACTER READY
006164  100375                          BPL     -4
006166  042777  000200  173054  5$      BIC     #BIT7,@CSR      ,CLEAR CHAR DONE BIT
006174  005711                          TST     (1)
006176  100401                          BMI     +4              ,TEST FOR VALID ENTRY
006200  104001                          ERROR                   ,REPORT INVALID ENTRY
006202  111122                          MOVB    (1),(2)+        ,MOVE CHAR FROM TUM  TAB  TO INPUT BUFFER

                                ,ROUTINE TO STORE RECEIVED PARITY BIT IN PARITY BIT BUFFER
006204  012705  000001                  MOV     #1,%5           ,GET ROTATE COUNT
006210  000261                          SEC                     ,SET THE CARRY BIT
006212  032711  020000                  BIT     #BIT13,(1)      ,TEST RECEIVED PARITY B T
006216  001001                          BNE     6$              ,BRANCH IF RECEIVED PARITY WAS ODD
006220  000241                          CLC                     ,CLEAR CARRY BIT
006222  004537  006472          6$      JSR     5,RORPARBUF      ROTATE RECEIVED PARITY INTO PAR TY BUFFER

                                 ROUTINE TO TEST THAT ENTRY IS FOR THE CORRECT LINE
006226  011137  001270                  MOV     (1),@#TTDAT     ,GET TABLE ENTRY
006232  042737  160777  001270          BIC     #160777,TTDAT   ,CLEAR ALL BUT LINE NUMBER
006240  123737  016412  001271          CMPB    LINE,TTDAT+1    ,COMPARE LINE NUMBERS
006246  001410                          BEQ     7$
006250  013737  016412  001276          MOV     LINE,XMTDAT     ,GET CORRECT LINE # (X2)
006256  013737  001270  001274          MOV     TTDAT,RCVDAT     GET LINE # (X2) THAT FALSE DATA CAME  N ON
006264  104011                          ERROR1                   ERROR! DATA CAME  N ON A LINE THAT
                                                                 PROGRAM WAS NOT TRANSM TT NG  !!
006266  000477                          BR      15$             ,EXIT TEST
006270  020127  001504          7$      CMP     (1),#TUMTAB+176  'S POINTER AT THE END
006274  001002                          BNE     8$               OF THE TABLE
006276  012701  001204                  MOV     #TUMTAB-2,%1
006302  005721                  8$      TST     (1)+             NCREMENT POINTER
006304  010046                          MOV     %0,-(6)          SAVE REGISTER ZERO
006306  013700  016412                  MOV     LINE,%0         ,FETCH LINE NUMBER
006312  005760  001146                  TST     WCT(0)           HAS THE LAST CHARACTER BEEN TRANSMITTED
006316  001402                          BEQ     +6              ,LAST CHARACTER HAS BEEN TRANSMITTED
006320  012600                          MOV     (6)+,%0          RESTORE REGISTER ZERO
006322  000674                          BR      2$              ,GO WAIT FOR NEXT CHARACTER
006324  012600                          MOV     (6)+,%0          RESTORE REGISTER ZERO
006326  012701  016564          9$      MOV     #OUTBUF,%1
006332  012702  016730                  MOV     #INBUF,%2
006336  012705  000014                  MOV     #12.,%5          ROTATE PARITY BUFFER
006342  004537  006472                  JSP     5,RORPARBUF      12  PLACES RIGHT
006346  005037  001274          10$     CLR     RCVDAT
006352  005037  001276                  CLR     XMTDAT
006356  020127  016727                  CMP     %1,#OUTBUF+99    HAVE ALL CHARS  BEEN COMPARED
006362  001441                          BEQ     15$
006364  112137  001276                  MOVB    (1)+,XMTDAT     ,GET TRANSMITTED CHARACTER
006370  043737  001300  001276          BIC     CARMSK,XMTDAT   ,CLEAR NON-TRANSMITTED BITS
006376  111237  001274                  MOVB    (2),RCVDAT      ,GET RECEIVED CHARACTER
006402  104002                          DATCHK                  ,COMPARE TRANS  & RCVD  CHAR

                                 ROUTINE TO COMPUTE AND CHECK PARITY ON RECEIVED DATA
006404  012703  000010          11$     MOV     #8.,%3           GET BIT COUNTER
006410  005000                          CLR     %0               CLEAR COMPUTED PARITY INDICATOR
006412  106037  001274          12$     RORB    RCVDAT           LOOK AT RECEIVED BIT
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```
006416  103001                  BCC     13$             ;BRANCH IF A 0
006420  005100                  COM     %0              ;COMPLEMENT R0 IF A 1
006422  005303          13$     DEC     %3              ;DECREMENT BIT COUNTER
006424  001372                  BNE     12$             ;LOOK AT NEXT BIT IF NOT DONE
006426  000240                  NOP                     ;IF COMPUTED PARITY WAS ODD R0 WILL
                                ;CONTAIN ALL 1'S, IF EVEN R0 = 0
006430  112237  001274          MOVB    (2)+,RCVDAT     ;GET RECEIVED CHARACTER
006434  012705  000001          MOV     #1,%5           ;ROTATE PARITY BUFFER 1 PLACE
006440  004537  006472          JSR     5,RORPARBUF     ;RIGHT LEAVING RECEIVED PARITY BIT IN CARRY
006444  103004                  BCC     14$             ;BRANCH IF RECEIVED PARITY WAS EVEN
006446  005700                  TST     %0              ;TEST FOR COMPUTED ODD PARITY
006450  001336                  BNE     10$             ;BRANCH IF COMPUTED & RECEIVED WAS ODD
006452  104001                  ERROR                   ;ERROR! COMPUTED =EVEN, RECEIVED = ODD
006454  000734                  BR      10$             ;CONTINUE TEST
006456  005700          14$     TST     %0              ;TEST FOR EVEN COMPUTED PARITY
006460  001732                  BEQ     10$             ;BRANCH IF COMPUTED PARITY WAS EVEN
006462  104001                  ERROR                   ;ERROR! COMPUTED =ODD, RECEIVED = EVEN
006464  000730                  BR      10$             ;CONTINUE TEST
006466  005726          15$     POPSP                   ;REPOSITION STACK POINTER
006470  104006                  SCOPE                   ;SCOPE

                                ;ROUTINE TO ROTATE PARITY BUFFER
006472  006037  006534          RORPARBUF ROR   PAR0
006476  006037  006536                  ROR     PAR1
006502  006037  006540                  ROR     PAR2
006506  006037  006542                  ROR     PAR3
006512  006037  006544                  ROR     PAR4
006516  006037  006546                  ROR     PAR5
006522  006037  006550                  ROR     PAR6
006526  005316                  DEC     (SP)            ;DECREMENT ROTATE COUNT
006530  001360                  BNE     RORPARBUF
006532  000205                  RTS     5

                                ;PARITY BUFFER
006534  000000          PAR0    OPEN
006536  000000          PAR1    OPEN
006540  000000          PAR2    OPEN
006542  000000          PAR3    OPEN
006544  000000          PAR4    OPEN
006546  000000          PAR5    OPEN
006550  000000          PAR6    OPEN

                                ;SUBROUTINE TO FORM LINE BIT POSITION WITH THE LINE # IN LINE
006552  010046          GTLINB  MOV     R0,-(SP)        ;SAVE R0 ON THE STACK
006554  005037  001272          CLR     @#LINBIT        ;CLEAR LINE BIT
006560  013700  016412          MOV     @#LINE,R0       ;GET LINE
006564  000261                  SEC                     ;SET CARRY
006566  006137  001272  1$      ROL     LINBIT          ;SHIFT LINE BIT
006572  162700  000002          SUB     #2,R0           ;SUBTRACT 2 FROM LINE NUMBER
006576  100373                  BPL     1$              ;BRANCH IF GREATER THAN 0
006600  012600                  MOV     (SP)+,R0        ;RESTORE R0
006602  000207                  RTS     PC              ;EXIT SUBROUTINE
```

```
006604  104000                  PRGO    TYPE
006606  017527                          PRGOM
006610  012737  006644  001506          MOV     #RT0,KSTART     ;GET ADDRESS OF FIRST TEST
006616  005037  001512                  CLR     RTNNO           ;CLEAR ROUTINE #
006622  000137  002254                  JMP     SRSET
006626  012737  006644  001506  PRGOR   MOV     #RT0,KSTART     ;GET ADDRESS OF FIRST TEST
006634  005037  001512                  CLR     RTNNO           ;CLEAR ROUTINE NUMBER
006640  000137  002306                  JMP     GETRDY          ;GO AND START PROGRAM
                                ;*****************************************************************************
006644  000000                  RT0     0                       ;ROUTINE # 0                                *
006646  006706                          RT1                     ;ADDR OF NEXT ROUTINE                       *
006650  000144                          100                     ;ITERATION COUNT                            *
006652  006654                          RT0A                    ;SCOPE ENTRY POINT                          *
        000000                          X=X+1
                                ;*****************************************************************************

                                ;TEST ABILITY TO REFERENCE CSR W THOUT TRAPPING
006654  012737  006676  000004  RT0A    MOV     #1$,@#ERRVEC    ;SET UP ERROR TRAP
006662  005777  172362                  TST     @CSR            ;REFERENCE CSR
006666  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC      ;RESET TIME OUT TRAP
006674  104006                          SCOPE
006676  162716  000004          1$      SUB     #4,(6)          ;RESTORE PC TO WHERE THE ILLEGAL
                                                                ;REFERENCE OCCURED
006702  104001                          ERROR                   ;ERROR  ILLEGAL REFERENCE OCCURED
006704  000002                          RT1                     ;LOOP ILLEGAL REFERENCE INSTRUCTION
                                ;*****************************************************************************
006706  000001                  RT1     1                       ;ROUTINE # 1                                *
006710  006760                          RT2                     ;ADDR OF NEXT ROUTINE                       *
006712  000144                          100                     ;ITERATION COUNT                            *
006714  006716                          RT1A                    ;SCOPE ENTRY POINT                          *
        000001                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT0 CAN BE SET AND CLEARED
006716  012777  000001  172324  RT1A    MOV     #BIT0,@CSR      ;SET BIT0
006724  022777  000001  172316          CMP     #BIT0,@CSR      ;TEST THAT BIT0 IS SET
006732  001402                          BEQ     1$              ;BRANCH IF SET
006734  104001                          ERROR                   ;CSR BIT0 FAILED TO SET
006736  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
006740  042777  000001  172302  1$      BIC     #BIT0,@CSR      ;CLEAR BIT0
006746  005777  172276                  TST     @CSR            ;TEST THAT BIT0 IS CLEAR
006752  001401                          BEQ     2$
006754  104001                          ERROR                   ;CSR BIT0 FAILED TO CLEAR
006756  104006                  2$      SCOPE
                                ;*****************************************************************************
006760  000002                  RT2     2                       ;ROUTINE # 2                                *
006762  007032                          RT3                     ;ADDR OF NEXT ROUTINE                       *
006764  000144                          100                     ;ITERATION COUNT                            *
006766  006770                          RT2A                    ;SCOPE ENTRY POINT                          *
        000002                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT1 CAN BE SET AND CLEARED
006770  012777  000002  172252  RT2A    MOV     #BIT1,@CSR      ;SET BIT1
006776  022777  000002  172244          CMP     #BIT1,@CSR      ;TEST THAT BIT1 IS SET
```

```
007004  001402                          BEQ     1$              ;BRANCH IF SET
007006  104001                          ERROR                   ;CSR BIT1 FAILED TO SET
007010  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
007012  042777  000002  172230  1$      BIC     #BIT1,@CSR      ;CLEAR BIT1
007020  005777  172224                  TST     @CSR            ;TEST THAT BIT1 IS CLEAR
007024  001401                          BEQ     2$
007026  104001                          ERROR                   ;CSR B T1 FAILED TO CLEAR
007030  104006                  2$      SCOPE
                                ;*****************************************************************************
007032  000003                  RT3     3                       ;ROUTINE # 3                                  *
007034  007104                          RT4                     ;ADDR OF NEXT ROUTINE                         *
007036  000144                          100                     ;ITERATION COUNT                              *
007040  007042                          RT3A                    ;SCOPE ENTRY POINT                            *
        000003                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT2 CAN BE SET AND CLEARED
007042  012777  000004  172200  RT3A    MOV     #BIT2,@CSR      ;SET BIT2
007050  022777  000004  172172          CMP     #BIT2,@CSR      ;TEST THAT BIT2 IS SET
007056  001402                          BEQ     1$              ;BRANCH IF SET
007060  104001                          ERROR                   ;CSR BIT2 FAILED TO SET
007062  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
007064  042777  000004  172156  1$      BIC     #BIT2,@CSR      ;CLEAR BIT2
007072  005777  172152                  TST     @CSR            ;TEST THAT BIT2 IS CLEAR
007076  001401                          BEQ     2$
007100  104001                          ERROR                   ;CSR BIT2 FAILED TO CLEAR
007102  104006                  2$      SCOPE
                                ;*****************************************************************************
007104  000004                  RT4     4                       ;ROUTINE # 4                                  *
007106  007156                          RT5                     ;ADDR OF NEXT POUTINE                         *
007110  000144                          100                     ;ITERATION COUNT                              *
007112  007114                          RT4A                    ;SCOPE ENTRY POINT                            *
        000004                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT4 CAN BE SET AND CLEARED
007114  012777  000020  172126  RT4A    MOV     #BIT4,@CSR      ;SET BIT4
007122  022777  000020  172120          CMP     #BIT4,@CSR      ;TEST THAT BIT4 IS SET
007130  001402                          BEQ     1$              ;BRANCH IF SET
007132  104001                          ERROR                   ;CSR BIT4 FAILED TO SET
007134  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
007136  042777  000020  172104  1$      BIC     #BIT4,@CSR      ;CLEAR BIT4
007144  005777  172100                  TST     @CSR            ;TEST THAT BIT4 IS CLEAR
007150  001401                          BEQ     2$
007152  104001                          ERROR                   ;CSR BIT4 FAILED TO CLEAR
007154  104006                  2$      SCOPE
                                ;*****************************************************************************
007156  000005                  RT5     5                       ;ROUTINE # 5                                  *
007160  007230                          RT6                     ;ADDR OF NEXT POUTINE                         *
007162  000144                          100                     ;ITERATION COUNT                              *
007164  007166                          RT5A                    ;SCOPE ENTRY POINT                            *
        000005                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT5 CAN BE SET AND CLEARED
007166  012777  000040  172054  RT5A    MOV     #BIT5,@CSR      ;SET BIT5
```

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                                                                L  3
007174  022777  000040  172046          CMP     #BIT5,@CSR      ;TEST THAT BIT5 IS SET
007202  001402                          BEQ     1$              ;BRANCH IF SET
007204  104001                          ERROR                   ;CSR BIT5 FAILED TO SET
007206  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
007210  042777  000040  172032  1$      BIC     #BIT5,@CSR      ;CLEAR BIT5
007216  005777  172026                  TST     @CSR            ;TEST THAT BIT5 IS CLEAR
007222  001401                          BEQ     2$
007224  104001                          ERROR                   ;CSR BIT5 FAILED TO CLEAR
007226  104006                  2$      SCOPE
                                ;*****************************************************************************
007230  000006                  RT6     6                       ;ROUTINE # 6                                *
007232  007302                          RT7                     ;ADDR OF NEXT ROUT NE                       *
007234  000144                          100                     ;ITERATION COUNT                            *
007236  007240                          RT6A                    ;SCOPE ENTRY POINT                          *
        000006                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT6 CAN BE SET AND CLEARED
007240  012777  000100  172202  RT6A    MOV     #BIT6,@CSR      ;SET BIT6
007246  022777  000100  171774          CMP     #BIT6,@CSR      ;TEST THAT B T6 IS SET
007254  001402                          BEQ     1$              ;BRANCH IF SET
007256  104001                          ERROR                   ;CSR BIT6 FAILED TO SET
007260  000407                          BR      2$              ;OR AN ADDITIONAL B T ALSO SET
007262  042777  000100  171760  1$      BIC     #BIT6,@CSR      ;CLEAR BIT6
007270  005777  171754                  TST     @CSR            ;TEST THAT BIT6 IS CLEAR
007274  001401                          BEQ     2$
007276  104001                          ERROR                   ;CSR BIT6 FAILED TO CLEAR
007300  104006                  2$      SCOPE
                                ;*****************************************************************************
007302  000007                  RT7     7                       ;ROUTINE # 7                                *
007304  007354                          RT10                    ;ADDR OF NEXT ROUTINE                       *
007306  000144                          100                     ;ITERATION COUNT                            *
007310  007312                          RT7A                    ;SCOPE ENTRY POINT                          *
        000007                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT12 CAN BE SET AND CLEARED
007312  012777  010000  171730  RT7A    MOV     #BIT12,@CSR     ;SET BIT12
007320  022777  010000  171722          CMP     #BIT12,@CSR     ;TEST THAT BIT12 IS SET
007326  001402                          BEQ     1$              ;BRANCH IF SET
007330  104001                          ERROR                   ;CSR BIT12 FAILED TO SET
007332  000407                          BR      2$              ;OR AN ADDITIONAL BIT ALSO SET
007334  042777  010000  171706  1$      BIC     #BIT12,@CSR     ;CLEAR BIT12
007342  005777  171702                  TST     @CSR            ;TEST THAT BIT12 IS CLEAR
007346  001401                          BEQ     2$
007350  104001                          ERROR                   ;CSR BIT12 FAILED TO CLEAR
007352  104006                  2$      SCOPE
                                ;*****************************************************************************
007354  000010                  RT10    10                      ;ROUTINE # 10                               *
007356  007426                          RT11                    ;ADDR OF NEXT ROUTINE                       *
007360  000144                          100                     ;ITERATION COUNT                            *
007362  007364                          RT10A                   ;SCOPE ENTRY POINT                          *
        000010                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT CSR BIT13 CAN BE SET AND CLEARED
```

```
007364  012777  020000  171656  RT10A   MOV     #BIT13,@CSR     ;SET BIT13
007372  022777  020000  171650          CMP     #BIT13,@CSR     ;TEST THAT BIT13 IS SET
007400  001402                          BEQ     1$              ;BRANCH IF SET
007402  104001                          ERROR                   ;CSR BIT13 FAILED TO SET
007404  000407                          BR      2$              ;OR AN ADDITIONAL B T ALSO SET
007406  042777  020000  171634  1$      BIC     #BIT13,@CSR     ;CLEAR BIT13
007414  005777  171630                  TST     @CSR            ;TEST THAT BIT13 IS CLEAR
007420  001401                          BEQ     2$
007422  104001                          ERROR                   ;CSR BIT13 FAILED TO CLEAR
007424  104006                  2$      SCOPE
                                ;*****************************************************************************
007426  000011                RT11    11                      ;ROUTINE # 11                                   *
007430  007516                        RT12                    ;ADDR OF NEXT ROUTINE                           *
007432  000144                        100                     ;ITERATION COUNT                                *
007434  007436                        RT11A                   ;SCOPE ENTRY POINT                              *
        000011                        X=X+1
                                ;*****************************************************************************

                                ;TEST THAT RESET & CLEAR INSTRUCTION CLEAR ALL R/W B TS  N THE CONTROL
                                ; STATUS REG  (CSR)
007436  012777  030167  171604  RT11A   MOV     #30167,@CSR     ;SET ALL R/W BITS  N THE CSR
007444  005037  001276                  CLR     XMTDAT
007450  104005                          SRESET                  ;ISSUE RESET
007452  017737  171572  001274          MOV     @CSR,RCVDAT     ;GET CSR CONTENTS
007460  001402                          BEQ     1$              ;BRANCH IF RESET CLEARED ALL BITS
007462  104011                          ERROR1                  ;ERROR! RESET DID NOT CLEAR ALL BITS
007464  000764                          BR      RT11A           ;LOOP ON ERROR
007466  012777  030167  171554  1$      MOV     #30167 @CSR     ;SET ALL R/W BITS IN CSR
007474  005077  171550                  CLR     @CSR            ;CLEAR THE CSR
007500  017737  171544  001274          MOV     @CSR,RCVDAT     ;GET & TEST CSR
007506  001402                          BEQ     2$              ;GO TO EXIT IF RESULT = 0
007510  104011                          ERROR1                  ;ERROR! CLEAR INST  DID NOT CLEAR ALL BITS
007512  000765                          BR      1$               LOOP ERROR
007514  104006                  2$      SCOPE                   ;SCOPE
                                 ******************************************************************************
007516  000012                RT12    12                      ;ROUTINE # 12                                   *
007520  007652                        RT13                    ;ADDR OF NEXT ROUTINE                           *
007522  000012                        10                      ;ITERATION COUNT                                *
007524  007526                        RT12A                   ;SCOPE ENTRY POINT                              *
        000012                        X=X+1
                                 ******************************************************************************

                                ;TEST THAT A BINARY COUNT CAN BE LOADED INTO A CLEAR BKCSR AND THAT
                                 A BINARY COUNT CAN BE CLEARED
007526  005037  001276          RT12A   CLR     XMTDAT
007532  013777  001276  171514  1$      MOV     XMTDAT,@BKCSR   ;LOAD BINARY COUNT INTO BKCSR
007540  017737  171510  001274          MOV     @BKCSR,RCVDAT   ;GET BKCSR DATA
007546  023737  001276  001274          CMP     XMTDAT RCVDAT   ;COMPARE DATA LOADED & DATA READ BACK
007554  001405                          BEQ     2$              ;BRANCH IF DATA COMPARES
007556  104011                          ERROR1                  ;ERROR! DATA GOOD BIT COMPARE
007560  032777  040000  171314          BIT     #BIT14,@SWR     ;SCOPE LOOP?
007566  001361                          BNE     1$              ;BRANCH IF SCOPE LOOP
007570  013701  001276          2$      MOV     XMTDAT,%1       ;SAVE BINARY COUNT
007574  005037  001276                  CLR     XMTDAT
007600  005077  171450          3$      CLR     @BKCSR          ;CLEAR BKCSR AND TEST
007604  017737  171444  001274          MOV     @BKCSR,RCVDAT   ;BKCSR CAN BE CLEARED
```

```
007612  001405                          BEQ     4$              ;BRANCH IF BKCSR CLEARED
007614  104011                          ERROR1                  ;ERROR! BKCSR DID NOT CLEAR
007616  032777  040000  171256          BIT     #BIT14,@SWR     ;SCOPE LOOP?
007624  001365                          BNE     3$              ;BRANCH IF SCOPE LOOP
007626  010137  001276          4$      MOV     %1,XMTDAT       ;GET BINARY COUNT
007632  023727  001276  177777          CMP     XMTDAT,#-1      ;ALL NUMBERS BEEN LOADED
007640  001403                          BEQ     5$              ;GO TO EXIT
007642  005237  001276                  INC     XMTDAT          ;INCREMENT BINARY COUNT
007646  000731                          BR      1$              ;REPEAT TEST
007650  104006                  5$      SCOPE                   ;SCOPE
                                ;*****************************************************************************
007652  000013                  RT13    13                      ;ROUTINE # 13                                *
007654  007764                          RT14                    ;ADDR OF NEXT ROUTINE                        *
007656  000144                          100                     ;ITERATION COUNT                             *
007660  007662                          RT13A                   ;SCOPE ENTRY POINT                           *
        000013                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT RANDOM NUMBERS CAN BE LOADED INTO THE BKCSR
007662  012702  010000          RT13A   MOV     #10000,%2       ;GET RANDOM #COUNTER
007666  017737  171362  001612  1$      MOV     @BKCSR,PRVCNT   ;GET PREVIOUS CONTENTS
007674  004737  002756                  JSR     7,@#RNGEN       ;GO GET A RANDOM NUMBER
007700  010037  001276                  MOV     %0,XMTDAT       ;GET RANDOM NUMBER
007704  013777  001276  171342  2$      MOV     XMTDAT,@BKCSR   ;LOAD RANDOM NUMBER INTO BKCSR
007712  017737  171336  001274          MOV     @BKCSR,RCVDAT   ;GET BKCSR DATA
007720  023737  001276  001274          CMP     XMTDAT,RCVDAT   ;COMPARE DATA
007726  001401                          BEQ     3$              ;BRANCH IF SAME
007730  104011                          ERROR1                  ;ERROR! DATA NOT THE SAME
007732  032777  040000  171142  3$      BIT     #BIT14,@SWR     ;SCOPE LOOP?
007740  001406                          BEQ     4$              ;BRANCH IF NO LOOP ON ERROR
007742  005077  171306                  CLR     @BKCSR          ;
007746  013777  001612  171300          MOV     PRVCNT,@BKCSR   ;LOAD PREVIOUS CONTENTS
007754  000753                          BR      2$              ;REPEAT TEST
007756  005302                  4$      DEC     %2
007760  001342                          BNE     1$              ;BRANCH IF NOT
007762  104006                  5$      SCOPE                   ;SCOPE
                                ;*****************************************************************************
007764  000014                  RT14    14                      ;ROUTINE # 14                                *
007766  010024                          RT15                    ;ADDR OF NEXT ROUTINE                        *
007770  000012                          10                      ;ITERATION COUNT                             *
007772  007774                          RT14A                   ;SCOPE ENTRY POINT                           *
        000014                          X=X+1
                                 *****************************************************************************

                                ;TEST THAT RESET CLEARS ALL BREAK STATUS REGISTER BITS

007774  012777  177777  171252  RT14A   MOV     #-1,@BKCSR
010002  005037  001276                  CLR     XMTDAT
010006  104005                          SRESET
010010  017737  171240  001274          MOV     @BKCSR,RCVDAT
010016  001401                          BEQ     1$
010020  104011                          ERROR1
010022  104006                  1$      SCOPE
                                ;*****************************************************************************
010024  000015                  RT15    15                      ;ROUTINE # 15                                *
010026  010160                          RT16                    ;ADDR OF NEXT ROUTINE                        *
```

```
010030  000012                          10                      ;ITERATION COUNT                *
010032  010034                          RT15A                   ;SCOPE ENTRY POINT              *
        000015                          X=X+1
                                ;*******************************************************************

                                ;TEST THAT A BINARY COUNT CAN BE LOADED INTO A CLEAR BASREG AND THAT
                                ;A BINARY COUNT CAN BE CLEARED
010034  005037  001276          RT15A   CLR     XMTDAT
010040  013777  001276  171210  1$      MOV     XMTDAT,@BASREG  ;LOAD BINARY COUNT INTO BASREG
010046  017737  171204  001274          MOV     @BASREG,RCVDAT  ;GET BASREG DATA
010054  023737  001276  001274          CMP     XMTDAT,RCVDAT   ;COMPARE DATA
010062  001405                          BEQ     2$              ;BRANCH IF DATA COMPARES
010064  104011                          ERROR1                  ;ERROR! DATA DID NOT COMPARE
010066  032777  040000  171006          BIT     #BIT14,@SWR     ;SCOPE LOOP?
010074  001361                          BNE     1$              ;BRANCH IF SCOPE LOOP
010076  013701  001276          2$      MOV     XMTDAT,%1       ;SAVE BINARY COUNT
010102  005037  001276                  CLR     XMTDAT
010106  005077  171144          3$      CLR     @BASREG
010112  017737  171140  001274          MOV     @BASREG,RCVDAT
010120  001405                          BEQ     4$              ;BRANCH IF BKCSR CLEARED
010122  104011                          ERROR1                  ;ERROR! BKCSR DID NOT CLEAR
010124  032777  040000  170750          BIT     #BIT14,@SWR     ;SCOPE LOOP?
010132  001365                          BNE     3$              ;BRANCH IF SCOPE LOOP
010134  010137  001276          4$      MOV     %1 XMTDAT       ;GET BINARY COUNT
010140  023727  001276  177000          CMP     XMTDAT,#177000  ;ALL NUMBERS BEEN LOADED
010146  001403                          BEQ     5$              ;GO TO EXIT
010150  105237  001277                  INCB    XMTDAT+1        ;INCREMENT BINARY COUNT
010154  000731                          BR      1$              ;REPEAT TEST
010156  104006                  5$      SCOPE                   ;SCOPE
                                ;*******************************************************************
010160  000016                  RT16    16                      ;ROUTINE # 16                   *
010162  010276                          RT17                    ;ADDR OF NEXT ROUTINE           *
010164  000144                          100                     ;ITERATION COUNT                *
010166  010170                          RT16A                   ;SCOPE ENTRY POINT              *
        000016                          X=X+1
                                ;*******************************************************************

                                ;TEST THAT RANDOM NUMBERS CAN BE LOADED INTO THE BASE REG STER
010170  012702  010000          RT16A   MOV     #10000,%2       ;GET RANDOM #COUNTER
010174  017737  171056  001612  1$      MOV     @BASREG,PRVCNT  ;GET PREVIOUS CONTENTS
010202  004737  002756                  JSR     7,@#RNGEN       ;GO GET A RANDOM NUMBER
010206  042700  000377                  BIC     #000377,%0      ;CLEAR UNUSED BITS
010212  010037  001276                  MOV     %0,XMTDAT       ;GET RANDOM NUMBER
010216  013777  001276  171032  2$      MOV     XMTDAT,@BASREG  ;LOAD RANDOM NUMBER INTO BASREG
010224  017737  171026  001274          MOV     @BASREG,RCVDAT  ;GET BASREG DATA
010232  023737  001276  001274          CMP     XMTDAT,RCVDAT   ;COMPARE DATA
010240  001401                          BEQ     3$              ;BRANCH IF SAME
010242  104011                          ERROR1                  ;ERROR! DATA NOT THE SAME
010244  032777  040000  170630  3$      BIT     #BIT14,@SWR     ;SCOPE LOOP?
010252  001406                          BEQ     4$              ;BRANCH IF NO LOOP ON ERROR
010254  005077  170776                  CLR     @BASREG
010260  013777  001612  170770          MOV     PRVCNT @BASREG  ;LOAD PREVIOUS CONTENTS
010266  000753                          BR      2$              ;REPEAT TEST
010270  005302                  4$      DEC     %2              ;10000 NUMBERS BEEN TESTED
010272  001340                          BNE     1$              ;BRANCH IF NOT
010274  104006                  5$      SCOPE                   ;SCOPE
```

```
                                ;*****************************************************************************
010276  000017                  RT17    17                      ;ROUTINE # 17                                *
010300  010370                          RT20                    ;ADDR OF NEXT ROUTINE                        *
010302  000144                          100                     ;ITERATION COUNT                             *
010304  010306                          RT17A                   ;SCOPE ENTRY POINT                           *
        000017                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT ALL BAR BITS CAN BE INDIVIDUALLY SET AND CLEARED
010306  013701  001252          RT17A   MOV     BAR,%1          ;GET BAR ADDRESS
010312  012777  001106  170736          MOV     #CAT,@BASREG    ;INITIALIZE BASE REGISTER
010320  012700  000001                  MOV     #1,%0           ;GET BIT TESTER
010324  050011                  1$      B S     %0,(1)          ;SET BAR BIT
010326  020011                          CMP     %0,(1)          ;TEST THAT ONLY THE PROPER BAR BIT SET
010330  001006                          BNE     3$              ;BRANCH IF ERROR
010332  040011                          B C     %0,(1)          ;CLEAR BAR BIT
010334  005711                          TST     (1)             ;TEST THAT BAR BIT CLEARED
010336  001011                          BNE     5$              ;BRANCH IF BAR BIT FAILED TO CLEAR
010340  006300                          ASL     %0              ;SHIFT BIT TESTER
010342  103370                          BCC     1$
010344  104006                  2$      SCOPE                   ;SCOPE
010346  010037  001276          3$      MOV     %0,XMTDAT       ;GET WHAT DATA WAS SUPPOSED TO BE
010352  011137  001274          4$      MOV     (1),RCVDAT      ;GET WHAT DATA WAS
010356  104011                          ERROR1                  ;ERROR! IMPROPER BIT OPERATION
010360  000771                          BR      2$              ;GO TO SCOPE
010362  005037  001276          5$      CLR     XMTDAT          ;GET WHAT DATA WAS SUPPOSED TO BE
010366  000771                          BR      4$
                                ;*****************************************************************************
010370  000020                  RT20    20                      ;ROUTINE # 20                                *
010372  010456                          RT21                    ;ADDR OF NEXT ROUTINE                        *
010374  000012                          10                      ;ITERATION COUNT                             *
010376  010400                          RT20A                   ;SCOPE ENTRY POINT                           *
        000020                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT RESET CLEARS ALL BAR BITS
010400  005037  001276          RT20A   CLR     XMTDAT
010404  052777  177777  170640          BIS     #-1,@BAR        ;SET ALL BAR BITS
010412  104005                          SRESET                  ;RESET
010414  017737  170632  001274          MOV     @BAR,RCVDAT     ;GET BAR DATA
010422  001402                          BEQ     1$              ;BRANCH IF ALL 0'S
010424  104011                          ERROR1                  ;ERROR! RESET DID NOT CLEAR ALL BAR BITS
010426  000412                          BR      2$              ;GO TO EXIT
010430  052777  177777  170614  1$      BIS     #-1,@BAR        ;SET ALL BIT IN THE BAR
010436  005077  170610                  CLR     @BAR            ;CLEAR ALL BITS IN THE BAR
010442  017737  170604  001274          MOV     @BAR,RCVDAT     ;GET & TEST RESULT OF CLEAR OPERATION
010450  001401                          BEQ     2$              ;EXIT IF ALL BITS CLEARED
010452  104011                          ERROR1                  ;ERROR! ALL BITS DID NOT CLEAR
010454  104006                  2$      SCOPE                   ;SCOPE
                                ;*****************************************************************************
010456  000021                  RT21    21                      ;ROUTINE # 21                                *
010460  010564                          RT22                    ;ADDR OF NEXT ROUTINE                        *
010462  000144                          100                     ;ITERATION COUNT                             *
010464  010466                          RT21A                   ;SCOPE ENTRY POINT                           *
        000021                          X=X+1
                                ;*****************************************************************************
```

```
                                        ;TEST THAT CSR RESPONDS PROPERLY TO BYTE COMMANDS
010466  012777  010100  170554  RT21A   MOV     #10100,@CSR     ;LOAD TEST NUMBER IN CSR
010474  105077  170550                  CLRB    @CSR            ;CLEAR EVEN BYTE
010500  022777  010000  170542          CMP     #10000,@CSR     ;TEST THAT ONLY EVEN BYTE CLEARED
010506  001410                          BEQ     1$
010510  012737  010100  001276          MOV     #10100,XMTDAT   ;LOAD CORRECT RESULT
010516  017737  170526  001274          MOV     @CSR,RCVDAT     ;GET ACTUAL RESULT
010524  104011                          ERROR1                  ;ERROR! EVEN BYTE INSTRUCT ON FAILED
010526  000415                          BR      2$              ;GO TO SCOPE
010530  012777  010100  170512  1$      MOV     #10100,@CSR     ;LOAD TEST NUMBER IN CSR
010536  105077  171052                  CLRB    @ CSR           ;TEST THAT ONLY ODD BYTE CLEARED
010542  001407                          BEQ     2$
010544  012737  000100  001276          MOV     #00100,XMTDAT   ;LOAD CORRECT RESULT
010552  017737  170472  001274          MOV     @CSR,RCVDAT     ;LOAD ACTUAL RESULT
010560  104011                          ERROR1                  ;ERROR! ODD BYTE INSTRUCTION FAILED
010562  104006                  2$      SCOPE                   ;SCOPE
                                        ;*****************************************************************************
010564  000022                  RT22    22                      ;ROUTINE # 22                                       *
010566  010672                          RT23                    ;ADDR OF NEXT ROUT NE                               *
010570  000144                          100                     ;ITERATION COUNT                                    *
010572  010574                          RT22A                   ;SCOPE ENTRY POINT                                  *
        000022                          X=X+1
                                        ;*****************************************************************************

                                        ;TEST THAT BAR RESPONDS PROPERLY TO BYTE COMMANDS
010574  012777  010100  170450  RT22A   MOV     #10100,@BAR     ;LOAD TEST NUMBER IN BAR
010602  105077  170444                  CLRB    @BAR            ;CLEAR EVEN BYTE
010606  022777  010000  170436          CMP     #10000,@BAR     ;TEST THAT ONLY EVEN BYTE CLEARED
010614  001410                          BEQ     1$
010616  012737  010100  001276          MOV     #10100,XMTDAT   ;LOAD CORRECT RESULT
010624  017737  170422  001274          MOV     @BAR,RCVDAT     ;GET ACTUAL RESULT
010632  104011                          ERROR1                   ERROR! EVEN BYTE INSTRUCTION FAILED
010634  000415                          BR      2$              ;GO TO SCOPE
010636  012777  010100  170406  1$      MOV     #10100,@BAR     ;LOAD TEST NUMBER IN BAR
010644  105077  170746                  CLRB    @ BAR           ;TEST THAT ONLY ODD BYTE CLEARED
010650  001407                          BEQ     2$
010652  012737  000100  001276          MOV     #00100,XMTDAT   ;LOAD CORRECT RESULT
010660  017737  170364  001274          MOV     @CSR,RCVDAT     ;LOAD ACTUAL RESULT
010666  104011                          ERROR1                  ;ERROR! ODD BYTE INSTRUCTION FAILED
010670  104006                  2$      SCOPE                   ;SCOPE
                                        *****************************************************************************
010672  000023                  RT23    23                      ;ROUTINE # 23                                       *
010674  011000                          RT24                    ;ADDR OF NEXT ROUTINE                               *
010676  000144                          100                     ;ITERATION COUNT                                    *
010700  010702                          RT23A                   ;SCOPE ENTRY POINT                                  *
        000023                          X=X+1
                                        ;*****************************************************************************

                                        ;TEST THAT BKCSR RESPONDS PROPERLY TO BYTE COMMANDS
010702  012777  010100  170344  RT23A   MOV     #10100,@BKCSR   ;LOAD TEST NUMBER IN BKCSR
010710  105077  170340                  CLRB    @BKCSR          ;CLEAR EVEN BYTE
010714  022777  010000  170332          CMP     #10000,@BKCSR   ;TEST THAT ONLY EVEN BYTE CLEARED
010722  001410                          BEQ     1$
010724  012737  010100  001276          MOV     #10100,XMTDAT   ;LOAD CORRECT RESULT
010732  017737  170316  001274          MOV     @BKCSR,RCVDAT   ;GET ACTUAL RESULT
```

```
010740  104011                          ERROR1                  ;ERROR' EVEN BYTE INSTRUCT ON FAILED
010742  000415                          BR      2$              ;GO TO SCOPE
010744  012777  010100  170302  1$      MOV     #10100,@BKCSR   ;LOAD TEST NUMBER IN BKCSR
010752  105077  170642                  CLRB    @ BKCSR         ;TEST THAT ONLY ODD BYTE CLEARED
010756  001407                          BEQ     2$
010760  012737  000100  001276          MOV     #00100,XMTDAT   ;LOAD CORRECT RESULT
010766  017737  170256  001274          MOV     @CSR,RCVDAT     ;LOAD ACTUAL RESULT
010774  104011                          ERROR1                  ;ERROR' ODD BYTE INSTRUCTION FAILED
010776  104006                  2$      SCOPE                   ;SCOPE
                                ;*****************************************************************
011000  000024                  RT24    24                      ;ROUTINE # 24                  *
011002  011044                          RT25                    ;ADDR OF NEXT ROUTINE          *
011004  000144                          100                     ;ITERATION COUNT               *
011006  011010                          RT24A                   ;SCOPE ENTRY POINT             *
        000024                          X=X+1
                                ;*****************************************************************

                                ;TEST THAT OVER RUN BIT (CSR BIT13) CAUSES AN INTERRUPT WHEN SET
011010  012777  011042  170246  RT24A   MOV     #1$,@XMTINT     ;LOAD TRANSMITTER INTERRLPT VECTOR
011016  012777  010000  170224          MOV     #BIT12,@CSR     ;SET TRANSMITTER IE B T
011024  052777  020000  170216          BIS     #BIT13,@CSR     ;SET OVER RUN BIT
011032  005037  177776                  CLR     @#PSW           ;ENABLE INTERRUPTS
011036  000240                          NOP
011040  104001                          ERROR                   ;ERROR'OVERRUN FAILED TO CAUSE AN
                                                                ;INTERRUPT,OR INTERRUPTED TO INCOR-
                                                                ;RECT ADDRESS
011042  104006                  1$      SCOPE                   ;SCOPE
                                ;*****************************************************************
011044  000025                  RT25    25                      ;POUTINE # 25                  *
011046  011152                          RT26                    ;ADDR OF NEXT POUTINE          *
011050  000100                          100                     ;ITERATION COUNT               *
011052  011054                          RT25A                   ;SCOPE ENTRY POINT             *
        000025                          X=X+1
                                ;*****************************************************************

                                ;TEST THAT THE DM11 INTERRUPTS AT THE CORRECT LEVEL
011054  012737  000340  177776  RT25A   MOV     #PRTY7,@#PSW
011062  012777  011112  170174          MOV     #1$,@XMTINT     ;LOAD TRANSMITTER INTEPRUPT VECTOR
011070  012777  030000  170152          MOV     #30000,@CSR     ;SET OVER RUN & IE BITS
011076  012737  000200  177776          MOV     #PRTY4,@#PSW    ;ALLOW INTERRUPTS ON LEVEL 5 & ABOVE
011104  000240                          NOP
011106  104001                          ERROR                   ;ERROR'DM11 FAILED TO INTERRUPT
011110  000417                          BR      3$              ;GO TO EXIT
011112  022626                  1$      CMP     (6)+,(6)+       ;RESET STACK POINTER
011114  013737  001266  177776          MOV     XMTLVL,@#PSW    ;LOAD DM11 INTERRUPT LEVEL
011122  012777  011146  170124          MOV     #2$,@XMTINT     ;LOAD TRANSMITTER  NTERRUPT VECTOR
011130  005077  170114                  CLR     @CSR
011134  012777  030000  170106          MOV     #30000,@CSR
011142  000240                          NOP
011144  000401                          BR      3$              ;GO TO EXIT
011146  104001                  2$      ERROR                   ;ERROR' DM11 INTERPRUPTED ON HIGHER
                                                                ;PRIORITY LEVEL THAN SET FOR
011150  104006                  3$      SCOPE
                                ;*****************************************************************
011152  000026                  RT26    26                      ;ROUTINE # 26                  *
011154  011170                          RT27                    ;ADDRESS OF NEXT TEST          *
```

```
011156  000144                  100                     ;ITERATION COUNT                *
011160  011162                  LTST0                   ;SCOPE ENTRY POINT              *
        000026                  X=X+1
                        ;*****************************************************************
                        ;TRANSMITTER LINE TEST LINE 0
011162  004537  004330  LTST0 JSR     5,XMTTST        ;GO TEST TRANSMITTER L NE 0
011166  000000                  LINE0
        000001                  Y=Y+1
                        ;*****************************************************************
011170  000027          RT27    27                      ;ROUTINE # 27                   *
011172  011206                  RT30                    ;ADDRESS OF NEXT TEST           *
011174  000144                  100                     ;ITERATION COUNT                *
011176  011200                  LTST1                   ;SCOPE ENTRY POINT              *
        000027                  X=X+1
                        ;*****************************************************************
                        ;TRANSMITTER LINE TEST LINE 1
011200  004537  004330  LTST1 JSR     5,XMTTST        ;GO TEST TRANSMITTER L NE 1
011204  000002                  LINE1
        000002                  Y=Y+1
                        ;*****************************************************************
011206  000030          RT30    30                      ;ROUTINE # 30                   *
011210  011224                  RT31                    ;ADDRESS OF NEXT TEST           *
011212  000144                  100                     ;ITERATION COUNT                *
011214  011216                  LTST2                   ;SCOPE ENTRY POINT              *
        000030                  X=X+1
                        ;*****************************************************************
                        ;TRANSMITTER LINE TEST LINE 2
011216  004537  004330  LTST2 JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 2
011222  000004                  LINE2
        000003                  Y=Y+1
                        ;*****************************************************************
011224  000031          RT31    31                      ;ROUTINE # 31                   *
011226  011242                  RT32                    ;ADDRESS OF NEXT TEST           *
011230  000144                  100                     ;ITERATION COUNT                *
011232  011234                  LTST3                   ;SCOPE ENTRY POINT              *
        000031                  X=X+1
                        ;*****************************************************************
                        ;TRANSMITTER LINE TEST LINE 3
011234  004537  004330  LTST3 JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 3
011240  000006                  LINE3
        000004                  Y=Y+1
                        ;*****************************************************************
011242  000032          RT32    32                      ;ROUTINE # 32                   *
011244  011260                  RT33                    ;ADDRESS OF NEXT TEST           *
011246  000144                  100                     ;ITERATION COUNT                *
011250  011252                  LTST4                   ;SCOPE ENTRY POINT              *
        000032                  X=X+1
                        ;*****************************************************************
                        ;TRANSMITTER LINE TEST LINE 4
011252  004537  004330  LTST4 JSR     5,XMTTST        ;GO TEST TRANSMITTER LINE 4
011256  000010                  LINE4
        000005                  Y=Y+1
                        ;*****************************************************************
011260  000033          RT33    33                      ;ROUTINE # 33                   *
011262  011276                  RT34                    ;ADDRESS OF NEXT TEST           *
011264  000144                  100                     ;ITERATION COUNT                *
```

```
                                                G  4
011266  011270                  LTST5                   ,SCOPE ENTRY POINT                      *
        000033                  X=X+1
                        ,*******************************************************************************
                        ,TRANSMITTER LINE TEST LINE 5
011270  004537  004330  LTST5 JSR       5,XMTTST        ,GO TEST TRANSMITTER   NE 5
011274  000012                  LINE5
        000006                  Y=Y+1
                        ,*******************************************************************************
011276  000034          RT34    34                      ,ROUTINE # 34                           *
011300  011314                  RT35                    ,ADDRESS OF NEXT TEST                   *
011302  000144                  100                     ,ITERATION COUNT                        *
011304  011306                  LTST6                   ,SCOPE ENTRY POINT                      *
        000034                  X=X+1
                        ,*******************************************************************************
                        ,TRANSMITTER LINE TEST LINE 6
011306  004537  004330  LTST6 JSR       5,XMTTST        ,GO TEST TRANSMITTER LINE 6
011312  000014                  LINE6
        000007                  Y=Y+1
                        ,*******************************************************************************
011314  000035          RT35    35                      ,ROUTINE # 35                           *
011316  011332                  RT36                    ,ADDRESS OF NEXT TEST                   *
011320  000144                  100                     ,ITERATION COUNT                        *
011322  011324                  LTST7                   ,SCOPE ENTRY POINT                      *
        000035                  X=X+1
                        ,*******************************************************************************
                        ,TRANSMITTER LINE TEST LINE 7
011324  004537  004330  LTST7 JSR       5,XMTTST        ,GO TEST TRANSMITTER LINE 7
011330  000016                  LINE7
        000010                  Y=Y+1
                        ,*******************************************************************************
011332  000036          RT36    36                      ,ROUTINE # 36                           *
011334  011350                  RT37                    ,ADDRESS OF NEXT TEST                   *
011336  000144                  100                     ,ITERATION COUNT                        *
011340  011342                  LTST10                  ,SCOPE ENTRY POINT                      *
        000036                  X=X+1
                        ,*******************************************************************************
                        ,TRANSMITTER LINE TEST LINE 10
011342  004537  004330  LTST10 JSR      5,XMTTST        ,GO TEST TRANSMITTER LINE 10
011346  000020                  LINE10
        000011                  Y=Y+1
                        ,*******************************************************************************
011350  000037          RT37    37                      ,ROUTINE # 37                           *
011352  011366                  RT40                    ,ADDRESS OF NEXT TEST                   *
011354  000144                  100                     ,ITERATION COUNT                        *
011356  011360                  LTST11                  ,SCOPE ENTRY POINT                      *
        000037                  X=X+1
                        ,*******************************************************************************
                        ,TRANSMITTER LINE TEST LINE 11
011360  004537  004330  LTST11 JSR      5,XMTTST        ,GO TEST TRANSMITTER LINE 11
011364  000022                  LINE11
        000012                  Y=Y+1
                        ,*******************************************************************************
011366  000040          RT40    40                      ,ROUTINE # 40                           *
011370  011404                  RT41                    ,ADDRESS OF NEXT TEST                   *
011372  000144                  100                     ,ITERATION COUNT                        *
011374  011376                  LTST12                  ,SCOPE ENTRY POINT                      *
```

```
                000040                  X=X+1
                                        ;*************************************************************************
                                        ;TRANSMITTER LINE TEST LINE 12
011376  004537  004330                  LTST12 JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 12
011402  000024                                  LINE12
                000013                          Y=Y+1
                                        ;*************************************************************************
011404  000041                          RT41    41                      ;ROUT NE # 41                          *
011406  011422                                  RT42                    ;ADDRESS OF NEXT TEST                  *
011410  000144                                  100                     ;ITERATION COUNT                       *
011412  011414                                  LTST13                  ;SCOPE ENTRY POINT                     *
                000041                          X=X+1
                                        ;*************************************************************************
                                        ;TRANSMITTER LINE TEST LINE 13
011414  004537  004330                  LTST13 JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 13
011420  000026                                  LINE13
                000014                          Y=Y+1
                                        ;*************************************************************************
011422  000042                          RT42    42                      ROUTINE # 42                           *
011424  011440                                  RT43                    ;ADDRESS OF NEXT TEST                  *
011426  000144                                  100                     ITERATION COUNT                        *
011430  011432                                  LTST14                  SCOPE ENTRY POINT                      *
                000042                          X=X+1
                                        ;*************************************************************************
                                        TRANSMITTER LINE TEST LINE 14
011432  004537  004330                  LTST14 JSR      5,XMTTST        GO TEST TRANSMITTER LINE 14
011436  000030                                  LINE14
                000015                          Y=Y+1
                                        ;*************************************************************************
011440  000043                          RT43    43                      ;ROUTINE # 43                          *
011442  011456                                  RT44                    ;ADDRESS OF NEXT TEST                  *
011444  000144                                  100                     ;ITERATION COUNT                       *
011446  011450                                  LTST15                  SCOPE ENTRY POINT                      *
                000043                          X=X+1
                                        ;*************************************************************************
                                        ;TRANSMITTER LINE TEST LINE 15
011450  004537  004330                  LTST15 JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 15
011454  000032                                  LINE15
                000016                          Y=Y+1
                                        ;*************************************************************************
011456  000044                          RT44    44                      ROUTINE # 44                           *
011460  011474                                  RT45                    ADDRESS OF NEXT TEST                   *
011462  000144                                  100                     ;ITERATION COUNT                       *
011464  011466                                  LTST16                  ;SCOPE ENTRY POINT                     *
                000044                          X=X+1
                                        ;*************************************************************************
                                        TRANSMITTER LINE TEST LINE 16
011466  004537  004330                  LTST16 JSR      5,XMTTST        GO TEST TRANSMITTER LINE 16
011472  000034                                  LINE16
                000017                          Y=Y+1
                                        ;*************************************************************************
011474  000045                          RT45    45                      ROUTINE # 45                           *
011476  011512                                  RT46                    ;ADDRESS OF NEXT TEST                  *
011500  000144                                  100                     ITERATION COUNT                        *
011502  011504                                  LTST17                  SCOPE ENTRY POINT                      *
                000045                          X=X+1
```

SEQ 0047

```
                        ;*****************************************************************************
                        ;TRANSMITTER LINE TEST LINE 17
011504  004537  004330  LTST17 JSR      5,XMTTST        ;GO TEST TRANSMITTER LINE 17
011510  000036                LINE17
        000020                Y=Y+1
        000000                Y=0
        000000                A=0
                        ;*****************************************************************************
011512  000046          RT46  46                      ;ROUTINE # 46                                  *
011514  011530                RT47                    ;ADDRESS OF NEXT TEST                          *
011516  000144                100                     ;ITERATION COUNT                               *
011520  011522                RCV0                    ;SCOPE ENTRY POINT                             *
        000046                X=X+1
                        ;*****************************************************************************
                        ;RECEIVER LINE TEST LINE 0
011522  004537  004542  RCV0  JSR      5,RCVTST        ;GO TEST RECEIVER LINE 0
011526  000000                LINE0
        000001                Y=Y+1
                        ;*****************************************************************************
011530  000047          RT47  47                      ;ROUTINE # 47                                  *
011532  011546                RT50                    ;ADDRESS OF NEXT TEST                          *
011534  000144                100                     ;ITERATION COUNT                               *
011536  011542                RCV1                    ;SCOPE ENTRY POINT                             *
        000047                X=X+1
                        ;*****************************************************************************
                        ;RECEIVER LINE TEST LINE 1
011540  004537  004542  RCV1  JSR      5,RCVTST        ;GO TEST RECEIVER LINE 1
011544  000002                LINE1
        000002                Y=Y+1
                        ;*****************************************************************************
011546  000050          RT50  50                      ;ROUTINE # 50                                  *
011550  011564                RT51                    ;ADDRESS OF NEXT TEST                          *
011552  000144                100                     ;ITERATION COUNT                               *
011554  011556                RCV2                    ;SCOPE ENTRY POINT                             *
        000050                X=X+1
                        ;*****************************************************************************
                        ;RECEIVER LINE TEST LINE 2
011556  004537  004542  RCV2  JSR      5,RCVTST        ;GO TEST RECEIVER LINE 2
011562  000004                LINE2
        000003                Y=Y+1
                        ;*****************************************************************************
011564  000051          RT51  51                      ;ROUTINE # 51                                  *
011566  011602                RT52                    ;ADDRESS OF NEXT TEST                          *
011570  000144                100                     ;ITERATION COUNT                               *
011572  011574                RCV3                    ;SCOPE ENTRY POINT                             *
        000051                X=X+1
                        ;*****************************************************************************
                        ;RECEIVER LINE TEST LINE 3
011574  004537  004542  RCV3  JSR      5,RCVTST        ;GO TEST RECEIVER LINE 3
011600  000006                LINE3
        000004                Y=Y+1
                        ;*****************************************************************************
011602  000052          RT52  52                      ;ROUTINE # 52                                  *
011604  011620                RT53                    ;ADDRESS OF NEXT TEST                          *
011606  000144                100                     ;ITERATION COUNT                               *
011610  011612                RCV4                    ;SCOPE ENTRY POINT                             *
```

```
                                                                                                    SEQ 0048

                000052                          X=X+1
                                        ;*****************************************************************
                                        ;RECE VER LINE TEST LINE 4
011612  004537  004542                RCV4    JSR     5,RCVTST        ;GO TEST RECEIVER LINE 4
011616  000010                                LINE4
                000005                          Y=Y+1
                                        ;*****************************************************************
011620  000053                        RT53    53                      ;ROUTINE # 53                   *
011622  011636                                RT54                    ;ADDRESS OF NEXT TEST           *
011624  000144                                100                     ;ITERATION COUNT                *
011626  011630                                RCV5                    ;SCOPE ENTRY POINT              *
                000053                          X=X+1
                                        ;*****************************************************************
                                        ;RECEIVER LINE TEST LINE 5
011630  004537  004542                RCV5    JSR     5,RCVTST        ;GO TEST RECEIVER LINE 5
011634  000012                                LINE5
                000006                          Y=Y+1
                                        ;*****************************************************************
011636  000054                        RT54    54                      ;ROUTINE # 54                   *
011640  011654                                RT55                    ;ADDRESS OF NEXT TEST           *
011642  000144                                100                     ;ITERATION COUNT                *
011644  011646                                RCV6                    ;SCOPE ENTRY POINT              *
                000054                          X=X+1
                                        ;*****************************************************************
                                        ;RECEIVER LINE TEST LINE 6
011646  004537  004542                RCV6    JSR     5,RCVTST        ;GO TEST RECEIVER LINE 6
011652  000014                                LINE6
                000007                          Y=Y+1
                                        ;*****************************************************************
011654  000055                        RT55    55                      ;ROUTINE # 55                   *
011656  011672                                RT56                    ;ADDRESS OF NEXT TEST           *
011660  000144                                100                     ;ITERATION COUNT                *
011662  011664                                RCV7                    ;SCOPE ENTRY POINT              *
                000055                          X=X+1
                                        ;*****************************************************************
                                        ;RECEIVER LINE TEST LINE 7
011664  004537  004542                RCV7    JSR     5,RCVTST        ;GO TEST RECEIVER LINE 7
011670  000016                                LINE7
                000010                          Y=Y+1
                                        ;*****************************************************************
011672  000056                        RT56    56                      ;ROUTINE # 56                   *
011674  011710                                RT57                    ;ADDRESS OF NEXT TEST           *
011676  000144                                100                     ;ITERATION COUNT                *
011700  011702                                RCV10                   ;SCOPE ENTRY POINT              *
                000056                          X=X+1
                                        ;*****************************************************************
                                        ;RECEIVER LINE TEST LINE 10
011702  004537  004542                RCV10   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 10
011706  000020                                LINE10
                000011                          Y=Y+1
                                        ;*****************************************************************
011710  000057                        RT57    57                      ;ROUTINE # 57                   *
011712  011726                                RT60                    ;ADDRESS OF NEXT TEST           *
011714  000144                                100                     ;ITERATION COUNT                *
011716  011720                                RCV11                   ;SCOPE ENTRY POINT              *
                000057                          X=X+1
```

```
                                ;*****************************************************************************
                                ;RECEIVER LINE TEST LINE 11
011720  004537  004542        RCV11   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 11
011724  000022                        LINE11
        000012                  Y=Y+1
                                ;*****************************************************************************
011726  000060                RT60    60                      ;ROUTINE # 60                   *
011730  011744                        RT61                    ;ADDRESS OF NEXT TEST           *
011732  000144                        100                     ;ITERATION COUNT                *
011734  011736                        RCV12                   ;SCOPE ENTRY POINT              *
        000060                  X=X+1
                                ;*****************************************************************************
                                ;RECEIVER LINE TEST LINE 12
011736  004537  004542        RCV12   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 12
011742  000024                        LINE12
        000013                  Y=Y+1
                                ;*****************************************************************************
011744  000061                RT61    61                      ;ROUTINE # 61                   *
011746  011762                        RT62                    ;ADDRESS OF NEXT TEST           *
011750  000144                        100                     ;ITERATION COUNT                *
011752  011754                        RCV13                   ;SCOPE ENTRY POINT              *
        000061                  X=X+1
                                ;*****************************************************************************
                                ;RECEIVER LINE TEST LINE 13
011754  004537  004542        RCV13   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 13
011760  000026                        LINE13
        000014                  Y=Y+1
                                *****************************************************************************
011762  000062                RT62    62                      ;ROUTINE # 62                   *
011764  012000                        RT63                    ;ADDRESS OF NEXT TEST           *
011766  000144                        100                     ;ITERATION COUNT                *
011770  011772                        RCV14                   ;SCOPE ENTRY POINT              *
        000062                  X=X+1
                                ;*****************************************************************************
                                ;RECEIVER LINE TEST LINE 14
011772  004537  004542        RCV14   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 14
011776  000030                        LINE14
        000015                  Y=Y+1
                                ;*****************************************************************************
012000  000063                RT63    63                      ;ROUTINE # 63                   *
012002  012016                        RT64                    ;ADDRESS OF NEXT TEST           *
012004  000144                        100                     ;ITERATION COUNT                *
012006  012010                        RCV15                   ;SCOPE ENTRY POINT              *
        000063                  X=X+1
                                *****************************************************************************
                                ;RECEIVER LINE TEST LINE 15
012010  004537  004542        RCV15   JSR     5,RCVTST        ;GO TEST RECEIVER LINE 15
012014  000032                        LINE15
        000016                  Y=Y+1
                                *****************************************************************************
012016  000064                RT64    64                      ;ROUTINE # 64                   *
012020  012034                        RT65                    ;ADDRESS OF NEXT TEST           *
012022  000144                        100                     ;ITERATION COUNT                *
012024  012026                        RCV16                   ;SCOPE ENTRY POINT              *
        000064                  X=X+1
                                *****************************************************************************
```

```
                                                    ,RECEIVER L NE TEST LINE 16
012026  004537  004542                    RCV16   JSR     5,RCVTST        ,GO TEST RECEIVER LINE 16
012032  000034                                    LINE16
        000017                                    Y=Y+1
                                          ,*****************************************************************************
012034  000065                            RT65    65                      ,ROUTINE # 65                          *
012036  012054                                    RT66                    ,ADDRESS OF NEXT TEST                  *
012040  000144                                    100                     ,ITERATION COUNT                       *
012042  012044                                    RCV17                   ,SCOPE ENTRY POINT                     *
        000065                                    X=X+1
                                          ,*****************************************************************************
                                          ,RECEIVER LINE TEST LINE 17
012044  004537  004542                    RCV17   JSR     5,RCVTST        ,GO TEST RECE VER L NE 17
012050  000036                                    LINE17
        000020                                    Y=Y+1
012052  000240                                    NOP
                                          ,*****************************************************************************
012054  000066                            RT66    66                      ,ROUTINE # 66                          *
012056  012314                                    RT67                    ,ADDR OF NEXT ROUT NE                  *
012060  000012                                    10                      ,ITERATION COUNT                       *
012062  012070                                    RT66A                   ,SCOPE ENTRY POINT                     *
        000066                                    X=X+1
                                          ******************************************************************************

012064  000240                                    NOP
012066  000240                                    NOP
                                          TEST THAT NEX BIT (CSR BIT 14) SETS WHEN THE TRANSMITTER REFERENCES
                                          NON-EXISTANT MEMORY, THE CORRESPONDING BAR BIT CLEARS
                                          AND THAT AN INTERPUPT OCCURS  ALL LINES ARE USED FOR THE TEST
012070  004737  003724                    RT66A   JSP     7,TIMER         ,GO CALCULATE MACINE TIME TO TRANSMIT
                                                                          ,ONE CHARACTER
012074  012701  001106                            MOV     #CAT,%1         ,GET CAT ADDRESS
012100  012702  160000                            MOV     #160000 %2       GET A NON-EXISTANT ADDRESS
012104  012703  000020                            MOV     #16  %3          GET COUNTER
012110  010221                    1$      MOV     %2,(1)+         ,LOAD THE CURRENT ADDRESS
012112  005303                            DEC     %3              ,TABLE WITH NON-EXISTANT
012114  001375                            BNE     1$              ,ADDRESSES
012116  012701  000001                    MOV     #LBIT0 %1       ,GET LINE BIT
012122  012777  012260  167134            MOV     #6$,@XMTINT     ,LOAD TRANSMITTER INT  VECTOR
012130  052777  000060  167112  2$        BIS     #60,@CSR        ,SET EXTENDED ADDRESS BITS
012136  050177  167110                    BIS     %1,@BAR         ,START TRANSMITTER
012142  013737  004076  012152            MOV     TIME14,3$       ,LOAD DELAY TIME TO
012150  104400                            DELAY                   ,DELAY FOR 1/4TH OF A CHARACTER
012152  000000                    3$      OPEN                    ,TO RESPOND TO NEX
012154  017737  167072  001274            MOV     @BAR,RCVDAT     ,GET BAR DATA & TEST
012162  001406                            BEQ     4$              ,THAT IT IS CLEAR
012164  005037  001276                    CLR     XMTDAT
012170  104011                            ERROR1                  ,ERROR!BAR BIT DIC NOT CLEAR
012172  005077  167054                    CLR     @BAR
012176  000440                            BR      7$               GO TO SCOPE
012200  032777  040000  167042  4$        BIT     #BIT14 @CSR     ,TEST THAT NEX BIT IS SET
012206  001002                            BNE     5$              ,BRANCH IF SET
012210  104001                            ERROR                   ,ERROR! NEX BIT FAILED TO SET
012212  000432                            BR      7$              ,GO TO SCOPE
012214  042777  100000  167026  5$        BIC     #BIT15 @CSR     ,CLEAR TRANSMITTER READY FLAG
012222  052777  010000  167020            BIS     #BIT12,@CSR      SET TRANSMITTER IE BIT
```

```
012230  005037  177776                  CLR     @#PSW           ;ALLOW INTERRUPTS
012234  000240                          NOP
012236  012737  000340  177776          MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
012244  010137  001276                  MOV     %1,XMTDAT       ;LOAD LINE THAT FAILED
012250  005037  001274                  CLR     RCVDAT
012254  104011                          ERROR1                  ;ERROR! NEX FAILED TO CAUSE INTERRUPT
                                                                ;TYPEOUT SHOWS LINE # THAT FAILED
012256  000410                          BR      7$              ;GO TO SCOPE
012260  005077  166764          6$      CLR     @CSR
012264  012737  000340  177776          MOV     #PRTY7,@#PSW    ;LOCK OUT INTERRUPTS
012272  022626                          CMP     (6)+,(6)+       ;ADJUST STACK PTR
012274  006301                          ASL     %1              ;SHIFT LINE BIT
012276  103314                          BCC     2$              ;DO NEXT LINE
012300  013737  004074  012310  7$      MOV     TIME1,8$        ;WAIT FOR TRANSMITTER TO RUN
012306  104400                          DELAY                   ;TO COMPLETION BEFORE
012310  000000                  8$      OPEN                    ;EXITING TEST
012312  104006                          SCOPE                   ;SCOPE
                                ;*****************************************************************************
012314  000067                  RT67    67                      ;ROUTINE # 67                                *
012316  012424                          RT70                    ;ADDR OF NEXT ROUTINE                        *
012320  000012                          10                      ;ITERATION COUNT                             *
012322  012324                          RT67A                   ;SCOPE ENTRY POINT                           *
        000067                          X=X+1
                                 *****************************************************************************

                                 TEST THAT NEX BIT SETS IF THE DM11 TABLES ARE IN NON-EXISTANT CORE
012324  012777  160000  166724  RT67A   MOV     #160000,@BASREG ;SET BASE REGISTER TO NON-EXISTANT ADRS
012332  012737  012414  000004          MOV     #4$,@#ERRVEC    ;SET TIME OUT TRAP VECTOR
012340  005737  160000                  TST     @#160000        ;CHECK THAT ADDRESS TIMES OUT
012344  013737  004076  012362          MOV     TIME14,1$       ;GET TIME TO TRANSMIT 1/4 CHAR
012352  052777  000001  166672          BIS     #LBIT0,@BAR     ;START TO TRANSMIT ON LINE 0
012360  104400                          DELAY                   ;DELAY 1/4TH OF A CHARACTER
012362  000000                  1$      OPEN                    ;TIME
012364  005077  166662                  CLR     @BAR            ;STOP TRANSMITTER
012370  022777  040060  166652          CMP     #BIT14+60,@CSR  ;TEST THAT ONLY NEX IS SET
012376  001401                          BEQ     2$
012400  104001                          ERROR                   ;ERROR! EITHER NEX FALED TO SET
                                                                ;OR OTHER BITS SET
012402  013737  004074  012412  2$      MOV     TIME1,3$        ;DELAY 1 CHARACTER TIME TO ALLOW
012410  104400                          DELAY                   ;TRANSMITTER TO RUN TO
012412  000000                  3$      OPEN                     COMPLETION
012414  012737  000006  000004  4$      MOV     #ERRVEC+2,@#ERRVEC      ;RESTORE TIME OUT TRAP
012422  104006                          SCOPE
                                 *****************************************************************************
012424  000070                  RT70    70                      ;ROUTINE # 70                                *
012426  012540                          RT71                    ;ADDR OF NEXT ROUTINE                        *
012430  000144                          100                     ;ITERATION COUNT                             *
012432  012434                          RT70A                   ;SCOPE ENTRY POINT                           *
        000070                          X=X+1
                                 *****************************************************************************

                                 TEST THAT WHEN THE GO BIT IS CLEAR THAT THE RECEIVERS DO NOT RECEIVE
                                 DATA EACH LINE IN TURN IS TRANSMITTED ON, AND WHEN TEN CHARACTERS
                                 HAVE BEEN TRANSMITTED THE RECEIVER DONE FLAG IS TESTED  IF IT IS SET
                                ;AN ERROR IS INDICATED ON THE LINE DATA WAS RECEIVED ON
012434  005037  016412          RT70A   CLR     LINE            ;SET UP TO TRANSMIT
```

```
                                                    N  4
012440  004537  005754          1$      JSR     5,@#XMITD       ,10  CHARACTERS
012444  177766                          -10                     ,ON EACH LINE
012446  005777  166576                  TST     @CSR            ,WAIT FOR 10  CHARACTERS
012452  100375                          BPL      -4             ,TO BE TRANSMITTED
012454  042777  100000  166566          BIC     #100000,@CSR
012462  105777  166562                  TSTB    @CSR            ,TEST RECEIVER DONE FLAG
012466  100010                          BPL     2$
012470  013737  001272  001274          MOV     LINBIT,RCVDAT   ,GET LINE BIT OF ACTIVE L NE
012476  013737  001272  001276          MOV     LINBIT,XMTDAT   ,THAT ERROR OCCURED ON
012504  104011                          ERROR1                  ,ERROR' DATA WAS RECEIVED ON L NE IND CATED
012506  000413                          BR      4$              ,GO TO SCOPE
012510  062737  000002  016412  2$      ADD     #2,LINE         ,SET UP NEXT LINE NUMBER
012516  006337  001272                  ASL     LINB T          ,GET READY TO TRANSMIT ON NEXT L NE
012522  103346                          BCC     1$              ,GO TRANSMIT ON NEXT LINE
012524  013737  004074  012534          MOV     TIME1,3$
012532  104400                          DELAY                   ,DELAY 1 CHARACTER
012534  000000                  3$      0                       ,TIME BEFORE ENTER NG NEXT TEST
012536  104006                  4$      SCOPE                   ,SCOPE
                                ********************************************************************************
012540  000071                  R771    71                      ,ROUTINE # 71                                   *
012542  012734                          RT72                    ,ADDR OF NEXT ROUTINE                           *
012544  000024                          20                      ,ITERATION COUNT                                *
012546  012550                          RT71A                   ,SCOPE ENTRY POINT                              *
        000071                          X=X+1
                                ********************************************************************************

                                 TEST THAT CURRENT ADDRESS INCREMENTS PROPERLY WHEN A CHAR-
                                 ACTER IS TRANSMITTED  LINE 0 IS USED FOR THE TEST
012550  005000                  RT71A   CLR     %0              ,R0=CURRENT ADRS AFTER TRANSM SSION
012552  010001                  1$      MOV     %0,%1           ,R0=CURRENT ADDRESS BEFORE TRANSMISSION
012554  005201                          INC     %1              ,AND R1=CURRENT ADDRESS AFTER TRANSMISSION
012556  012737  012720  000004          MOV     #3$,@#ERRVEC            ,SET UP PROCESSOR
012564  012737  000340  000006          MOV     #PRTY7,@#ERRVEC+2       ,TIME OUT TRAP
012572  012777  001106  166456          MOV     #CAT,@BASREG    ,SET UP BASE REGISTER
012600  010037  001106                  MOV     %0,CAT          ,LOAD CURRENT ADDRESS TABLE (LINE 0)
012604  105710                          TSTB    (0)             ,DOES MEMORY EXIST?
012606  012737  177776  001146          MOV     #-2,WCT         ,SET CHAR  COUNT TO TRANSMIT 1 CHAR
012614  012777  000005  166426          MOV     #5,@CSR         ,SET MAINT & GO BITS
012622  012777  000001  166422          MOV     #LBIT0,@BAR     ,TRANSMIT ON LINE 0
012630  105777  166414                  TSTB    @CSR            ,WAIT FOR THE RECEIVER
012634  100375                          BPL      -4             ,TO RECEIVE FIRST CHARACTER
012636  042777  000200  166404          BIC     #200,@CSR       ,CLEAR RECEIVER DONE FLAG
012644  105777  166400                  TSTB    @CSR            ,WAIT FOR RECEIVER TO RECEIVE
012650  100375                          BPL      -4             ,THE SECOND CHARACTER
012652  023701  001106                  CMP     CAT,%1          ,TEST THAT CURRENT ADRS
                                                                ,INCREMENTED PROPERLY
012656  001413                          BEQ     2$
012660  010137  001276                  MOV     %1,XMTDAT       ,GET COMPUTED RESULT
012664  013737  001106  001274          MOV     CAT,RCVDAT      ,GET ACTUAL RESULT
012672  104011                          ERROR1                  ,ERROR' CURRENT ADDRESS DID NOT
012674  032777  040000  166200          BIT     #BIT14,@SWR     ,INCREMENT PROPERLY
012702  001323                          BNE     1$              ,BRANCH IF SCOPE SWITCH IS SET
012704  000405                          BR      3$              ,GO TO EXIT
012706  005701                  2$      TST     %1
012710  001403                          BEQ     3$
012712  000261                          SEC
```

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                                                                                                                    SEQ 0053

012714  006100                          ROL     %0
012716  100715                          BMI     1$
012720  012737  000006  000004  3$      MOV     #ERRVEC+2,@#ERRVEC      ;RESTORE T ME OUT TRAP
012726  005037  000006                  CLR     @#ERRVEC+2
012732  104006                          SCOPE                           ;SCOPE
                                ;*******************************************************************************
012734  000072                  RT72    72                              ;ROUTINE # 72                           *
012736  013300                          RT73                            ;ADDR OF NEXT ROUTINE                   *
012740  000024                          20                              ;ITERATION COUNT                        *
012742  012744                          RT72A                           ;SCOPE ENTRY POINT                      *
        000072                          X=X+1
                                ;*******************************************************************************

                                ;TEST THAT DATA CAN BE TRANSMITTED FROM ALL AVAILABLE CORE
                                ;LINE 0 IS USED FOR THE TEST AND ONLY ONE WORD IS TRANSMITTED
                                ;AT A TIME
012744  005000                  RT72A   CLR     %0                      ;CLEAR INDEX REGISTER
012746  000005                          RESET
012750  016037  013234  001106  1$      MOV     AREA(0),CAT             ;LOAD CURRENT ADDRESS
012756  012777  000005  166264          MOV     #5,@CSR                 ;SET MAINT & GO BITS
012764  012737  177777  001146          MOV     #-1,WCT                 ;SET UP CHAR COUNT TO TRANSMIT 1 CHAR
012772  012777  000001  166252          MOV     #LBIT0,@BAR             ;TRANSMIT CHAR ON LINE 0
013000  005777  166244                  TST     @CSR                    ;WAIT FOR THE TRANSMITTER
013004  100375                          BPL      -4                     ;TO TRANSMIT THE CHARACTER
013006  105777  166236                  TSTB    @CSR                    ;TEST FOR DONE
013012  100375                          BPL      -4
013014  005077  166230                  CLR     @CSR                    ;CLEAR ALL FLAGS
013020  005037  001274                  CLR     RCVDAT
013024  113737  001306  001274          MOVB    TUMTAB,RCVDAT           ;GET RECEIVED CHARACTER
013032  117037  013234  001276          MOVB    @AREA(0),XMTDAT         ;GET TRANSMITTED CHARACTER
013040  043737  001300  001276          BIC     CARMSK,XMTDAT           ;CLEAR NON-TRANSMITTED BITS
013046  123737  001274  001276          CMPB    RCVDAT,XMTDAT           ;COMPARE CHARACTERS
013054  001402                          BEQ     2$                       BRANCH IF VALID COMPARISON
013056  104011                          ERROR1                          ;ERROR!DATA COMPARISON ERROR
                                ;(CAT)-1 IS THE MEMORY LOCATION WHERE THE DATA WAS TRANSMITTED FROM
013060  000464                          BR      6$                      ;GO TO EXIT
013062  020027  000006          2$      CMP     %0,#6                   ;HAS FIRST 4K BEEN TESTED
013066  001402                          BEQ     3$                      ;BRANCH IF IT HAS
013070  005720                          TST     (0)+                    ;INCREMENT INDEX
013072  000726                          BR      1$                      ;GO REPEAT TEST


013074                          3$                                      ;BEGIN TESTING ABOVE 4K
013074  012737  013222  000034          MOV     #5$,@#ERRVEC            ;SET TIME OUT TRAP TO EXIT
                                                                        ;TEST IF MEMORY TIMES OUT
013102  005001                          CLR     %1                      ;SET UP DATA IDENTIFIER
013104  005201                  4$      INC     %1                      ;INCREMENT DATA IDENTIFIER
013106  005720                          TST     (0)+                    ;INCREMENT INDEX
013110  110170  013234                  MOVB    %1,@AREA(0)             ;LOAD IDENTIFIER INTO MEMOR
013114  016037  013234  001106          MOV     AREA(0),CAT             ;LOAD CURRENT ADDRESS
013122  012777  000005  166120          MOV     #5,@CSR                 ;SET MAINT & GO BITS
013130  012737  177777  001146          MOV     #-1,WCT                 ;SET UP CHAR COUNT TO TRANSMIT 1 CHAR
013136  012777  000001  166106          MOV     #LBIT0,@BAR             ;TRANSMIT ON LINE 0
013144  005777  166100                  TST     @CSR                    ;WAIT FOR THE TRANSMITTER TO
013150  100375                          BPL      -4                      TRANSMIT THE CHARACTER
013152  105777  166072                  TSTB    @CSR                    ;TEST FOR CHARACTER DONE
```

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013156  100375                          BPL     -4
013160  005077  166064                  CLR     @CSR
013164  113737  001306  001274          MOVB    TUMTAB,RCVDAT   ,GET THE RECEIVED CHARACTER
013172  117037  013234  001276          MOVB    @AREA(0),XMTDAT ,GET THE TRANSMITTED CHARACTER
013200  043737  001300  001276          BIC     CARMSK,XMTDAT   ,CLEAR NON-TRANSMITTED BITS
013206  123737  001274  001276          CMPB    RCVDAT,XMTDAT   ,COMPARE CHARACTERS
013214  001733                          BEQ     4$              ,BRANCH IF VALID COMPARISON
013216  104011                          ERROR1                  ,ERROR'DATA COMPARISON ERROR NUMBER
013220  000404                          BR      6$              ,IN S/B GIVES MEMORY LOCATION (SEE TABLE
013222  022626                  5$      POPSP2                  ,RESET THE STACK
013224  012737  000006  000004          MOV     #6,@#ERRVEC     ,RESTORE TIME OUT TRAP
013232  104006                  6$      SCOPE                   ,EXIT TEST
                                ,MEMORY LOCATIONS TRANSMITTED FROM TABLE
013234  000000                  AREA    0                       ,FOR DATA IN FIRST
013236  005252                          5252                    ,4K SEE THE LISTING
013240  012525                          12525                   ,CONTENTS OF THESE LOCATIONS (BYTE
013242  017777                          17777                   ,IS THE DATA TRANSMITTED
013244  020000                  A8K     20000                   ,CONTENTS =1 (IF AVA LABLE)
013246  026314                          26314                   ,    "     2       "
013250  031463                          31463                   ,    "     3       "

013252  037477                          37477                   ,    "     4       "
013254  040000                  A12K    40000                   ,    "     5       "
013256  057477                          57477                   ,    "     6       "
013260  060000                  A16K    60000                   ,    "     7       "
013262  077477                          77477                   ,    "     10      "
013264  100000                  A20K    100000                  ,    "     11      "
013266  117477                          117477                  ,    "     12      "
013270  120000                  A24K    120000                  ,    "     13      "
013272  137477                          137477                  ,    "     14      "
013274  140000                  A28K    140000                  ,    "     15      "
013276  173000                          173000                  ,    "     16      "
                                ;*******************************************************************************
013300  000073                  RT73    73                      ,ROUTINE # 73                                  *
013302  013514                          RT74                    ,ADDR OF NEXT ROUTINE                          *
013304  000012                          10                      ,ITERATION COUNT                               *
013306  013310                          RT73A                   ,SCOPE ENTRY POINT                             *
        000073                          X=X+1
                                ;*******************************************************************************

                                ,TEST THAT THE TRANSMITTER CAN TRANSMIT 100  CHARACTERS BEFORE SETTING
                                ,THE READY BIT (CSR 15),AND CLEARING THE BAR BIT
013310  005037  016412          RT73A   CLR     LINE
013314  012777  000001  165726  1$      MOV     #1,@CSR         ,SET THE GO BIT
013322  005037  001274                  CLR     RCVDAT
013326  013737  016412  001276          MOV     @#LINE,XMTDAT   ,GET LINE NUMBER (X2)
013334  004537  005754                  JSR     5,@#XMITD        TRANSMIT 100  CHARACTERS
013340  177634                          -100                    ,ON LINE AS SPECIFIED BY LINE
013342  105777  165702          2$      TSTB    @CSR            ,WAIT FOR THE RECEIVER
013346  100375                          BPL     2$              ,TO RECEIVE ONE CHARACTER
013350  042777  000200  165672          BIC     #BIT7,@CSR      ,CLEAR CHAR  DONE FLAG
013356  005237  001274                  INC     RCVDAT          ,INCREMENT CHAR  RCVD COUNT
013362  023727  001274  000144          CMP     RCVDAT,#100     ,HAVE 100  CHARS  BEEN RCVD
013370  001416                          BEQ     4$
013372  005777  165652                  TST     @CSR            ,TEST READY FLAG
013376  100002                          BPL     3$               GO TEST BAR
```

```
013400  104011                          ERROR1                  ;ERROR!READY BIT SET TOO SOON
                                ;TYPEOUT SHOWS HOW MANY CHARS WERE RECEIVED WHEN READY SET AND THE LINE # (X2)
013402  000443                          BR      8$              ;GO TO EXIT

013404  023777  001272  165640  3$      CMP     @#LINBIT,@BAR   ;TEST THAT BAR BIT  S SET
013412  001753                          BEQ     2$              ;BRANCH IF SET
013414  017737  165632  001276          MOV     @BAR,XMTDAT     ;GET BAR CONTENTS
013422  104011                          ERROR1                  ;ERROR! BAR BIT CLEARED TO SOON
                                ;TYPEOUT SHOWS THE BAR CONTENTS AND HOW MANY CHARS WERE RECE VED WHEN BAP FAILED
                                ;LOCATION LINBIT HAS THE CORRECT BAR CONTENTS
013424  000432                          BR      8$              ;EXIT TEST
013426  013737  004076  013436  4$      MOV     TIME14,5$       ;DELAY 1/4 CHARACTER T ME
013434  104400                          DELAY                   ;TO ALLOW TRANSM TTER TO F NISH
013436  000000                  5$      OPEN
013440  005777  165604                  TST     @CSP            ;TEST READY FLAG (SHOULD BE SET
013444  100402                          BMI     6$              ;GO TEST BAR
013446  104001                          EPROR                   ;ERROR! READY FLAG FAILED TO SET
013450  000420                          BR      8$              ;GO TO EXIT
013452  005777  165574          6$      TST     @BAP            ;TEST THAT BAP BIT  S CLEAR
013456  001407                          BEQ     7$              ;GO TO 7$ IF CLEAR
013460  017737  165566  001274          MOV     @BAR,RCVDAT
013466  005037  001276                  CLR     XMTDAT
013472  104011                          ERROR1                  ;EPROR  BAR BIT FA LED TO CLEAR
013474  000406                          BR      8$
013476  062737  000002  016412  7$      ADD     #2,@#LINE
013504  006337  001272                  ASL     @#LINBIT
013510  103301                          BCC     1$
013512  104006                  8$      SCOPE
                                ********************************************************************************
013514  000074                  RT74    74                      ;ROUTINE # 74                                   *
013516  013702                          RT75                    ;ADDR OF NEXT ROUTINE                           *
013520  000012                          10                      ;ITERATION COUNT                                *
013522  013524                          RT74A                   ; SCOPE ENTRY POINT                             *
        000074                          X=X+1
                                ********************************************************************************

                                ;TEST THAT THE TUMBLE TABLE POINTER INCREMENTS PROPERLY AND
                                ;RETURNS TO THE BEGINNING AFTER 64  CHARACTERS HAVE BEEN RECEIVED
                                ;LINE 0 IS USED FOR THE TEST
013524  012701  001306          RT74A   MOV     #TUMTAB,%1      ; CLEAR THE
013530  012702  000100                  MOV     #64 ,%2         ; TUMBLE TABLE
013534  005021                  1$      CLR     (1)+
013536  005302                          DEC     %2
013540  001375                          BNE     1$
013542  012701  001306                  MOV     #TUMTAB,%1
013546  012777  000004  165474          MOV     #BIT2,@CSR      ;SET MAINT BIT & CLEAR GO BIT
013554  005037  001276                  CLR     XMTDAT
013560  005037  001274                  CLR     RCVDAT
013564  012737  177677  001146          MOV     #-65 ,WCT       ;SET UP TO TRANSMIT 65  CHARACTERS
013572  052777  000001  165450          BIS     #BIT0,@CSR      ;SET THE GO BIT
013600  012777  000001  165444          MOV     #LBIT0 @BAR     ;TRANSMIT ON LINE 0
013606  105777  165436          2$      TSTB    @CSR            ;WAIT FOR CHAR  DONE FLAG
013612  100375                          BPL     2$
013614  042777  000200  165426          BIC     #BIT7,  @CSR    ;CLEAR CHAR  DONE FLAG
013622  005237  001274                  INC     RCVDAT          ;INCREMENT CHARACTERS
013626  005237  001276                  INC     XMTDAT          ; RECEIVED COUNT
```

```
013632  005711                          TST     (1)             ;TEST TT ENTRY FOR VALID
013634  100402                          BMI     3$              ;DATA ENTRY
013636  104011                          ERROR1                  ;ERROR! NO VALID DATA ENTRY
                                                                ;TYPEOUT SHOWS # OF CHARS  RCVD WHEN ERROR OCCURED
013640  000417                          BR      4$              ;GO TO SCOPE
013642  005021                  3$      CLR     (1)+            ;CLEAR TT ENTRY
013644  023727  001276  000100        CMP     XMTDAT,#64      ;HAVE 64  CHARACTERS BEEN RECEIVED
013652  001355                          BNE     2$
013654  005777  165370                TST     @CSR            ;WAIT FOR THE LAST CHARACTER
013660  100375                          BPL     -4              ;TO BE TRANSMITTED
013662  105777  165362                TSTB    @CSR            ;TEST FOR DONE
013666  100375                          BPL     -4
013670  005737  001306                TST     TUMTAB          ;TEST FIRST TT ENTRY
013674  100401                          BMI     4$              ;FOR VALID DATA
013676  104001                          ERROR                   ;ERROR! POINTER DID NOT RETURN
013700  104006                  4$      SCOPE                   ;SCOPE
        000000                          A=0
        000000                          Y=0
                                ;*******************************************************************************
013702  000075                  RT75    75                      ;ROUTINE # 75                                   *
013704  013720                          RT76                    ;ADDRESS OF NEXT TEST                           *
013706  000144                          100                     ;ITERATION COUNT                                *
013710  013712                          BRK0                    ;SCOPE ENTRY POINT                              *
        000075                          X=X+1
                                ;*******************************************************************************
                                ;BREAK TEST ON LINE 0
013712  004537  005164          BRK0    JSR     5,BRKTST        ;GO DO BREAK TEST
013716  000001                          LBIT0                   ;ON LINE 0
        000001                          Y=Y+1
                                ;*******************************************************************************
013720  000076                  RT76    76                      ;ROUTINE # 76                                   *
013722  013736                          RT77                    ;ADDRESS OF NEXT TEST                           *
013724  000144                          100                     ;ITERATION COUNT                                *
013726  013730                          BRK1                    ;SCOPE ENTRY POINT                              *
        000076                          X=X+1
                                ;*******************************************************************************
                                ;BREAK TEST ON LINE 1
013730  004537  005164          BRK1    JSR     5,BRKTST        ;GO DO BREAK TEST
013734  000002                          LBIT1                   ;ON LINE 1
        000002                          Y=Y+1
                                ;*******************************************************************************
013736  000077                  RT77    77                      ;ROUTINE # 77                                   *
013740  013754                          RT100                   ;ADDRESS OF NEXT TEST                           *
013742  000144                          100                     ;ITERATION COUNT                                *
013744  013746                          BRK2                    ;SCOPE ENTRY POINT                              *
        000077                          X=X+1
                                ;*******************************************************************************
                                ;BREAK TEST ON LINE 2
013746  004537  005164          BRK2    JSR     5,BRKTST        ;GO DO BREAK TEST
013752  000004                          LBIT2                   ;ON LINE 2
        000003                          Y=Y+1
                                ;*******************************************************************************
013754  000100                  RT100   100                     ;ROUTINE # 100                                  *
013756  013772                          RT101                   ;ADDRESS OF NEXT TEST                           *
013760  000144                          100                     ;ITERATION COUNT                                *
013762  013764                          BRK3                    ;SCOPE ENTRY POINT                              *
```

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                000100                          X=X+1
                                               ;*****************************************************************
                                               ;BREAK TEST ON LINE 3
013764  004537  005164                 BRK3    JSR     5,BRKTST        ;GO DO BREAK TEST
013770  000010                                  LBIT3                   ;ON LINE 3
                000004                          Y=Y+1
                                                ****************************************************************
013772  000101                         RT101   101                     ;ROUTINE # 101                          *
013774  014010                                 RT102                   ;ADDRESS OF NEXT TEST                   *
013776  000144                                 100                     ;ITERATION COUNT                        *
014000  014002                                 BRK4                    ;SCOPE ENTRY PO NT                      *
                000101                          X=X+1
                                               ;*****************************************************************
                                               ;BREAK TEST ON LINE 4
014002  004537  005164                 BRK4    JSR     5,BRKTST        ;GO DO BREAK TEST
014006  000020                                  LBIT4                   ;ON LINE 4
                000005                          Y=Y+1
                                               ;*****************************************************************
014010  000102                         RT102   102                     ;ROUTINE # 102                          *
014012  014026                                 RT103                   ;ADDRESS OF NEXT TEST                   *
014014  000144                                 100                     ;ITERATION COUNT                        *
014016  014020                                 BRK5                    ;SCOPE ENTRY POINT                      *
                000102                          X=X+1
                                                ****************************************************************
                                               ;BREAK TEST ON LINE 5
014020  004537  005164                 BRK5    JSR     5,BRKTST        ;GO DO BREAK TEST
014024  000040                                  LBIT5                   ;ON LINE 5
                000006                          Y=Y+1
                                                ****************************************************************
014026  000103                         RT103   103                     ;ROUTINE # 103                          *
014030  014044                                 RT104                   ;ADDRESS OF NEXT TEST                   *
014032  000144                                 100                      ITERATION COUNT                        *
014034  014036                                 BRK6                     SCOPE ENTRY POINT                      *
                000103                          X=X+1
                                                ****************************************************************
                                                BREAK TEST ON LINE 6
014036  004537  005164                 BRK6    JSR     5 BRKTST        ;GO DO BREAK TEST
014042  000100                                  LBIT6                   ;ON LINE 6
                000007                          Y=Y+1
                                                ****************************************************************
014044  000104                         RT104   104                      ROUTINE # 104                          *
014046  014062                                 RT105                    ADDRESS OF NEXT TEST                   *
014050  000144                                 100                     ;ITERATION COUNT                        *
014052  014054                                 BRK7                    ;SCOPE ENTRY POINT                      *
                000104                          X=X+1
                                                ****************************************************************
                                                BREAK TEST ON LINE 7
014054  004537  005164                 BRK7    JSR     5,BRKTST        ;GO DO BREAK TEST
014060  000200                                  LBIT7                   ;ON LINE 7
                000010                          Y=Y+1
                                                ****************************************************************
014062  000105                         RT105   105                     ;ROUTINE # 105                          *
014064  014100                                 RT106                   ;ADDRESS OF NEXT TEST                   *
014066  000144                                 100                      ITERATION COUNT                        *
014070  014072                                 BRK10                    SCOPE ENTRY POINT                      *
                000105                          X=X+1
```

```
                                                G  5
                        ;*****************************************************************
                        ;BREAK TEST ON LINE 10
014072  004537  005164  BRK10   JSR     5,BRKTST        ;GO DO BREAK TEST
014076  000400                  LBIT10                  ;ON LINE 10
        000011                  Y=Y+1
                        ;*****************************************************************
014100  000106          RT106   106                     ;ROUTINE # 106                  *
014102  014116                  RT107                   ;ADDRESS OF NEXT TEST           *
014104  000144                  100                     ;ITERATION COUNT                *
014106  014110                  BRK11                   ;SCOPE ENTRY POINT              *
        000106                  X=X+1
                        ;*****************************************************************
                        ;BREAK TEST ON LINE 11
014110  004537  005164  BRK11   JSR     5,BRKTST        ;GO DO BREAK TEST
014114  001000                  LBIT11                  ;ON LINE 11
        000012                  Y=Y+1
                        ;*****************************************************************
014116  000107          RT107   107                     ;ROUTINE # 107                  *
014120  014134                  RT110                   ;ADDRESS OF NEXT TEST           *
014122  000144                  100                     ;ITERATION COUNT                *
014124  014126                  BRK12                   ;SCOPE ENTRY POINT              *
        000107                  X=X+1
                        ;*****************************************************************
                        ;BREAK TEST ON LINE 12
014126  004537  005164  BRK12   JSR     5,BRKTST        ;GO DO BREAK TEST
014132  002000                  LBIT12                  ;ON LINE 12
        000013                  Y=Y+1
                        ;*****************************************************************
014134  000110          RT110   110                     ;ROUTINE # 110                  *
014136  014152                  RT111                   ;ADDRESS OF NEXT TEST           *
014140  000144                  100                     ;ITERATION COUNT                *
014142  014144                  BRK13                   ;SCOPE ENTRY POINT              *
        000110                  X=X+1
                        ;*****************************************************************
                        ;BREAK TEST ON LINE 13
014144  004537  005164  BRK13   JSR     5,BRKTST        ;GO DO BREAK TEST
014150  004000                  LBIT13                  ;ON LINE 13
        000014                  Y=Y+1
                        ;*****************************************************************
014152  000111          RT111   111                     ;ROUTINE # 111                  *
014154  014170                  RT112                   ;ADDRESS OF NEXT TEST           *
014156  000144                  100                     ;ITERATION COUNT                *
014160  014162                  BRK14                   ;SCOPE ENTRY POINT              *
        000111                  X=X+1
                        ;*****************************************************************
                        ;BREAK TEST ON LINE 14
014162  004537  005164  BRK14   JSR     5,BRKTST        ;GO DO BREAK TEST
014166  010000                  LBIT14                  ;ON LINE 14
        000015                  Y=Y+1
                        ;*****************************************************************
014170  000112          RT112   112                     ;ROUTINE # 112                  *
014172  014206                  RT113                   ;ADDRESS OF NEXT TEST           *
014174  000144                  100                     ;ITERATION COUNT                *
014176  014200                  BRK15                   ;SCOPE ENTRY POINT              *
        000112                  X=X+1
                        ;*****************************************************************
```

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                                                                                                                    SEQ 0059

                                    ;BREAK TEST ON LINE 15
014200  004537  005164              BRK15   JSR     5,BRKTST        ;GO DO BREAK TEST
014204  020000                              LBIT15                  ;ON LINE 15
        000016                              Y=Y+1
                                    ;*****************************************************************************
014206  000113                      RT113   113                     ;ROUTINE # 113                              *
014210  014224                              RT114                   ;ADDRESS OF NEXT TEST                       *
014212  000144                              100                     ;ITERATION COUNT                            *
014214  014216                              BRK16                   ;SCOPE ENTRY POINT                          *
        000113                              X=X+1
                                    ;*****************************************************************************
                                    ;BREAK TEST ON LINE 16
014216  004537  005164              BRK16   JSR     5,BRKTST        ;GO DO BREAK TEST
014222  040000                              LBIT16                  ;ON LINE 16
        000017                              Y=Y+1
                                    ******************************************************************************
014224  000114                      RT114   114                     ;ROUTINE # 114                              *
014226  014242                              RT115                   ;ADDRESS OF NEXT TEST                       *
014230  000144                              100                     ; TERAT ON COUNT                            *
014232  014234                              BRK17                   ;SCOPE ENTRY POINT                          *
        000114                              X=X+1
                                    ******************************************************************************
                                    BREAK TEST ON LINE 17
014234  004537  005164              BRK17   JSR     5,BRKTST        ;GO DO BREAK TEST
014240  100000                              LBIT17                  ;ON LINE 17
        000020                              Y=Y+1
        000000                              A=0
        000000                              Y=0
                                    ******************************************************************************
014242  000115                      RT115   115                     ;ROUTINE #115                               *
014244  014260                              RT116                   ;ADDRESS OF NEXT TEST                       *
014246  000144                              100                     ;ITERATION COUNT                            *
014250  014252                              DAT0                    ;SCOPE ENTRY POINT                          *
        000115                              X=X+1
                                    ;*****************************************************************************
                                    ;DATA TEST 100 CHARACTERS LINE0
014252  004537  006020              DAT0    JSP     5,DATTST        ;GO RUN DATA TEST
014256  000000                              LINE0                   ;ON LINE0
        000001                              Y=Y+1
                                    ******************************************************************************
014260  000116                      RT116   116                     ;ROUTINE #116                               *
014262  014276                              RT117                   ;ADDRESS OF NEXT TEST                       *
014264  000144                              100                     ;ITERATION COUNT                            *
014266  014270                              DAT1                    ;SCOPE ENTRY POINT                          *
        000116                              X=X+1
                                    ******************************************************************************
                                    DATA TEST 100 CHARACTERS LINE1
014270  004537  006020              DAT1    JSR     5,DATTST        ;GO RUN DATA TEST
014274  000002                              LINE1                   ;ON LINE1
        000002                              Y=Y+1
                                    ******************************************************************************
014276  000117                      RT117   117                     ;ROUTINE #117                               *
014300  014314                              RT120                   ;ADDRESS OF NEXT TEST                       *
014302  000144                              100                     ;ITERATION COUNT                            *
014304  014306                              DAT2                    ;SCOPE ENTRY POINT                          *
        000117                              X=X+1
```

```
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE2
014306  004537  006020          DAT2    JSR     5,DATTST        ;GO RUN DATA TEST
014312  000004                          LINE2                   ;ON LINE2
        000003                          Y=Y+1
                                ;*****************************************************************************
014314  000120                  RT120   120                     ;ROUTINE #120                                  *
014316  014332                          RT121                   ;ADDRESS OF NEXT TEST                          *
014320  000144                          100                     ;ITERATION COUNT                               *
014322  014324                          DAT3                    ;SCOPE ENTRY POINT                             *
        000120                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE3
014324  004537  006020          DAT3    JSR     5,DATTST        ;GO RUN DATA TEST
014330  000006                          LINE3                   ;ON LINE3
        000004                          Y=Y+1
                                ;*****************************************************************************
014332  000121                  RT121   121                     ;ROUTINE #121                                  *
014334  014350                          RT122                   ;ADDRESS OF NEXT TEST                          *
014336  000144                          100                     ;ITERATION COUNT                               *
014340  014342                          DAT4                    ;SCOPE ENTRY POINT                             *
        000121                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE4
014342  004537  006020          DAT4    JSR     5,DATTST        ;GO RUN DATA TEST
014346  000010                          LINE4                   ;ON LINE4
        000005                          Y=Y+1
                                ;*****************************************************************************
014350  000122                  RT122   122                     ;ROUTINE #122                                  *
014352  014366                          RT123                   ;ADDRESS OF NEXT TEST                          *
014354  000144                          100                     ;ITERATION COUNT                               *
014356  014360                          DAT5                    ;SCOPE ENTRY POINT                             *
        000122                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE5
014360  004537  006020          DAT5    JSR     5,DATTST        ;GO RUN DATA TEST
014364  000012                          LINE5                   ;ON LINE5
        000006                          Y=Y+1
                                ;*****************************************************************************
014366  000123                  RT123   123                     ;ROUTINE #123                                  *
014370  014404                          RT124                   ;ADDRESS OF NEXT TEST                          *
014372  000144                          100                     ;ITERATION COUNT                               *
014374  014376                          DAT6                    ;SCOPE ENTRY POINT                             *
        000123                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE6
014376  004537  006020          DAT6    JSR     5,DATTST        ;GO RUN DATA TEST
014402  000014                          LINE6                   ;ON LINE6
        000007                          Y=Y+1
                                ;*****************************************************************************
014404  000124                  RT124   124                     ;ROUTINE #124                                  *
014406  014422                          RT125                   ;ADDRESS OF NEXT TEST                          *
014410  000144                          100                     ;ITERATION COUNT                               *
014412  014414                          DAT7                    ;SCOPE ENTRY POINT                             *
        000124                          X=X+1
                                ;*****************************************************************************
```

```
                                        ;DATA TEST 100 CHARACTERS LINE7
014414  004537  006020                  DAT7    JSR     5,DATTST        ;GO RUN DATA TEST
014420  000016                                  LINE7                   ;ON LINE7
        000010                                  Y=Y+1
                                        ;*****************************************************************************
014422  000125                          RT125   125                     ;ROUTINE #125                              *
014424  014440                                  RT126                   ;ADDRESS OF NEXT TEST                      *
014426  000144                                  100                     ;ITERATION COUNT                           *
014430  014432                                  DAT10                   ;SCOPE ENTRY PO NT                         *
        000125                                  X=X+1
                                        ;*****************************************************************************
                                        ;DATA TEST 100 CHARACTERS LINE10
014432  004537  006020                  DAT10   JSR     5,DATTST        ;GO RUN DATA TEST
014436  000020                                  LINE10                  ;ON LINE10
        000011                                  Y=Y+1
                                        ;*****************************************************************************
014440  000126                          RT126   126                     ;ROUTINE #126                              *
014442  014456                                  RT127                   ;ADDRESS OF NEXT TEST                      *
014444  000144                                  100                     ;ITERATION COUNT                           *
014446  014450                                  DAT11                   ;SCOPE ENTRY POINT                         *
        000126                                  X=X+1
                                        ;*****************************************************************************
                                        ;DATA TEST 100 CHARACTERS LINE11
014450  004537  006020                  DAT11   JSR     5,DATTST        ;GO RUN DATA TEST
014454  000022                                  LINE11                  ;ON LINE11
        000012                                  Y=Y+1
                                        ;*****************************************************************************
014456  000127                          PT127   127                     ;ROUTINE #127                              *
014460  014474                                  RT130                   ;ADDRESS OF NEXT TEST                      *
014462  000144                                  100                     ;ITERATION COUNT                           *
014464  014466                                  DAT12                   ;SCOPE ENTRY POINT                         *
        000127                                  X=X+1
                                        ;*****************************************************************************
                                        ;DATA TEST 100 CHARACTERS LINE12
014466  004537  006020                  DAT12   JSR     5,DATTST        ;GO RUN DATA TEST
014472  000024                                  LINE12                  ;ON LINE12
        000013                                  Y=Y+1
                                        ;*****************************************************************************
014474  000130                          RT130   130                     ;ROUTINE #130                              *
014476  014512                                  RT131                   ;ADDRESS OF NEXT TEST                      *
014500  000144                                  100                     ;ITERATION COUNT                           *
014502  014504                                  DAT13                   ;SCOPE ENTRY POINT                         *
        000130                                  X=X+1
                                        ;*****************************************************************************
                                        ;DATA TEST 100 CHARACTERS LINE13
014504  004537  006020                  DAT13   JSR     5,DATTST        ;GO RUN DATA TEST
014510  000026                                  LINE13                  ;ON LINE13
        000014                                  Y=Y+1
                                        ;*****************************************************************************
014512  000131                          RT131   131                     ;ROUTINE #131                              *
014514  014530                                  RT132                   ;ADDRESS OF NEXT TEST                      *
014516  000144                                  100                     ;ITERATION COUNT                           *
014520  014522                                  DAT14                   ;SCOPE ENTRY POINT                         *
        000131                                  X=X+1
                                        ;*****************************************************************************
                                        ;DATA TEST 100 CHARACTERS LINE14
```

```
014522  004537  006020          DAT14   JSR     5,DATTST        ;GO RUN DATA TEST
014526  000030                          LINE14                  ;ON LINE14
        000015                          Y=Y+1
                                ;*****************************************************************************
014530  000132                  RT132   132                     ;ROUTINE #132                               *
014532  014546                          RT133                   ;ADDRESS OF NEXT TEST                       *
014534  000144                          100                     ;ITERATION COUNT                            *
014536  014540                          DAT15                   ;SCOPE ENTRY PO NT                          *
        000132                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE15
014540  004537  006020          DAT15   JSR     5,DATTST        ;GO RUN DATA TEST
014544  000032                          LINE15                  ;ON LINE15
        000016                          Y=Y+1
                                ;*****************************************************************************
014546  000133                  RT133   133                     ;ROUTINE #133                               *
014550  014564                          RT134                   ;ADDRESS OF NEXT TEST                       *
014552  000144                          100                     ;ITERATION COUNT                            *
014554  014556                          DAT16                   ;SCOPE ENTRY PO NT                          *
        000133                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE16
014556  004537  006020          DAT16   JSR     5,DATTST        ;GO RUN DATA TEST
014562  000034                          LINE16                  ;ON LINE16
        000017                          Y=Y+1
                                ;*****************************************************************************
014564  000134                  RT134   134                     ;ROUTINE #134                               *
014566  014602                  .       RT135                   ;ADDRESS OF NEXT TEST                       *
014570  000144                          100                     ;ITERATION COUNT                            *
014572  014574                          DAT17                   ;SCOPE ENTRY POINT                          *
        000134                          X=X+1
                                ;*****************************************************************************
                                ;DATA TEST 100 CHARACTERS LINE17
014574  004537  006020          DAT17   JSR     5,DATTST        ;GO RUN DATA TEST
014600  000036                          LINE17                  ;ON LINE17
        000020                          Y=Y+1
                                ;*****************************************************************************
014602  000135                  RT135   135                     ;ROUTINE # 135                              *
014604  015202                          RT136                   ;ADDR OF NEXT ROUTINE                       *
014606  000144                          100                     ;ITERATION COUNT                            *
014610  014612                          RT135A                  ;SCOPE ENTRY POINT                          *
        000135                          X=X+1
                                ;*****************************************************************************

                                ;TEST THAT DATA (ALL 1'S) CAN BE TRANSMITTED ON LINES SIMULTANEOUSLY
                                 THE FOLLOWING TESTS ARE PERFORMED
                                        THERE ARE 16  DATA ENTRIES
                                        THERE ISN'T A 17TH ENTRY
                                ;       DATA RECEIVED IS CORRECT
                                        ONE DATA ENTRY PER LINE

014612  005037  001306          RT135A  CLR     TUMTAB          ;CLEAR THE
014616  004537  005732                  JSR     5,BMOVE         ;TUMBLE
014622  001306                          TUMTAB                  ;TABLE
014624  001307                          TUMTAB+1                ;(200
014626  000177                          177                     ;ENTRIES)
```

```
014630  012737  177777  016564          MOV     #-1,OUTBUF      ;LOAD CHAR INTO OUTPUT BUFFER
014636  005000                          CLR     %0              ;SET R0 = LINE 0
014640  012737  000001  001272          MOV     #LBIT0,LINBIT   ;GET LINE BIT
014646  012777  000001  164374          MOV     #BIT0,@CSR      ;SET THE GO BIT
014654  010037  016412          1$      MOV     %0,LINE         ;GET LINE NUMBER
014660  004537  005754                  JSR     5,XMITD         ;TRANSMIT 1 CHAR
014664  177777                          -1                      ;ON EACH LINE
014666  005720                          TST     (0)+            ;INCREMENT LINE NUMBER (+2)
014670  006337  001272                  ASL     LINBIT          ;SHIFT LINE BIT TO NEXT LINE
014674  103367                          BCC     1$              ;BRANCH IF ALL LINES NOT DONE
014676  013737  004074  014706          MOV     TIME1,2$        ;PUT TIME TO TRANSMIT 1 CHAR
014704  104400                          DELAY                   ;DELAY 1
014706  000000          2$              OPEN                    ;CHARACTER TIME
014710  017737  164336  001274          MOV     @BAR,RCVDAT     ;GET & TEST BAR CONTENTS
014716  001410                          BEQ     3$              ;BRANCH IF 0
014720  005037  001276                  CLR     XMTDAT
014724  104011                          ERROR1                  ;ERROR! BAR NOT CLEAR AFTER ALL
014726  005077  164320                  CLR     @BAR            ;LINES FINISHED
014732  005077  164312                  CLR     @CSR
014736  000520                          BR      16$             ;GO TO EXIT
014740  032777  020000  164302  3$      BIT     #BIT13,@CSR     ;TEST THAT OVER RUN DID NOT SET
014746  001404                          BEQ     4$
014750  104001                          ERROR                   ;ERROR! OVER RUN BIT SET
014752  005077  164272                  CLR     @CSR
014756  000510                          BR      16$             ;GO TO EXIT

                                ;TEST THAT THERE ARE 16  VALID DATA ENTRIES
014760  005077  164264          4$      CLR     @CSR            ;CLEAR THE CSR
014764  012702  000020                  MOV     #16.,%2         ;GET TT SCAN COUNT
014770  012701  001306                  MOV     #TUMTAB,%1      ;GET FIRST TT ADDRESS
014774  005302                  5$      DEC     %2              ;DECREMENT SCAN COUNTER
014776  100404                          BMI     6$              ;BRANCH IF 16  ENTRIES SCANNED
015000  005721                          TST     (1)+            ;TEST FOR VALID DATA ENTRY
015002  100774                          BMI     5$              ;BRANCH IF FOUND
015004  104001                          ERROR                   ;ERROR! MISING DATA ENTRY
015006  000474                          BR      16$             ;GO TO EXIT
015010  005721                  6$      TST     (1)+            ;TEST 17TH ENTRY (SHOULD BE - TO 0)
015012  001402                          BEQ     7$              ;BRANCH IF 0
015014  104001                          ERROR                   ;ERROR! EXTRA DATA ENTRY
015016  000470                          BR      16$             ;GO TO EXIT

                                ;TEST THAT THE DATA IS CORRECT IN ALL 16  ENTRIES
015020  012701  001306          7$      MOV     #TUMTAB,%1      ;GET FIST TT ADDRESS
015024  012702  000020                  MOV     #16.,%2         ;GET SCAN COUNT
015030  005302                  8$      DEC     %2              ;DECREMENT SCAN COUNT
015032  100421                          BMI     10$             ;BRANCH IF 16  ENTRIES SCANNED
015034  013737  016564  001276          MOV     OUTBUF,XMTDAT   ;GET TRANSMITTED DATA
015042  043737  001300  001276          BIC     CARMSK,XMTDAT   ;CLEAR NON-TRANSMITTED BITS
015050  113737  001306  001274          MOVB    TUMTAB,RCVDAT   ;GET RECEIVED DATA
015056  123737  001276  001274          CMPB    XMTDAT,RCVDAT   ;COMPARE DATA
015064  001402                          BEQ     9$
015066  104011                          ERROR1                  ;ERROR  INCORRECT DATA
015070  000443                          BR      16$             ;GO TO EXIT
015072  005721                  9$      TST     (1)+            ;INCREMENT TT ADDRESS
015074  000755                          BR      8$              ;TEST NEXT ENTRY
```

```
                                        ;CLEAR ALL BUT LINE NUMBER IN TUMBLE TABLE ENTRY
015076  012701  001306          10$     MOV     #TUMTAB,%1      ;GET FIRST TT ADDRESS
015102  012702  000020                  MOV     #16.,%2         ;GET SCAN COUNT
015106  005302                  11$     DEC     %2              ;DECREMENT SCAN COUNT
015110  100403                          BMI     12$             ;BRANCH IF ALL LINES TESTED
015112  042721  160777                  BIC     #160777,(1)+    ;CLEAR ALL BUT LINE NUMBER  N TT
015116  000773                          BR      11$             ;DO NEXT TT ADDRESS

                                        ;TEST THAT THERE IS AN ENTRY FOR EACH OF THE 16  LINES
015120  005037  001276          12$     CLR     XMTDAT
015124  012701  000020                  MOV     #16.,%1
015130  012702  000020          13$     MOV     #16.,%2
015134  012700  001306                  MOV     #TUMTAB,%0
015140  023720  001276          14$     CMP     XMTDAT,(0)+     ;TEST FOR LINE ENTRY
015144  001406                          BEQ     15$             ;BRANCH IF FOUND
015146  005302                          DEC     %2              ;DECREMENT SCAN COUNT
015150  001373                          BNE     14$             ;LOOK AT NEXT ENTRY
015152  005037  001274                  CLR     RCVDAT
015156  104011                          ERROR1                  ;ERROR! NO ENTRY FOUND FOR TH S L NE
015160  000407                          BR      16$             ;GO TO EXIT
015162  005301          15$     DEC     %1                      ;DECREMENT LINES FOUND COUNT
015164  005701                  TST     %1
015166  001404                          BEQ     16$             ;BRANCH IF ALL L'NE TESTED
015170  062737  001000  001276          ADD     #1000,XMTDAT    ;INCREMENT LINE NUMBER
015176  000754                          BR      13$             ;GO DO NEXT LINE
015200  104006          16$     SCOPE                           ;SCOPE
                                        ;*****************************************************************************
015202  000136          PT136   136                             ;ROUTINE # 136                                  *
015204  015516                  RT137                           ;ADDR OF NEXT ROUTINE                           *
015206  000144                  100                             ;ITERATION COUNT                                *
015210  015212                  RT136A                          ;SCOPE ENTRY POINT                              *
        000136                  X=X+1
                                        ;*****************************************************************************

                                        ;TEST THAT THE DM11 CAN TRANSMIT A BREAK ON ALL LINES SIMULTANEOUSLY
015212  013737  004074  015266  RT136A  MOV     @#TIME1 1$      ;GET TIME TO TRANSMIT ONE CHARACTER
015220  005037  001306                  CLR     TUMTAB          ;CLEAR
015224  004537  005732                  JSR     5,BMOVE         ;THE
015230  001306                          TUMTAB                  ;TUMBLE
015232  001307                          TUMTAB+1                ;TABLE
015234  000177                          177
015236  012777  000001  164064          MOV     #BIT0,@CSR      ;SET GO
015244  012777  177777  164002          MOV     #-1,@BKCSR      ;SET BREAK BIT FOR ALL LINES
015252  105777  163772                  TSTB    @CSR            ;WAIT FOR THE RECEIVER
015256  100375                          BPL     .-4             ;TO RECEIVE A BREAK
015260  005077  163770                  CLR     @BKCSR          ;CLEAR ALL BREAK BITS
015264  104400                          DELAY                   ;WAIT ONE CHARACTER
015266  000000          1$      OPEN                            ;TIME
015270  022777  000201  163752          CMP     #201,@CSR       ;TEST THAT ONLY GO AND DONE ARE SET
015276  001410                          BEQ     2$
015300  017737  163744  001274          MOV     @CSR,RCVDAT     ;GET CSR ENTRY
015306  012737  000201  001276          MOV     #201,XMTDAT     ;GET CORRECT RESULT
015314  104011                          ERROR1                  ;ERROR! INCORRECT CSR DATA
015316  000476                          BR      13$             ;EXIT

                                TEST THAT THERE IS 16  VALID DATA ENTRIES
```

```
015320  012701  001306          2$      MOV     #TUMTAB,%1      ;GET TUMBLE TABLE BASE ADDRESS
015324  012702  000020                  MOV     #16.,%2         ;GET SCAN COUNT
015330  005721                  3$      TST     (1)+            ;TEST FOR VALID DATA ENTRY
015332  100402                          BM      4$              ;BRANCH IF VALID DATA ENTRY FOUND
015334  104001                          ERROR                   ;ERROR! MISSING VALID DATA ENTRY
015336  000466                          BR      13$             ;EXIT
015340  005302                  4$      DEC     %2              ;DECREMENT SCAN COUNT
015342  001372                          BNE     3$              ;BRANCH IF 16  ENTRIES NOT SCANNED

                                ;TEST THAT THE BREAK BIT IS SET IN 16  TUMBLE TABLE ENTRIES
015344  012701  001306                  MOV     #TUMTAB,%1
015350  012702  000020                  MOV     #16.,%2
015354  032721  040000          5$      BIT     #BIT14,(1)+     ;BREAK BIT SET?
015360  001002                          BNE     6$              ;BRANCH IF SET
015362  104001                          ERROR                   ;ERROR! MISSING BREAK BIT
015364  000453                          BR      13$             ;EXIT
015366  005302                  6$      DEC     %2              ;DECREMENT SCAN COUNT
015370  001371                          BNE     5$

                                ;TEST THAT THE TUMBLE TABLE DATA BYTE IS ALL 0'S
015372  012701  001306                  MOV     #TUMTAB,%1
015376  012702  000020                  MOV     #16.,%2
015402  105721                  7$      TSTB    (1)+            ;TEST DATA BYTE
015404  001402                          BEQ     8$              ;BRANCH IF 0'S
015406  104001                          ERROR                   ;ERROR! INCORRECT DATA
015410  000441                          BR      13$             ;EXIT
015412  105721                  8$      TSTB    (1)+            ;STEP TABLE POINTER TO NEXT DATA BYTE
015414  005302                          DEC     %2
015416  001371                          BNE     7$

                                ;CLEAR ALL BUT LINE NUMBER IN TUMBLE TABLE ENTRY
015420  012701  001306                  MOV     #TUMTAB,%1
015424  012702  000020                  MOV     #16.,%2
015430  042721  160777          9$      BIC     #160777,(1)+    ;CLEAR ALL BUT LINE NUMBER
015434  005302                          DEC     %2
015436  001374                          BNE     9$

                                ;TEST THAT THERE IS A TUMBLE TABLE ENTRY FOR EACH LINE
015440  005004                          CLR     %4              ;CLEAR LINE NUMBER
015442  012703  000020                  MOV     #16.,%3
015446  012702  000020          10$     MOV     #16.,%2
015452  012701  001306                  MOV     #TUMTAB %1
015456  020421                  11$     CMP     %4,(1)+         ;TEST FOR LINE ENTRY FOR THIS LINE
015460  001410                          BEQ     12$             ;BRANCH IF FOUND
015462  005302                          DEC     %2
015464  001374                          BNE     11$
015466  010437  001276                  MOV     %4,XMTDAT
015472  010437  001274                  MOV     %4,RCVDAT
015476  104011                          ERROR1                  ;ERROR! NO LINE ENTRY FOUND FOR THIS LINE
015500  000405                          BR      13$             ;EXIT
015502  005303                  12$     DEC     %3              ;ALL LINES BEEN FOUND
015504  001403                          BEQ     13$             ;EXIT IF YES
015506  062704  001000                  ADD     #1000,%4        ;SEARCH FOR
015512  000755                          BR      10$             ;NEXT LINE
015514  104006                  13$     SCOPE                   ;SCOPE
                                ********************************************************************************
```

```
                                                8  6
015516  000137                  RT137   137                     ,ROUTINE # 137                  *
015520  015534                          RT140                   ,ADDR OF NEXT ROUT NE           *
015522  000002                          2                       ,ITERATION COUNT                *
015524  015526                          RT137A                  ,SCOPE ENTRY POINT              *
        000137                          X=X+1
                                ,*******************************************************************************

                                ,TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STAT NG THE
                                ,NEXT LINE
015526  004537  005310          RT137A  JSR     5,@#DLYXMT      ;GO DO TEST  DELAY
015532  000040                          32                      ,THIS MUCH BETWEEN L NES
                                ,*******************************************************************************
015534  000140                  RT140   140                     ,ROUTINE # 140                  *
015536  015552                          RT141                   ,ADDR OF NEXT ROUTINE           *
015540  000002                          2                       ,ITERATION COUNT                *
015542  015544                          RT140A                  ,SCOPE ENTRY POINT              *
        000140                          X=X+1
                                ,*******************************************************************************

                                ,TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STAT NG THE
                                ,NEXT LINE
015544  004537  005310          RT140A  JSR     5,@#DLYXMT      ,GO DO TEST  DELAY
015550  000020                          16                      ,THIS MUCH BETWEEN LINES
                                ,*******************************************************************************
015552  000141                  RT141   141                     ,ROUTINE # 141                  *
015554  015570                          RT142                   ,ADDR OF NEXT ROUTINE           *
015556  000002                          2                       ,ITERATION COUNT                *
015560  015562                          RT141A                  ,SCOPE ENTRY POINT              *
        000141                          X=X+1
                                *******************************************************************************

                                 TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
                                ,NEXT LINE
015562  004537  005310          RT141A  JSR     5,@#DLYXMT      ,GO DO TEST  DELAY
015566  000010                          8                       ,THIS MUCH BETWEEN LINES
                                *******************************************************************************
015570  000142                  RT142   142                     ,ROUTINE # 142                  *
015572  015606                          RT143                   ,ADDR OF NEXT ROUTINE           *
015574  000002                          2                       ,ITERATION COUNT                *
015576  015600                          RT142A                  ,SCOPE ENTRY POINT              *
        000142                          X=X+1
                                ,*******************************************************************************

                                 TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFOPE STATING THE
                                ,NEXT LINE
015600  004537  005310          RT142A  JSR     5,@#DLYXMT      ,GO DO TEST  DELAY
015604  000004                          4                       ,THIS MUCH BETWEEN LINES
                                ,*******************************************************************************
015606  000143                  RT143   143                     ,ROUTINE # 143                  *
015610  015624                          RT144                   ,ADDR OF NEXT ROUTINE           *
015612  000002                          2                       ,ITERATION COUNT                *
015614  015616                          RT143A                  ,SCOPE ENTRY POINT              *
        000143                          X=X+1
                                ,*******************************************************************************

                                 TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
```

```
                                                        ,NEXT LINE
015616  004537  005310                        RT143A  JSR     5,@#DLYXMT      ,GO DO TEST  DELAY
015622  000002                                          2                       ,THIS MUCH BETWEEN L NES
                                                        ,*************************************************************************
015624  000144                                RT144   144                     ,ROUTINE # 144                                  *
015626  015642                                          RT145                   ,ADDR OF NEXT ROUTINE                           *
015630  000002                                          2                       ,ITERATION COUNT                                *
015632  015634                                          RT144A                  ,SCOPE ENTRY POINT                              *
        000144                                          X=X+1
                                                        *************************************************************************

                                                        ,TEST TO TRANSMIT ON EACH LINE WITH A DELAY BEFORE STATING THE
                                                        ,NEXT LINE
015634  004537  005310                        RT144A  JSR     5,@#DLYXMT      ,GO DO TEST  DELAY
015640  000001                                          1                       ,THIS MUCH BETWEEN LINES
                                                        ,*************************************************************************
015642  000145                                RT145   145                     ,ROUTINE # 145                                  *
015644  016010                                          RT146                   ,ADDR OF NEXT ROUTINE                           *
015646  000144                                          100                     ,ITERATION COUNT                                *
015650  015652                                          RT145A                  ,SCOPE ENTRY POINT                              *
        000145                                          X=X+1
                                                        *************************************************************************

                                                        ,TEST THAT THE DM11 WORKS PROPERLY WHEN THE HALF-DUPLEX B T (CSR B T 1)
                                                        ,IS SET  THE TEST TRANSMITS DATA ON LINE 0, AND 'BREAKS' ON LINE 1  ONLY
                                                        ,THE BREAK SHOULD BE RECEIVED ON LINE 0 IN THE TUMBLE TABLE
015652  005037  001306                        PT145A  CLR     TUMTAB          ,CLEAR THE FIRST TWO
015656  005037  001310                                CLR     TUMTAB+2        ,TUMBLE TABLE ENTPIES
015662  012737  016564  001106                        MOV     #OUTBUF,CAT     ,SET UP TO
015670  012737  177777  001146                        MOV     #-1,WCT         ,TRANSMIT 1 CHARACTER
015676  012777  000007  163344                        MOV     #7,@CSR         ,SET GO, HALF DUPLEX & MAINT BITS
015704  012777  000001  163340                        MOV     #LBIT0,@BAR     ,TRANSMIT 1 CHAP  ON LHNE 0
015712  012777  000002  163334                        MOV     #LBIT1,@BKCSR   ,SET BREAK ON LINE 1
015720  105777  163324                                TSTB    @CSR            ,WAIT FOR THE CHARACTER
015724  100375                                      BPL     -4              ,TO BE RECEIVED
015726  005077  163322                                CLR     @BKCSR          ,CLEAR THE BREAK BIT ON LINE 1

                                                ,TEST THAT ONLY THE BREAK WAS RECEIVED
015732  022737  141000  001306                        CMP     #141000,TUMTAB  ,TDST FOR BREAK ENTRY (LINE 1)
015740  001410                                      BEQ     1$
015742  013737  001306  001274                        MOV     TUMTAB,RCVDAT   ,GET ACTUAL ENTRY
015750  012737  141000  001276                        MOV     #141000,XMTDAT  ,GET CORRECT ENTRY
015756  104011                                      ERROR1                  ,ERROR! INCORRECT BREAK ENTRY
015760  000407                                      BR      2$              ,GO TO EXIT
015762  013737  001310  001274  1$                  MOV     TUMTAB+2,RCVDAT ,TEST THAT NEXT ENTRY IS CLEAR
015770  001403                                      BEQ     2$              ,EXIT IF CORRECT
015772  005037  001276                                CLR     XMTDAT
015776  104011                                      ERROR1                  ,ERROR! SECOND ENTRY WAS NOT CLEAR
016000  005777  163244                  2$          TST     @CSR            ,WAIT FOR THE TRANSMITTER
016004  100375                                      BPL     -4              ,TO FINISH
016006  104006                                      SCOPE                   ,SCOPE
                                                        *************************************************************************
016010  000146                                RT146   146                     ROUTINE # 146                                   *
016012  177777                                          RTLAST                  ,ADDR OF NEXT ROUTINE                           *
016014  000144                                          100                     ,ITERATION COUNT                                *
016016  016020                                          RT146A                  SCOPE ENTRY POINT                               *
```

```
                                                    D 6
                000146                          X=X+1
                                        ;*******************************************************************************

                                        ;TEST THAT THE DM11 RESPONDS CORRECTLY TO A RESET
016020  012737  016564  001106  RT146A  MOV     #OUTBUF,CAT     ;SET UP TO TRANSMIT 10
016026  012737  177770  001146          MOV     #-10,WCT        ;CHARACTERS ON LINE 0
016034  013737  004074  016104          MOV     TIME1,2$        ;GET TIME TO TRANSMIT 2 CHARACTERS
016042  013737  004074  016150          MOV     TIME1,6$
016050  005037  001276                  CLR     XMTDAT
016054  012777  000007  163166          MOV     #7,@CSR         ;SET MAINT , HALF DUPLEX & GO BITS
016062  012777  000001  163162          MOV     #LBIT0,@BAR     ;START TO TRANSM T ON LINE 0
016070  012777  000002  163156          MOV     #LBIT1,@BKCSR   ;BREAK ON LINE 1
016076  012704  000002                  MOV     #2,%4
016102  104400                  1$      DELAY                   ;WAIT 2 CHARACTER
016104  000000                  2$      OPEN                    ;T MES
016106  005304                          DEC     %4
016110  001374                          BNE     1$
016112  104005                          SRESET                  ;RESET
016114  017737  163130  001274          MOV     @CSR,RCVDAT     ;GET CSR CONTENTS
016122  001401                          BEQ     3$              ;BRANCH IF 0
016124  104011                          ERROR1                  ;ERROR! CSR DID NOT CLEAR
016126  017737  163120  001274  3$      MOV     @BAR,RCVDAT     ;GET BAR CONTENTS
016134  001402                          BEQ     4$              ;BRANCH IF 0
016136  104011                          ERROR1                  ;ERROR! BAR IS NOT CLEAR
016140  000427                          BR      9$              ;EXIT
016142  012704  000010          4$      MOV     #8 .%4
016146  104400                  5$      DELAY                    WAIT 8 MORE CHARACTER TIMES
016150  000000                  6$      OPEN
016152  005304                          DEC     %4
016154  001374                          BNE     5$
016156  017737  163066  001274          MOV     @CSR,RCVDAT     ;TEST THAT CSR IS CLEAR
016164  001402                          BEQ     7$
016166  104011                          ERROR1                  ;ERROR! CSR WAS NOT CLEAR
016170  000413                          BR      9$              ;GO TO EXIT
016172  017737  163054  001274  7$      MOV     @BAR,RCVDAT     ;TES THAT BAR IS CLEAR
016200  001402                          BEQ     8$
016202  104011                          ERROR1                  ;ERROR! BAR D D NOT CLEAR
016204  000405                          BR      9$
016206  017737  163042  001274  8$      MOV     @BKCSR,RCVDAT   ;TEST THAT BKCSR IS CLEAR
016214  001401                          BEQ     9$
016216  104011                          ERROR1                  ;ERROR! BKCSR DID NOT CLEAR
016220  104006                  9$      SCOPE                    SCOPE
```

SEQ 0069

```
                                        ;PRG1- TRANSMITTER SCOPE LOOP
016222                                  PRG1                            ;BEGIN
016222  104000                                TYPE                      ;TYPE PROGRAM T TLE
016224  017543                                PRG1M
016226  004737  016402                        JSR     7,PARAM           ;GO GET USER PARAMETERS
016232  004737  016454                PRG1R   JSR     7,LOOP            ;GO LOOP TRANSMITTER
016236  005777  163010                PRG1B   TST     @BAR              ;WAIT FOR ALL LINES TO FIN SH
016242  001375                              BNE     PRG1B             ;BRANCH IF NOT DONE
016244  005077  163000                PRG1C   CLR     @CSR              ;CLEAR THE CSR
016250  005037  016264                        CLR     PRG1D             ;CLEAR DELAY TIME
016254  117737  162623  016264              MOVB    @SWR+1,PRG1D      ;GET DELAY
016262  104400                              DELAY                     ;DELAY AS SPEC FIED
016264  000000                PPG1D   OPEN                            ;BY USER
016266  000761                        BP      PPG1P                   ;LOOP BACK
```

```
                                        ;PRG2- RECEIVER SCOPE LOOP
016270                                  PRG2                            ;BEGIN
016270  104000                                  TYPE                    ;TYPE PROGRAM
016272  017561                                  PRG2M                   ;TITLE
016274  004737  016402                          JSR     7,PARAM         ;GO GET USER PARAMETERS
016300  004737  016454                  PRG2R   JSR     7,LOOP          ;GO START TRANSMITTER
016304  012777  000001  162736          PRG2A   MOV     #BIT0,@CSR      ;SET GO,CLEAR THE OTHERS
016312  005777  162734                  PRG2AA  TST     @BAR            ;HAVE ALL LINES SELECTED F N SHED
016316  001415                                  BEQ     PRG2B           ;BRANCH IF FINISHED TRANSMITTING
016320  105777  162724                          TSTB    @CSR            ;WAIT FOR THE RECE VER TO
016324  100372                                  BPL     PRG2AA          ;RECEIVE A CHARACTER
016326  042777  000200  162714                BIC     #BIT7,@CSR      ;CLEAR RECEIVER FLAG
016334  020127  001504                          CMP     %1,#TUMTAB+176  ;IS THE POINTER AT THE END OF THE TT
016340  001002                                  BNE      +6             ;BRANCH IF NOT
016342  012701  001304                          MOV     #TUMTAB-2,%1    ;RESET POINTER
016346  005721                                  TST     (1)+            ;INCREMENT POINTER
016350  000755                                  BR      PRG2A           ;GO BACK & TEST TRANSMITTER FLAG
016352  005077  162672                  PRG2B   CLR     @CSR            ;CLEAR THE CSR
016356  005077  162670                          CLR     @BAR            ;CLEAR THE BAR
016362  005037  016376                          CLR     PRG2C           ;CLEAR USER DELAY
016366  117737  162511  016376                MOVB    @SWR+1,PRG2C    ;LOAD USER DELAY
016374  104400                                  DELAY                   ;DELAY AS SPECIFIED
016376  000000                          PRG2C   OPEN                    ;BY USER
016400  000737                                  BR      PRG2R           ;REPEAT LOOP


                                        ;SUBROUTINE TO GET USER PARAMETERS (FOR PRG1 & 2)
016402  104000                          PARAM   TYPE                    ;ASK USER WHICH L NE
016404  017600                                  LINPAR                  ;TO TEST
016406  004537  004124                          JSR     5,RECD          ;GET LINE AND PUT IT
016412  000000                          L NE    0                       ;HERE
016414  104000                          PARAMA  TYPE                    ;ASK USER HOW MANY
016416  017623                                  HOWMAN                  ;CHARACTERS TO TRANSMIT
016420  004537  004124                          JSR     5,RECD          ;GET CHARS AND PUT IT
016424  000000                          CHARS   0                       ;HERE
016426  023727  016424  000310                CMP     CHARS,#200      ;LIMIT RESPONSE TO 200
016434  101403                                  BLOS    PARAMB          ;(CORE LIMITATION)
016436  104000                                  TYPE
016440  017444                                  M1
016442  000764                                  BR      PARAMA          ;RE-REQUEST PARAMETER
016444  104000                          PARAMB  TYPE                    ;TYPE INSTRUCTIONS
016446  017467                                  M4
016450  104015                                  CNTLU                   ;GO GET VALUE
016452  000207                                  RTS     -               ;EXIT


                                         SUBROUTINE TO TRANSMIT DATA FROM THE SR
016454  117737  162422  016564          LOOP    MOVB    @SWR,OUTBUF     ;FILL OUTPUT
016462  004537  005732                          JSR     5,BMOVE         ;BUFFER
016466  016564                                  OUTBUF                  ;WITH
016470  016565                                  OUTBUF+1                ;DATA TO BE
016472  000307                                  199                     ;TRANSMITTED
016474  012777  001106  162554                MOV     #CAT,@BASREG    ;INITIALIZE BASE REGISTER
016502  012737  016564  001106                MOV     #OUTBUF,CAT     ;LOAD CURRENT
016510  004537  005732                          JSR     5,BMOVE         ;ADDRESS TABLE
```

```
016514  001106                          CAT                     ;WITH ADDRESS
016516  001110                          CAT+2                   ;OF OUTPUT BUFFER
016520  000040                          32
016522  013737  016424  001146          MOV     CHARS,WCT       ;LOAD WORD COUNT
016530  005437  001146                  NEG     WCT             ;FORM TWO'S COMPLEMENT
016534  004537  005732                  JSR     5,BMOVE         ;TABLE WITH
016540  001146                          WCT                     ;NUMBER OF
016542  001150                          WCT+2                   ;CHARACTERS TO BE
016544  000040                          32                      ;TRANSMITTED
016546  013737  016412  001272          MOV     LINE,LINBIT     ;SAVE LINES TO BE TRANSMITTED ON
016554  013777  016412  162470          MOV     LINE,@BAR       ;START TRANSMITTING ON SELECTED LINES
016562  000207                          RTS     PC              ;EXIT


016564  000000                  OUTBUF  0                       ;FIRST ADDRESS OF 100
        016730                          =OUTBUF+100             ;CHARACTER OUTPUT BUFFER
016770  000000                  INBUF   0                       ;FIRST ADDRESS OF 100
        017074                          =INBUF+100              ;CHARACTER INPUT BUFFER (WHERE RECEIVED
                                                                DATA IS STORED)

017074  013746  000006          SUSWPP  MOV     @#6,-(SP)               ;SAVE VECTORS
017100  013746  000004                  MOV     @#4,-(SP)
017104  012737  017124  000004          MOV     #1$,@#4                 ;SET UP FOR TIMEOUT
017112  022777  177777  161762          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
017120  001402                          BEQ     2$
017122  000407                          BR      3$
017124  022626                  1$      CMP     (SP)+,(SP)+             ;ADJUST STACK
017126  012737  000176  001102  2$      MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
017134  012737  000174  001104          MOV     #DISPREG,DISPLAY                ;POINT TO SOFT DISPLAY REG
017142  012637  000004          3$      MOV     (SP)+,@#4               ;RESTORE VECTORS
017146  012637  000006                  MOV     (SP)+,@#6
017152  000002                          RTI


                        ;ROUTINE TO CHECK FOR  G BEING TYPED

017154  022737  000176  001102  KBDINTT CMP     #SWREG,SWR
017162  001021                          BNE     1$
017164  023737  000042  000046          CMP     @#42,@#46       ;ACT11?
017172  001415                          BEQ     1$              ;BR IF YES
017174  005037  017266                  CLR     TMP1                    ;CLEAR TEMP AREA
017200  117737  162372  017266          MOVB    @TKDBR,TMP1             ;FETCH THE BUFFER
017206  142737  000200  017266          BICB    #200,TMP1               ;STRIP OFF PARITY
017214  122737  000007  017266          CMPB    #7,TMP1                 ;WAS IT  G
017222  001001                          BNE     1$                      ;NOP
017224  104015                          CNTLU                           ;GO CHANGE  T
017226  000002                  1$      RTI                             ;EXIT


                        ;ROUTINE TO CHANGE CONTENTS OF SWREG+LOC 176

017230  022737  000176  001102  CNTLUU  CMP     #SWREG,SWR
017236  001023                          BNE     FUX
017240  104000                          TYPE
017242  017323                          $SWREG
017244  004537  005662                  JSR     R5,OACNV                ;CONVERT TO ASCII
```

```
017250  000176                          SWREG
017252  017331                          $VALUE
017254  000006                          6
017256  104000                          TYPE
017260  017331                          $VALUE
017262  004537  004124                  JSR     5,RECD          ;GET TMP1 AND PUT IT
017266  000000                  TMP1    0                       ;HERE
017270  022737  000007  004302          CMP     #7,CNT
017276  001403                          BEQ     FJX
017300  013777  017266  161574          MOV     TMP1,@SWP               ;CHANGE CONTENTS OF SWREG
017306  000002                  FJX     RT
```

```
                                        ;MESSAGES
017310  053045  041505  020124  WHERE   ASCII   '%VECT ADR?@
017316  042101  037522     100
017323     045  053523  036522  $SWREG  ASCII   '%SWR=@'
017330     100
017331     040  020040  020040  $VALUE  ASCII   '          NEW=@'
017336  020040  020040  047040
017344  053505  040075
017350  036445                  $CTLU   ASCII   '%='
017352  052445  044516  021524  WHICH   ASCII   '%UNIT#(8)?@'
017360  034050  037451     100
017365     045  044103  051101  LEVEL   ASCII   '%CHAR LNGTH@'
017372  046040  043516  044124
017400     100
017401     045  051105  020122  ERDAT   ASCII   '%ERR S B  '
017406  027523  035102     040
017413     040  020040  020040  AASB    ASCII   '       WAS  '
017420  020040  040527  035123
017426     040
017427     040  020040  020040  AWAS    ASCII   '      @'
017434  040040
017436  050045  043522  040043  M0      ASCII   '%PRG#@'
017444  037445     100          M1      ASCII   '%?@'
017447     045  047105  040104  M2      ASCII   '%END@'
017454  051445  036522  037460  M3      ASCII   '%SP=0? GO @'
017462  043440  027117     100
017467     045  042114  041440  M4      ASCII   '%LD CHAR IN SP0-7,DLY IN SP5-15@'
017474  040510  020122  047111
017502  051440  030122  033455
017510  042073  054514  044440
017516  020116  051123  026470
017524  032461     100
017527     045  047514  044507  PRGOM   ASCII   '*LOGIC TSTS@'
017534  020103  051524  051524
017542     100
017543     045  046530  052111  PRG1M   ASCII   '%XMITTER LOOP@'
017550  042524  020122  047514
017556  050117     100
017561     045  046530  052111  PRG2M   ASCII   '%XMIT/RE. LOOP@'
017566  051057  041505  046040
017574  047517  040120
017600  052045  050131  046040  LINPAR  ASCII   '*TYP LINES TO TST @'
017606  047111  051505  052040
017614  020117  051524  020124
017622     100
017623     045  047443  020106  HOWMAN  ASCII   '*#OF CHARS?@'
017630  044103  051101  037523
017636     100
017637     045  020122          EMO     ASCII   '%R '
017642  020040  050040  036503  ATNUMB  ASCII   '   PC='
017650  020040  020040  020040  APC     ASCII   '      @'
017656     100
017657     015     012          MSG1    BYTE    15,12
017661     124  042510  050440          ASCII   'THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 1234567890'
017666  044525  045503  041040
017674  047522  047127  043040
```

```
017702  054117  045040  046525
017710  042520  020104  053117
017716  051105  052040  042510
017724  046040  055101  020131
017732  047504  051507  041040
017740  041501  020113  031061
017746  032063  033065  034067
017754  030071
        000001                          END
```

```
A      = 000000   CAT     001106   ERROR = 104001   L NE12= 000024   PAR5    006546
AASB     017413   CC      = 177776 ERROR1= 104011   L NE13= 000026   PAR6    006550
APC      017650   CHALT   = 104003 ERRVEC= 000004   L NE14= 000030   PASS    001624
APCADD   001610   CHARS     016424   ERR1     001672   LINE15= 000032   PCADD   001606
AREA     013234   CLKINT    001260   ESCOPE   002406   L NE16= 000034   PFAIL   004304
ATNUMB   017642   CLKLVL    001262   FJX      017306   LINE17= 000036   POPSP   = 005726
AWAS     017427   CNT       004302   FORWD    002554   L NE2 = 000004   POPSP2= 022626
A12K     013254   CNTLU   = 104015   FORWDA   002600   L NE3 = 000006   PRGLIM  001522
A16K     013260   CNTLUU    017230   GETRDY   002306   LINE4 = 000010   PRGNUM  002162
A20K     013264   CNVDAT    002040   GTBIN    005612   LINE5 = 000012   PRGTAB  001524
A24K     013270   COUNT     001604   GTLINB   006552   LINE6 = 000014   PRG0    006604
A28K     013274   CSR       001250   GTRDYA   002324   LINE7 = 000016   PRGOM   017527
A8K      013244   CURTST    001510   GTRDYC   002346   LINPAR  017600   PRGOR   006626
BAR      001252   DATCHK= 104002   GTRDYD   002370   LOOP    016454   PRG1    016222
BASREG   001256   DATTST    006020   GTRDYX   002314   LTSTO   011162   PRG1B   016236
BAT      001206   DATO      014252   HOWMAN   017623   LTST1   011200   PRG1C   016244
BELL   = 000007   DAT1      014270   ICTR     001516   LTST10  011342   PRG1D   016264
BIT0   = 000001   DAT1AA    00o024   INBIN    005562   LTST11  011360   PRG1M   017543
BIT1   = 000002   DAT10     014432   INBUF    016730   LTST12  011376   PRG1R   016232
BIT10  = 002000   DAT11     014450   INCRTN   001626   LTST13  011414   PRG2    016270
BIT11  = 004000   DAT12     014466   INIT     003142   LTST14  011432   PRG2A   016304
BIT12  = 010000   DAT13     014504   INITIA= 104012   LTST15  011450   PRG2AA  016312
BIT13  = 020000   DAT14     014522   KBDIN  = 104014   LTST16  011466   PRG2B   016352
BIT14  = 040000   DAT15     014540   KBDINT   017154   LTST17  011504   PRG2C   016376
BIT15  = 100000   DAT16     014556   KSTART   001506   LTST2   011216   PRG2M   017561
BIT2   = 000004   DAT17     014574   LBIT0  = 000001   LTST3   011234   PRG2R   016300
BIT3   = 000010   DAT2      014306   LBIT1  = 000002   LTST4   011252   PRTY0  = 000000
BIT4   = 000020   DAT3      014324   LBIT10= 000400   LTST5   011270   PRTY1  = 000040
BIT5   = 000040   DAT4      014342   LBIT11= 001000   LTST6   011306   PRTY2  = 000100
BIT6   = 000100   DAT5      014360   LBIT12= 002000   LTST7   011324   PRTY3  = 000140
BIT7   = 000200   DAT6      014376   LBIT13= 004000   MACHER  000004   PRTY4  = 000200
BIT8   = 000400   DAT7      014414   LBIT14= 010000   MANUAL= 100000   PRTY5  = 000240
BIT9   = 001000   DELAY   = 104400   LBIT15= 020000   MSG1    017657   PRTY6  = 000300
BKCSR    001254   DISPLA    001104   LBIT16= 040000   M0      017436   PRTY7  = 000340
BMOVE    005732   DISPRE    000174   LBIT17= 100000   M1      017444   PRVCNT  001612
BRKTST   005164   DLY       005506   LBIT2  = 000004   M2      017447   PSW    = 177776
BRK0     013712   DLYXMT    005310   LBIT3  = 000010   M3      017454   PT0     005606
BRK1     013730   DMPAR     003172   LBIT4  = 000020   M4      017467   PT1     005610
BRK10    014072   DMPARB    003454   LBIT5  = 000040   NOF    = 000240   PWRUP   004314
BRK11    014110   DMPARC    003600   LBIT6  = 000100   NXTSI   001514   RCVDAT  001274
BRK12    014126   DTCHK     001634   LBIT7  = 000200   OACNV   005662   RCVTST  004542
BRK13    014144   EHALT   = 104004   LENGTH   003620   OACNVA  005674   RCV0    011522
BRK14    014162   EM0       017637   LENOKA   003636   OPEN   = 000000   RCV1    011540
BRK15    014200   EMTINT    002606   LENOKB   003646   OUTBUF  016564   RCV10   011702
BRK16    014216   EMTTAB    001540   LENOKC   003654   OVRLAY  004100   RCV11   011720
BRK17    014234   FRDAT     017401   LENOKD   003714   PARAM   016402   RCV12   011736
BRK2     013746   ERR       001654   LEVEL    017365   PARAMA  016414   RCV13   011754
BRK3     013764   ERRA      001712   LINBIT   001272   PARAMB  016444   RCV14   011772
BRK4     014002   ERRB      001754   LINE     016412   PAR0    006534   RCV15   012010
BRK5     014020   ERRC      001762   LINE0  = 000000   PAR1    006536   RCV16   012026
BRK6     014036   ERRD      002014   LINE1  = 000002   PAR2    006540   RCV17   012044
BRK7     014054   ERREX     002034   LINE10= 000020   PAR3    006542   RCV2    011556
CAPMSK   001300   ERRHLT    002032   LINE11= 000022   PAR4    006544   RCV3    011574
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PCV4    011612          RT121   014332          RT21    010456          RT62    011762          TIME14  004076
PCV5    011630          RT122   014350          RT21A   010466          RT63    012000          TKCSR   001574
PCV6    011646          RT123   014366          RT22    010564          RT64    012016          TKDBR   001576
PCV7    011664          RT124   014404          RT22A   010574          RT65    012034          TMP1    017266
PECD    004124          RT125   014422          RT23    010672          RT66    012054          TPCSR   001600
PIND    005604          RT126   014440          RT23A   010702          RT66A   012070          TPDBR   001602
PNGEN   002756          RT127   014456          RT24    011000          RT67    012314          TTDAT   001270
PORPAR  006472          RT13    007652          RT24A   011010          RT67A   012324          TUMTAB  001306
PP1     003024          RT13A   007662          RT25    011044          RT7     007302          TYP     003030
PP2     003026          RT130   014474          RT25A   011054          RT7A    007312          TYPA    003040
PSTART  001532          RT131   014512          RT26    011152          RT70    012424          TYPC    003056
PSTAT1  002134          RT132   014530          RT27    011170          RT70A   012434          TYPD    003074
PSTAT2  002222          RT133   014546          RT3     007032          RT71    012540          TYPDAT  003140
PSTPC   002734          RT134   014564          RT3A    007042          RT71A   012550          TYPE  = 104000
PSTPSW  002736          RT135   014602          RT30    011206          RT72    012734          TYPF    003112
PSTREG= 104010          RT135A  014612          RT31    011224          RT72A   012744          TYPG    003124
PSTRG   002700          RT136   015202          RT32    011242          RT73    013300          UNIT    003474
PTLAST= 177777          RT136A  015212          RT33    011260          RT73A   013310          UNTOKA  003514
PTNNO   001512          RT137   015516          RT34    011276          RT74    013514          UNTOKB  003540
PTO     006644          RT137A  015526          RT35    011314          RT74A   013524          UNTOKC  003570
PTOA    006654          RT14    007764          RT36    011332          RT75    013702          VAC     001246
PT1     006706          RT14A   007774          RT37    011350          RT76    013720          VECOK   003374
PT1A    006716          RT140   015534          RT4     007104          RT77    013736          VECOKA  003404
PT10    007354          RT140A  015544          RT4A    007114          SAVREG= 104007          VECOKB  003412
RT10A   007364          RT141   015552          RT40    011366          SAVPG   002640          VECTOR  003356
RT100   013754          RT141A  015562          RT41    011404          SCOPE = 104006          WCT     001146
RT101   013772          RT142   015570          RT42    011422          SCOPEA  002444          WHERE   017310
RT102   014010          RT142A  015600          RT43    011440          SCOPEB  002450          WH CH   017352
RT103   014026          RT143   015606          RT44    011456          SCOPED  002504          X     = 000146
RT104   014044          RT143A  015616          RT45    011474          SCOPTR  001520          XMITD   005754
RT105   014062          RT144   015624          RT46    011512          SPBOT   001100          XMTDAT  001276
RT106   014100          RT144A  015634          RT47    011530          SRESET= 104005          XMTINT  001264
RT107   014116          RT145   015642          RT5     007156          SPSET   002254          XMTLVL  001266
RT11    007426          RT145A  015652          RT5A    007166          SRSETT  002740          XMTTST  004330
RT11A   007436          RT146   016010          RT50    011546          START   002066          Y     = 000020
RT110   014134          RT146A  016020          RT51    011564          SUSWR = 104013          $CTLU   017350
RT111   014152          RT15    010024          RT52    011602          SUSWRR  017074          $ENDAD  002544
RT112   014170          RT15A   010034          RT53    011620          SVRPC   002674          $SWREG  017323
RT113   014206          RT16    010160          RT54    011636          SVRPSW  002676          $VALUE  017331
RT114   014224          RT16A   010170          RT55    011654          SWR     001102                =  017756
RT115   014242          RT17    010276          RT56    011672          SWREG   000176           BAR    001616
RT116   014260          RT17A   010306          RT57    011710          TIMEA   004000           BASRE  001622
RT117   014276          RT2     006760          RT6     007230          TIMEB   004034           BKCSR  001620
RT12    007516          RT2A    006770          RT6A    007240          TIMEC   004044           CSR    001614
RT12A   007526          RT20    010370          RT60    011726          TIMEP   003724
RT120   014314          RT20A   010400          RT61    011744          TIME1   004074

  ABS   017756      000


 ERRORS DETECTED   0

 .DZDMAC SEQ/NL SEQ=DZDMAC P11
 RUN-TIME  5 9  5 SECONDS
 RUN-TIME RATIO  426/15=27.5
 CORE USED  13K  (25 PAGES)
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