DQ11

RECEIVER AND XMT TESTS

MD-11-DZDQD-D

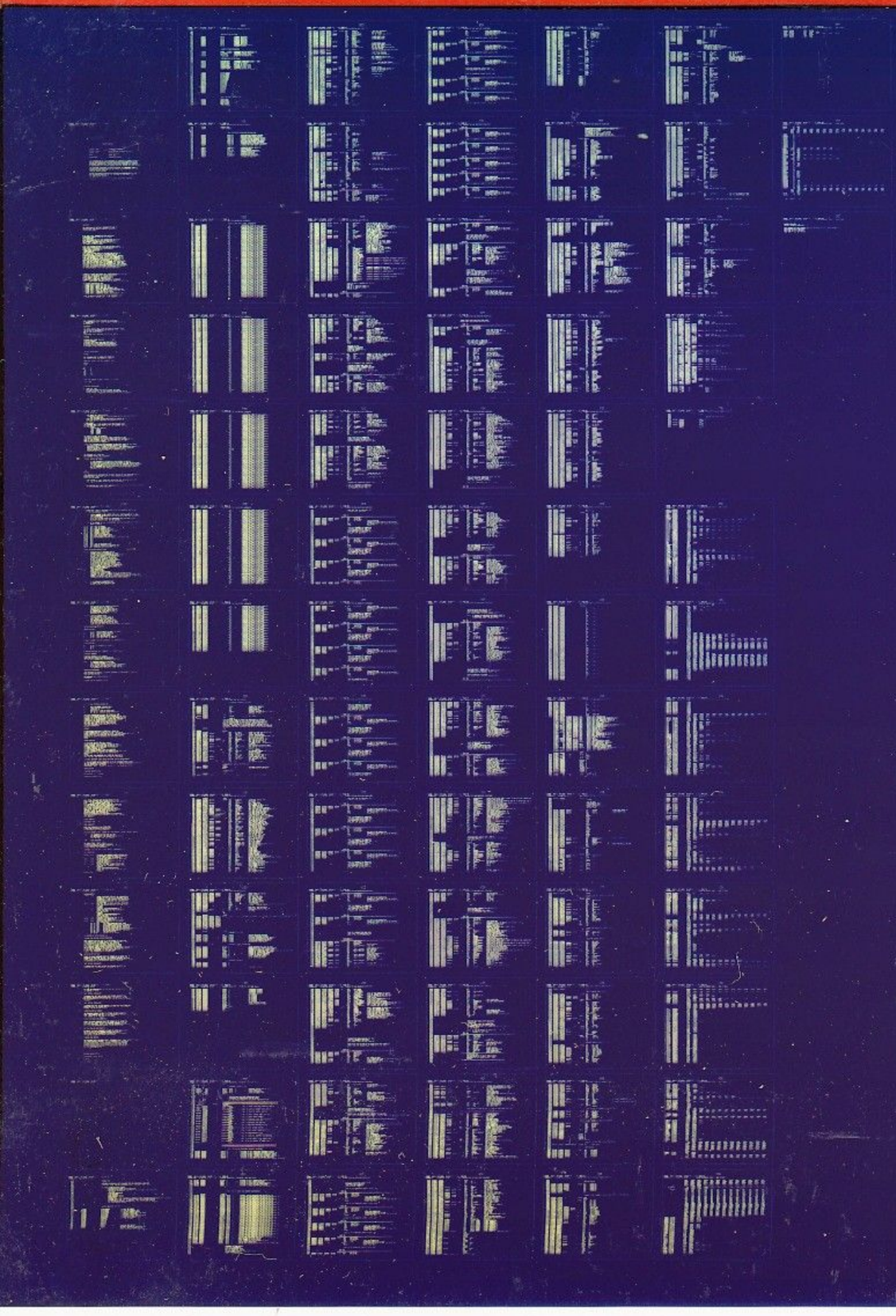
EP-DZDQD-D-DL-B

FICHE 1 OF 1

APR 1977

digital

MADE IN USA



BC1

EOF1DZDQCDSEQ	00010000	770325	PDP10 411	COHDR1DZDQDDSEQ	00010000	770325

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDQD-D-D

PRODUCT NAME: RECEIVER AND TRANSMITTER TESTS

DATE: MARCH 1977

MAINTAINER: DIAGNOSTIC GROUP

1. ABSTRACT

THE FUNCTION OF THE DQ11 DIAGNOSTICS ARE TO
VERIFY THAT THE OPTION OPERATES ACCORDING
TO SPECIFICATIONS.

THIS TEST TEST TRANSMITTER AND RECEIVER
CHARACTER LENGTHS FROM 00 TO 16 BITS
PER CHARACTER.
ALSO DATA REALIBILITY FOR TRANSMITTER,RECEIVER
AND TRANSMITTER AND RECEIVER TOGETHER.
CABLE TEST TRANSFERS 400 CHARACTERS THROUGHT
THE CABLE TO VERIFY CABLE.

WHEN THE PROGRAM ENTERS TEST #56 ON EACH FIRST
TIME AFTER STARTING OR IF THERE ARE MULTIPLE DQ11'S
UNDER TEST; A MESSAGE WILL BE PRINTED:
"CHARACTERS DECTECTED"
"CHAR ADDRESS".
THIS TEST IS DONE ONLY IF THE DQ11-BB OPTION IS
NOT INSTALLED. THIS TEST IS DETERMINING THE
STRAP-SELECTABLE CHARS ON THE M7818 MODULE. DEFAULT
CHAR AND ADDRESS IS "CHAR 177777" AND "ADDRESS 17".
THIS MAY BE CHANGED AS PER CUSTOMER PREFERANCES AND
SHOULD BE PRINTED OUT ACCORDINGLY. IF THERE IS
ONLY ONE DQ11 UNDER TEST THIS MESSAGE WILL BE PRINTED
ONLY ONCE AFTER EACH START OF PROGRAM. IF THERE ARE
MULTIPLE DQ11'S THIS WILL BE PRINTER EACH TIME THROUGH
THE TEST. THE ABOVE DESCRIBED MESSAGE IS *NOT* AN ERROR
BUT MUST BE VERIFIED TO "WHAT WAS PRINTED OUT MATCHES
THE M7818 MODULE". SEE TEST #56 FOR MORE DETAIL.

CURRENTLY THERE ARE SEVEN OFF LINE DIAGNOSTICS THAT ARE
TO BE RUN IN SEQUENCE TO INSURE THAT IF AN
ERROR SHOULD OCCUR IT WILL BE DETECTED
AT AN EARLY STAGE AND INSURING THAT
DIAGNOSIS OF ERROR WILL BE IMMEDIATE TO PROBLEM
NOTE: ADDITIONAL DIAGNOSTICS MAY BE ADDED IN THE FUTURE.

THE SEVEN DIAGNOSTICS ARE:
1. DZDQA [REV] BASIS R/W TEST #1
2. DZDQB [REV] BASIC R/W TEST #2
3. DZDQC [REV] BASIC MPR AND INTERUPT TEST
4. DZDQD [REV] RECEIVER TRANSMITTER EXERCISER TEST
5. DZDQE [REV] MISC. RX AND TX TESTS. PLUS BCC TESTS.
6. DZDQF [REV] CHARACTER DETECT TESTS.
7. DZDQH [REV] CHARACTER LENGTH AND INTERRUPT TESTS.

THERE IS ALSO AN ONLINE TEST TO BE DISCUSED LATER.
1. DZDQO [REV] ONLINE TEST. (ITEP OVERLAY)

AND A PARAMETER INPUT PROGRAM IS AVAILABLE
1. DZDQG [REV] DQ11 TRIAL PROGRAM (PARAMETER INPUT)

2. REQUIREMENTS

2.1 EQUIPMENT

ANY PDP11 FAMILY CPU (WITH MINIMUM 8K MEMORY)-WITH
 OR WITHOUT A HARDWARE SWITCH REGISTER (LOC. 177570)
ASR 33 (OR EQUILIVALENT)
DQ11
SYNC MODEM (ONLY REQUIRED FOR ONLINE TEST)

2.2 STORAGE

PROGRAM WILL LOAD AND RUN
IN 8K OF MEMORY.
LOCATION 1400 THRU 1600 ARE ESPECIALLY TO
BE NOTED AND TO BE UNTOUCHED BY OPERATOR
AFTER DQ11 TRIAL PROGRAM HAS BEEN EXECUTED.
OR AFTER THE "AUTO SIZING" HAS BEEN DONE.

3. LOADING PROCEEDURE

3.1 METHOD

ALL PROGRAMS ARE IN ABSOLUTE FORMAT AND
ARE LOADED USING THE ABSOLUTE LOADER.

ABSOLUTE LOADER STARTING ADDRESS *500

MEMORY SIZE	*
4K	17
8K	37
12K	57
16K	77
20K	117
24K	137
28K	157

3.1.1 LOAD THE ADDRESS OF ABS. LOADER (LOC.XXX500)

3.1.2 THEN START

4. STARTING PROCEEDURE

A. LOAD LOC. 200
B. SET SWR TO ZERO FOR "AUTO SIZING" OR LEAVE
   LEAVE SWR BIT 7=1 TO USE EXISTING PARAMETERS SET UP
   BY DQ11 TRIAL PROGRAM OR A PREVIOUSLY RUN DQ11 DIAGNOSTIC

THAT USED THE "AUTO SIZING".
****REFER TO SECTION 4.1 FOR SOFTWARE SWITCH REGISTER OPERATION
AND OPTIONS.****
NOTE:THE SOFTWARE SWITCH REGISTER IS LOCATED AT LOC.176
SOFTWARE DISPLAY REGISTER IS LOCATED AT LOC.174

C.THEN START
THE PROGRAM WILL TYPE MAINDEC NAME AND PROGRAM NAME
IF THIS WAS THE FIRST START UP OF THE PROGRAM) AND ALSO
THE FOLLOWING:
"MAP OF DQ11 STATUS"
1400 160010
1402 152300
1404 160020
1406 150310

THE ABOVE IS ONLY AN EXAMPLE!
THIS WOULD INDICATE THE STATUS TABLE STARTING AT ADD.
1400 IN THE PROGRAM. THE STATUS TABLE MUST BE VERIFIED BY THE
USER IF AUTO SIZING IS DONE. FOR INFORMATION OF STATUS
TABLE SEE SECTION 8.4 FOR HELP.

****IF THE SOFTWARE SWITCH REGISTER IS SELECTED THEN THE FOLLOWING
WILL BE TYPED AFTER THE PROGRAM IDENTIFIES ITSELF:
SWR=XXXXXX NEW= (REFER TO SECTION 4.1 FOR OPERATOR'S OPTION)****
NOTE:IF USING THE SOFTWARE SWITCH REGISTER WHEN A HARDWARE
SWITCH REGISTER IS AVAILABLE THE PROGRAM WILL NOT
TYPE OUT THE TITLE.

THE PROGRAM WILL TYPE "R"
AND PROCEED TO RUN THE DIAGNOSTIC

4.1 CONTROL SWITCH SETTINGS

IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH
REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS
THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER.
IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES
AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH
REGISTER (LOC. 176) IS USED.

CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH
REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY
DOING THE FOLLOWING:

1) TYPE CONTROL G (↑G): THIS WILL ALLOW THE TTY TO ENTER DATA INTO
LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.

2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS
OF THE SOFTWARE SWITCH REGISTER.)

3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE
OF THE FOLLOWING AT THE TTY:

A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>.
(ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS
WILL BE ALLOWED)
IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH
REGISTER CONTENTS WILL NOT BE CHANGED.

B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU
BACK TO STEP 2.

SW 15 SET: HALT ON ERROR
SW 14 SET: LOOP ON CURRENT TEST
SW 13 SET: INHIBIT ERROR PRINT OUT
SW 12 SET: INHIBIT TYPE OUT/BELL ON ERROR.
SW 11 SET: INHIBIT ITERATIONS
SW 10 SET: ESCAPE TO NEXT TEST
SW 09 SET: LOOP WITH CURRENT DATA
SW 08 SET: CATCH ERROR AND LOOP ON IT
SW 07 SET: USE PREVIOUS STATUS TABLE. CLR-DO AUTO SIZE.
SW 06 SET:
SW 05 SET:
SW 04 SET:
SW 03 SET:
SW 02 SET: LOCK ON SELECTED TEST
SW 01 SET: RESTART PROGRAM AT SELECTED TEST
SW 00 SET: RESELECT DQ11'S DESIRED ACTIVE.

4.1.2 SWITCH REGISTER RESTRICTIONS

SW 00 RESELECT DQ11'S DESIRED ACTIVE.
PLEASE NOTE THAT A MESSAGE IS TYPED
OUT FOR SWITCH REGISTER BEING EQUAL TO DQ11'S
ACTIVE. THIS MEANS IF THE SYSTEM HAS
FOUR DQ11S; BITS 00,01,02,03 WILL
BE SET IN LOC "DQACTV". USING THIS
SWITCH ALTERS THAT LOCATION;THEREFORE
IF FOUR DQ11S ARE IN THE SYSTEM
DO NOT SET SWITCHS GREATER THAN
SW 03 IN THE UP POSITION. THIS WOULD BE
A FATAL ERROR. DO NOT SELECT MORE ACTIVE
DQ11S THAN HAS BEEN GIVEN INFORMATION
ABOUT IN TRIAL PROGRAM.

METHOD: A: LOAD ADDRESS 200
B: START WITH SW 00=1
C: PROGRAM WILL TYPE MESSAGE
D: CONTINUE THE BINARY NUMBER OF DQ11S DESIRED ACTIVE
EXAMPLE: 1=1 DQ11; 3=2 DQ11; 7=3 DQ11; 17=4 DQ11 37=5 DQ11 ETC.
E: NUMBER (IF VALID) WILL BE IN DATA LIGHTS (EXCLUDING 11/05, 11/04, 11/34)
F: CONTINUE WITH ANY OTHER SWITCH SETTINGS DESIRED.

SW 01 IT IS STRONGLY SUGGESTED THAT
AT LEAST ONE PASS HAS BEEN MADE
BEFORE TRYING TO SELECT A TEST

THAT IS NOT IN THE ORDER OF SEQUENCE
THE REASON BEING IS THAT THE
PROGRAM HAS TO CLEAR AREAS AND SET
UP PARAMETERS. ALSO WHEN A TEST IS
SELECTED ALWAYS START AT THE VERY
BEGINNING OF THAT TEST.

SW 09 LOOP ON CURRENT DATA:
THIS SWITCH WILL ONLY WORK IF
CALL "SCOP1" IS IN THAT TEST.
THE REASON BEING THAT MOST TESTS
DEAL WITH BLOCKS OF DIFFERENT DATA
TO BE SENT OR RECEIVED ALL AT ONCE
THUS IN BLOCK DATA; ONE PATTERN CANN'T BE SINGLED OUT.

4.1.3 SWITCH REGISTER PRIORITYS

ERROR SWITCHES

1. SW 12 DELETE PRINT OUT/BELL ON ERROR.
2. SW 13 DELETE ERROR PRINTOUT.
3. SW 15 HALT ON THE ERROR.
4. SW 08 GOTO BEGINNING OF THE TEST.
5. SW 10 GOTO NEXT TEST ON ERROR.

****HLT (ERROR) ROUTINE SUPPORTS <↑G> OPERATION****

SCOPE SWITCHES

1. SW 09 (IF ENABLED BY "SCOP1")
2. SW 14
3. SW 11

****SCOPE ROUTINE WILL SUPPORT <↑G> OPERATION****

4.2 STARTING ADDRESS

STARTING ADDRESS IS AT 000200
THERE ARE NO OTHER STARTING ADDRESSES
FOR THE DQ11 DIAGNOSTICS PREVIOUSLY MENTIONED

NOTE: IF ADDRESS 000042 IS NON-ZERO
THE PROGRAM ASSUMES IT IS UNDER
ACT11 OR DDP CONTROL AND WILL ACT ACCORDINGLY
AFTER *ALL* AVAILABLE DQ11'S ARE TESTED
THE PROGRAM WILL RETURN TO "DDP2" OR "ACT-11".

5. OPERATING PROCEDURE

WHEN PROGRAM IS INITIALLY STARTED MESSAGES AS DESCRIBED IN SECTION
FOUR WILL BE PRINTED.

AND PROGRAM WILL BEGIN RUNNING THE
DIAGNOSTIC

5.2 PROGRAM AND/OR OPERATOR ACTION

THE TYPICAL APPROACH SHOULD BE

1. HALT ON ERROR (VIA SW 15=1)
   WHEN EVER AN ERROR OCCURS
2. CLEAR SW 15
3. SET SW 14: (LOOP ON THIS TEST)
4. SET SW 13: (INHIBIT ERROR PRINT OUT)

THE TEST NUMBER AND PC WILL BE TYPED OUT AND
POSSIBILY AN ERROR MESSAGE (THIS DEPENDS ON THE TEST)
TO GIVE THE OPERATOR AN IDEA AS TO THE SOURCE OF THE
PROBLEM. IF IT IS NECESSARY TO KNOW MORE INFORMATION
CONCERNING THE ERROR REPORT; LOOK IN THE LISTING
FOR THAT TEST NUMBER WHICH WAS TYPED OUT
AND THEN NOTE THE PC OF THE ERROR REPORT
THIS WAY THE EXACT FUNCTIONING OF THE TEST
CAN BE INTERPEDITED

6. ERRORS

AS DESCRIBED PREVIOUSLY THERE WILL ALWAY BE
A TEST NUMBER AND PC TYPED OUT AT THE TIME OF AN
ERROR (PROVIDING SW 13=0 AND SW 12=0). IN MOST CASES ADDITIONAL
INFORMATION WILL BE SUPPLIED THE THE ERROR MESSAGE
WHICH IS TO GIVE THE OPERATOR AN INDICATION OF THE
ERROR.

6.2 ERROR RECOVERY

IF FOR SOME REASON THE DQ11 SHOULD
"HANG THE BUS" (GAIN CONTROL OF BUS SO THAT
CONSOLE MANUAL FUNCTIONS ARE INHIBITED) AN INIT
OR POWER DOWN/UP IS NECESSARY FOR OPERATOR
TO REGAIN CONTROL OF CPU.
IF THIS SHOULD HAPPEN; LOOK IN LOCATION
"TSTNO" (ADDRESS 1226)FOR THE NUMBER OF THE TEST THAT
WAS RUNNING AT THE TIME OF THE CATASTROPHIC
ERROR.
IN THIS WAY THE OPERATOR WILL HAVE AN IDEA AS TO
WHAT THE DQ11 WAS DOING AT THE TIME OF THE ERROR.

6.3 ****HALT RECOVERY WHEN USING SOFTWARE SWITCH REGISTER****

IF THE SOFTWARE SWITCH REGISTER IS TO BE CHANGED AFTER A HALT
THE THE OPERATOR IS REQUIRED TO TYPE A ⟨↑G⟩ BEFORE DEPRESSING CONTINUE.
THE FOLLOWING WILL BE TYPED:
SWR=XXXXXX NEW= (REFER TO SECTION 4.1 FOR OPERATOR OPTION)

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

SEE SECTION 4. (PLEASE)

7.2 OPERATING RESTRICTIONS

DQ11 TRIAL PROGRAM MUST BE RUN PRIOR TO THE
FIRST AND ONLY THE FIRST RUNNING OF ANY DQ11 DIAGNOSTIC
NOTE: IF NO PROGRAM OTHER THAN A
DQ11 DIAGNOSTIC WAS LOADED AFTER DQ11 TRIAL OR
IF CORE MEMORY HAS NOT BEEN CHANGED;OR IF THERE
IS NO DQ11 CONFIGURATION CHANGES; THE
DQ11 TRIAL PROGRAM NEED NEVER BE RUN AGAIN.
HOWEVER IF ANY OF THE ABOVE HAVE BEEN VIOLATED
THE DQ11 TRIAL PROGRAM MUST BE RUN AGAIN
BEFORE RUNNING THE DIAGNOSTICS
NOTE: AN ALTERNATIVE TO THE ABOVE IS ATTEMPTING
THE "AUTO SIZING" WHEN PROGRAM IS INITIALLY STARTED
WITH SW07=0.

8. MISCELLANEOUS

8.1 EXECUTION TIME

8.2 PASS COMPLETE

WHEN THE DIAGNOSTIC HAS COMPLETED
A PASS THE FOLLOWING IS AN EXAMPLE
OF THE PRINT OUT TO BE EXPECTED.

END PASS DZDQD-D CSR: 160000 VEC: 300 PASSES: 000001 ERRORS: 000000

NOTE: THE NUMBERS FOR CSR AND VEC ARE
NOT NECESSARILY THE VALUES FOR THE DEVICE
THEY ARE ONLY FOR THIS EXAMPLE.

8.3 TST1 (MINI MONITOR)

THE VERY FIRST "TEST" (TST1)
IS *NOT* A TEST OF THE DQ11 HARDWARE
IT IS A MINI-MONITOR USED TO CYCLE DQ11 IN THE
SYSTEM THROUGH THE DIAGNOSTIC.

REMEMBER: TST1 IS NOT A TEST OF DQ11 HARDWARE!!!!!!!

8.4 KEY LOCATIONS

RETURN	(1214)	CONTAINS THE ADDRESS WHERE PROGRAM WILL RETURN WHEN ITERATION COUNT IS REACHED OR IF LOOP ON TEST IS ASSERTED.
NEXT	(1216)	CONTAINS THE ADDRESS OF THE NEXT TEST TO BE PEFORMED.
TSTNO	(1226)	CONTAINS THE NUMBER OF THE TEST NOW BEING PEFORMED.
RUN	(1304)	THE BIT IN "RUN" ALWAYS POINTS ONE PAST THE DQ11 CURRENTLY BEING TESTED. EXAMPLE: (RUN) 1304/0000000001000000 MEANS THAT DQ11 NO.05 IS THE DQ11 NOW RUNNING.
DQCR00-DQCR17		

DQSTD0-DQST17
(1400)-(1476)

THESE LOCATIONS CONTAIN THE INFORMATION
NEEDED TO TEST UP TO 16 (DECIMAL) DQ11S
SEQUENTIALY. THEY CONTAIN THE CSR,VECTOR
AND STATUS CONCERNING THE CONFIGURATION
OF EACH DQ11.

DQACTV (1500) EACH BIT SET IN THIS LOCATION INDICATES
THAT THE ASSOCIATED DQ11 WILL BE TESTED
IN TURN.
EXAMPLE:
(DQACTV) 1500/0000000000011111
MEANS THAT DQ11 NO. 00,01,02,03,04
WILL BE TESTED.
EXAMPLE:
(DQACTV) 1500/0000000000010001
MEANS THAT DQ11 NO. 00,04
WILL BE TESTED.

DQCSR (1506) CONTAINS THE RECEIVER CSR OF THE
CURRENT DQ11 UNDER TEST.

DQSTAT (1510) CONTAINS THE STATUS OF THE CURRENT
DQ11 UNDER TEST.

BIT 15 SET: TWO SYNC CHARS/ONE SYNC CHAR
BIT 14 SET: TEST JUMPER INSTALLED/NOT INSTALLED
BIT 13 SET: BB OPTION INSTALLED/NOT INSTALLED
BIT 12 SET: BA OPTION INSTALLED/NOT INSTALLED
BIT 11 SET: ACTIVE ON FIRST NON-SYNC/ACTIVE AFTER NO. OF SYNC
BIT 10 SET: AB OPTION INSTALLED/NOT INSTALLED
BIT 09 SET: ODD VRC/EVEN VRC
BIT 00-08 VECTOR "A" OF DEVICE

8.5 *** METHOD OF AUTO SIZING ***

8.5.1 FINDING THE CONTROL STATUS REGISTER.

WHEN LOOKING FOR THE CSR IT IS NECESSARY TO TAKE CARE
THAT WHEN A CSR IS FOUND THAT IT IS INDEED A DQ11. THAT
IS THE METHOD OF MY MADNESS FOR THIS ROUTINE.
AN ATTEMPT TO CLEAR THE MISC. REGISTER IS TRIED
IF A TIME-OUT TRAP OCCURES POINTERS ARE UPDATED
AND ATTEMPTED AGAIN, IF NO TIME-OUT; THE RECEIVER "ACTIVE BIT" (BIT 12)
IS SET AND A *COMPARE* FOR BOTH SYNC1 AND SYNC 2 IS DONE
AT THE MISC. REGISTER. IF THEY ARE THERE THIS IS
A DQ11. THE INFORMATION IS STORED AWAY.

8.5.2 ONE SYNC BIT OR TWO?

SINCE TOO MUCH HARDWARE MUST BE TURNED ON TO SENSE THE
PRESENTS OF ONE SYNC OR TWO. THE PROGRAM ASSUMES TWO SYNC
CHARS. NOTE: THIS ASSUMPTION MAY BE ALTERED AFTER AUTO SIZING
BY ALTERING BIT 15 IN APPRIOATE DQSTXX: LOCATION.

8.5.3 "BB" OPTION INSTALLED?

TO SENSE FOR THE "BB" OPTION THE PROGRAM SELECTS THE
CHARACTER DET. REGISTER AND THE LOADS IN ALL 1'S; IF

ANY ONE OR COMBINATION OF BITS ARE SET THE BB OPTION
IS ASSUMED TO EXIST.

8.5.4 "AB" OPTION INSTALLED?

TO SENSE FOR THE "AB" OPTION THE PROGRAM SELECTS THE
POLYNOMIAL REGISTER AND WRITES ALL 1'S INTO IT; IF ANY
ONE OR COMBINATION OF BITS ARE SET THE AB OPTION IS ASSUMED
TO EXIST.

8.5.5 "BA" OPTION INSTALLED?

TO SENSE FOR "BA" OPTION REQUEST TO SEND AND DATA TERMINAL
READY ARE SET; IF EITHER ONE OR BOTH ARE SET THE PROGRAM
ASSUMES THE BA OPTION EXISTES

8.5.6 JUMPER ON END OF CABLE?

THE PROGRAM CHECKS TO SEE IF EITHER OR BOTH CLEAR TO
SEND AND CARRIER ARE SET; IF SO THE PROGRAM ASSUMES THE
TEST JUMPER IS ON THE END OF THE CABLE.

8.5.7 ACTIVE ON FIRST NON-SYNC?

SINCE TOO MUCH HARDWARE MUST BE TURNED ON TO SENSE FOR
WHEN THE DQ11 GOES ACTIVE THE PROGRAM ASSUMES "ACTIVE
ON FIRST NON-SYNC". NOTE: THIS CAN BE CHANGED BY ALTERING
BIT 11 IN THE APPRIOATE DQSTXX: AFTER AUTO SIZING

8.5.8 SET FOR ODD OR EVEN PARITY?

AS ABOVE TOO MUCH HARDWARE IS NEED TO SENSE WHICH PARITY
WAS SELECTED.SO THE PROGRAM ASSEMES ODD PARITY.
NOTE: THIS CAN BE CHANGED BY ALTERING BIT 9 IN APPRIO-
ATE DQSTXX: LOCATION. AFTER AUTO SIZING

8.5.9 FINDING THE VECTOR.

THE PROGRAM SETS "PRIMARY DONE", "SECONDAY DONE", AND "INTERUPT ENABLE"
AND LOOKS FOR AN INTERUPT. IF IT INTERUPTS IT IS PICKED
UP AND STORED AWAY. IF NO INTERUPT OCCURES THE PROGRAM
ASSUMES VECTOR =300. THIS PROBLEM WILL BE FIXED IN ONE
OF THE DIAGNOSTICS AND *AUTO SIZING* SHOULD BE REDONE TO
GET THE CORRECT VECTOR.

9. PROGRAM DESCRIPTION

CONTAINED WITHIN LISTING

10. LISTING

FOLLOWING

```
                                .ENABLE AMA

                                ;MAINDEC-11-DZDQD-D/(377)/TRANSMITTER AND RECEIVER EXERCISER
                                ;COPYRIGHT 1975, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754

                                ;REVISED 16-DEC-76 BY R. BLACK
                                ;       A)SUPPORTS SOFTWARE SWITCH REGISTER
                                ;       B)SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER
                                ;         BY (↑G).
                                ;       ;STARTING PROCEDURE
                                ;       ;LOAD PROGRAM
                                ;       ;LOAD ADDRESS 000200
                                ;       ;PRESS START
                                ;       ;PROGRAM WILL TYPE "MAINDEC-11-DZDQD-D/(377)/TRANSMITTER AND RECEIVER EXERCISER"
                                ;       ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                ;       ;AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
                                ;       ;AND THEN RESUME TESTING


                                ;SWITCH REGISTER OPTIONS

  100000                        SW15=100000             ;=1,HALT ON ERROR
  040000                        SW14=40000              ;=1,LOOP ON CURRENT TEST
  020000                        SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
  010000                        SW12=10000              ;=1,DELETE TYPEOUT/BELL ON ERROR.
  004000                        SW11=4000               ;=1,INHIBIT ITERATIONS
  002000                        SW10=2000               ;=1,ESCAPE TO NEXT TEST ON ERROR
  001000                        SW09=1000               ;=1,LOOP WITH CURRENT DATA
  000400                        SW08=400                ;=1,LOOP ON ERROR
  000100                        SW06=100
  000040                        SW05=40
  000020                        SW04=20
  000010                        SW03=10
  000004                        SW02=4                  ;LOCK ON TEST SELECT
  000002                        SW01=2                  ;RESTART PROGRAM AT SELECTED TEST
  000001                        SW00=1                  ;RESELECT DQ11 DESIRED ACTIVE
                                                        ;NOTE: THIS MUST NOT EXCEED ORIGINAL COUNT
```

```
                                ;REGISTER DEFINITIONS
                                
000000                          R0=%0           ;GENERAL REGISTER
000001                          R1=%1           ;GENERAL REGISTER
000002                          R2=%2           ;GENERAL REGISTER
000003                          R3=%3           ;GENERAL REGISTER
000004                          R4=%4           ;GENERAL REGISTER
000005                          R5=%5           ;GENERAL REGISTER
000006                          SP=%6           ;PROCESSOR STACK POINTER
000007                          PC=%7           ;PROGRAM COUNTER
                                
                                ;LOCATION EQUIVALENCIES
                                
177570                          DSWR=   177570  ;HARDWARE SWITCH REGISTER LOC.
177570                          DLIGHTS=177570  ;HARDWARE DISPLAY REGISTER LOC.
177776                          PS=177776       ;PROCESSOR STATUS WORD
001200                          STACK=1200      ;START OF PROCESSOR STACK
                                
                                ;INSTRUCTION DEFINITIONS
                                
005746                          PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
005726                          POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
010046                          PUSHR0=10046    ;SAVE R0 ON STACK
012600                          POPR0=12600     ;RESTORE R0 FROM STACK
024646                          PUSH2SP=24646   ;DECREMENT STACK TWICE
022626                          POP2SP=22626    ;INCREMENT STACK TWICE
                                .EQUIV  EMT,HLT ;BASIC DEFINITION OF ERROR CALL
                                
                                
100000                          BIT15=100000
040000                          BIT14=40000
020000                          BIT13=20000
010000                          BIT12=10000
004000                          BIT11=4000
002000                          BIT10=2000
001000                          BIT9=1000
000400                          BIT8=400
000200                          BIT7=200
000100                          BIT6=100
000040                          BIT5=40
000020                          BIT4=20
000010                          BIT3=10
000004                          BIT2=4
000002                          BIT1=2
000001                          BIT0=1
                                
                                
                                ;DQ11 OPTIONAL DEFINITIONS
                                
002000                          ABBIT=2000
004000                          ACTBIT=4000
010000                          BABIT=10000
020000                          BBBIT=20000
040000                          JUMBIT=40000
```

```
                001000          ODDBIT=1000
                100000          SYNBIT=100000


                                ;DQ11 SECONDARY REGISTER DEFINATIONS

000000                          RXBA.P=0        ;RECEIVER BUS ADDRESS PRIMARY.
000001                          RXWC.P=1        ;RECEIVER WORD COUNT PRIMARY.
000002                          TXBA.P=2        ;TRANSMITTER BUS ADDRESS PRIMARY.
000003                          TXWC.P=3        ;TRANSMITTER BUS ADDRESS PRIMARY.
000004                          RXBA.S=4        ;RECEIVER BUS ADDRESS SECONDARY.
000005                          RXWC.S=5        ;RECEIVER WORD COUNT SECONDARY.
000006                          TXBA.S=6        ;TRANSMITTER BUS ADDRESS SECONDARY.
000007                          TXWC.S=7        ;TRANSMITTER WORD COUNT SECONDARY.

000010                          CHARDT=10       ;CHARACTER DETECT REGISTER.
000011                          SYNC.=11        ;SYNC REGISTER.
000012                          MISC.=12        ;MISCELLANEOUS REGISTER.
000013                          TX.MUX=13       ;TRANSMITTER MUX REGISTER.
000014                          SEQ.=14         ;SEQUENCE REGISTER.
000015                          RX.BCC=15       ;RECEIVER BCC REGISTER.
000016                          TX.BCC=16       ;TRANSMITTER BCC REGISTER.
000017                          POLY.=17        ;POLYNOMIAL REGISTER.
```

```
                                        ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
                 000000          .=0
        000000   000002                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000002   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000004   000006                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000006   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000010   000012                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000012   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000014   000016                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000016   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000020   000022                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000022   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000024   000026                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000026   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000030   000032                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000032   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000034   000036                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000036   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000040   000042                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000042   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000044   000046                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000046   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000050   000052                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000052   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000054   000056                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000056   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000060   000062                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000062   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000064   000066                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000066   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000070   000072                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000072   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000074   000076                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000076   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000100   000102                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000102   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000104   000106                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000106   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000110   000112                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000112   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000114   000116                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000116   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000120   000122                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000122   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000124   000126                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000126   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000130   000132                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000132   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000134   000136                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000136   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000140   000142                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000142   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000144   000146                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000146   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
        000150   000152                  .+2            ;UNEXPECTED TRAP TO THIS LOCATION
        000152   000000                  HALT           ;EXAMINE STACK TO FIND CAUSE
```

```
    723  000154  000156                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    724  000156  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    725  000160  000162                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    726  000162  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    727  000164  000166                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    728  000166  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    729  000170  000172                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    730  000172  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    731  000174  000176                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    732  000176  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    733  000200  000202                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    734  000202  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    735  000204  000206                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    736  000206  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    737  000210  000212                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    738  000212  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    739  000214  000216                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    740  000216  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    741  000220  000222                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    742  000222  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    743  000224  000226                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    744  000226  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    745  000230  000232                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    746  000232  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    747  000234  000236                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    748  000236  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    749  000240  000242                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    750  000242  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    751  000244  000246                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    752  000246  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    753  000250  000252                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    754  000252  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    755  000254  000256                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    756  000256  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    757  000260  000262                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    758  000262  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    759  000264  000266                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    760  000266  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    761  000270  000272                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    762  000272  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    763  000274  000276                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    764  000276  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    765  000300  000302                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    766  000302  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    767  000304  000306                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    768  000306  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    769  000310  000312                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    770  000312  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    771  000314  000316                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    772  000316  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    773  000320  000322                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    774  000322  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    775  000324  000326                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    776  000326  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
    777  000330  000332                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
    778  000332  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
```

F02


```
779  000334  000336                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
780  000336  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
781  000340  000342                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
782  000342  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
783  000344  000346                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
784  000346  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
785  000350  000352                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
786  000352  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
787  000354  000356                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
788  000356  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
789  000360  000362                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
790  000362  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
791  000364  000366                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
792  000366  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
793  000370  000372                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
794  000372  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
795  000374  000376                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
796  000376  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
797  000400  000402                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
798  000402  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
799  000404  000406                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
800  000406  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
801  000410  000412                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
802  000412  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
803  000414  000416                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
804  000416  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
805  000420  000422                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
806  000422  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
807  000424  000426                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
808  000426  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
809  000430  000432                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
810  000432  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
811  000434  000436                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
812  000436  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
813  000440  000442                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
814  000442  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
815  000444  000446                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
816  000446  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
817  000450  000452                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
818  000452  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
819  000454  000456                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
820  000456  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
821  000460  000462                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
822  000462  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
823  000464  000466                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
824  000466  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
825  000470  000472                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
826  000472  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
827  000474  000476                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
828  000476  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
829  000500  000502                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
830  000502  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
831  000504  000506                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
832  000506  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
833  000510  000512                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
834  000512  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
```

```
835  000514  000516          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
836  000516  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
837  000520  000522          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
838  000522  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
839  000524  000526          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
840  000526  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
841  000530  000532          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
842  000532  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
843  000534  000536          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
844  000536  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
845  000540  000542          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
846  000542  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
847  000544  000546          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
848  000546  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
849  000550  000552          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
850  000552  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
851  000554  000556          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
852  000556  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
853  000560  000562          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
854  000562  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
855  000564  000566          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
856  000566  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
857  000570  000572          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
858  000572  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
859  000574  000576          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
860  000576  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
861  000600  000602          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
862  000602  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
863  000604  000606          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
864  000606  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
865  000610  000612          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
866  000612  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
867  000614  000616          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
868  000616  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
869  000620  000622          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
870  000622  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
871  000624  000626          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
872  000626  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
873  000630  000632          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
874  000632  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
875  000634  000636          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
876  000636  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
877  000640  000642          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
878  000642  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
879  000644  000646          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
880  000646  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
881  000650  000652          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
882  000652  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
883  000654  000656          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
884  000656  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
885  000660  000662          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
886  000662  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
887  000664  000666          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
888  000666  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
889  000670  000672          .+2          ;UNEXPECTED TRAP TO THIS LOCATION
890  000672  000000          HALT         ;EXAMINE STACK TO FIND CAUSE
```

```
  891  000674  000676                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  892  000676  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  893  000700  000702                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  894  000702  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  895  000704  000706                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  896  000706  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  897  000710  000712                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  898  000712  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  899  000714  000716                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  900  000716  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  9C:  000720  000722                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  902  000722  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  903  000724  000726                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  904  000726  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  905  000730  000732                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  906  000732  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  907  000734  000736                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  908  000736  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  909  000740  000742                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  910  000742  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  911  000744  000746                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  912  000746  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  913  000750  000752                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  914  000752  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  915  000754  000756                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  916  000756  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  917  000760  000762                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  918  000762  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  919  000764  000766                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  920  000766  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  921  000770  000772                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  922  000772  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  923  000774  000776                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  924  000776  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
```

ROUTINES USED FOR AUTO SIZING.

```
                                        ;STANDARD INTERRUPT VECTORS

                000024                  .=24
000024  017042                          .PFAIL                  ;POWER FAIL HANDLER
000026  000340                          340                     ;SERVICE AT LEVEL 7
000030  016512                          .HLT                    ;ERROR HANDLER
000032  000340                          340                     ;SERVICE AT LEVEL 7
000034  016460                          .TRPSRV                 ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                          340                     ;SERVICE AT LEVEL 7
                000046                  .=46
000046  015240                          LOGICAL                 ;ACT HOOKS
                000052                  .=52
000052  000000                          .WORD 0
                                        ;THIS ROUTINE TRIES TO FORCE THE RECEIVER TO INTERUPT
                                        ;TO ITS VECTOR WHERE IT WILL PICK UP THE STATUS LOCATION
                                        ;FOR ITS NEW PC; AND PICK UP AN IOT INSTRUCTION FOR ITS
                                        ;NEW PS. WHEN THE NEW PC IS FETCHED AN IOT INSTRUCTION IS
                                        ;EXECUTED, TRAPPING TO LOCATION 20 WHERE A ROUTINE IS EXECUTED
                                        ;TO TAKE THE PC FROM THE STACK AND US IT AS THE VECTOR ADDRESS
                000056                  .=56

000056                                  VECMAP:
000056  010120                  1$:     MOV     R1,(R0)+        ;START FILLING THE VECTOR AREA
000060  012721  000004                  MOV     #4,(R1)+        ;WITH .+2; IOT (4)
000064  022021                          CMP     (R0)+,(R1)+     ;UPDATE THE POINTERS
000066  020127  001000                  CMP     R1,#1000        ;IS ALL FLOATING VECTOR AREA DONE
000072  101771                          BLOS    1$              ;BR IF NOT ALL DONE
000074  012737  000146  000020          MOV     #4$,@#20        ;SET FOR IOT TRAP BY DQ11
000102  013737  001500  001244          MOV     DQACTV,TEMP1    ;GET THE ACTIVE DQ11 S
000110  006037  001244          2$:     ROR     TEMP1           ;ARE YOU ACTIVE.. DQ11
000114  103023                          BCC     5$              ;IF CARRY CLEAR.. NO MORE DQ11S
000116  005037  177776                  CLR     PS              ;CLEAR PS
000122  005722                          TST     (R2)+           ;PUT POINTER TO STATUS TABLE
000124  012772  000340  177776          MOV     #340,@-2(R2)    ;TRY AND SET PRI/SEC DONE AND IE
000132  105200                          INCB    R0              ;DELAY.....
000134  001376                          BNE     .-2             ;.....DELAY
000136  112712  000300                  MOVB    #300,(R2)       ;NO INTERUPT ASSUME 300 FIX IN TEST C
000142  005722                  3$:     TST     (R2)+           ;UPDATE POINTERS
000144  000761                          BR      2$              ;GO DO IT AGAIN
000146  051612                  4$:     BIS     (SP),(R2)       ;ENTERD  BY IOT TRAP BY DQ11
000150  042712  000007                  BIC     #7,(R2)         ;CLEAR UNWANTED BITS
000154  022626                          CMP     (SP)+,(SP)+     ;POP IOT JUNK OFF STACK
000156  012716  000142                  MOV     #3$,(SP)        ;SET RETURN PC ON STACK
000162  000002                          RTI                     ;GO HOME.
000164  000207                  5$:     RTS     PC              ;ALL SIZING IS DONE

                                        ;****SOFTWARE SWITCH REGISTER****
                000174                  .=174
000174  000000                  DISPREG:        0               ;SOFTWARE DISPLAY REGISTER
000176  000000                  SWREG:          0               ;SOFTWARE SWITCH REGISTER

                                        ;PROGRAM START

                000200                  .=200
000200  000137  001512                  JMP     .START          ;GO TO START OF PROGRAM
```

```
                        001220                  .=220
000220  012702  001400          CSRMAP: MOV     #1400,R2        ;CLEAR ALL STATUS TABLE
000224  005022                  CLR     (R2)+                   ;DO CLEAR
000226  022702  001512                  CMP     #1512,R2        ;ALL TABLE DONE
000232  001374                  BNE     .-6                     ;BR IF MORE TO GO
000234  005037  001504                  CLR     DQNUM           ;SET NUMBER OF DQ11S TO 0
000240  012702  001400                  MOV     #1400,R2        ;SET TABLE POINTER
000244  012701  160000                  MOV     #160000,R1      ;GET FIRST FLOATING ADDRESS
000250  012737  000614  000004          MOV     #5$,@#4         ;SET FOR TIME OUT TRAP--NO DEVICE--
000256  112761  000012  000005  1$:     MOVB    #12,5(R1)       ;TRY AND SEL MISC REGISTER
000264  005061  000006                  CLR     6(R1)           ;TRY AND CLEAR MISC REG
000270  012711  010000                  MOV     #10000,(R1)     ;TRY AND SET RX ACTIVE
000274  022761  030000  000006          CMP     #30000,6(R1)    ;LOOK FOR SYNC 1 AND SYNC 2
000302  001071                  BNE     2$                      ;THIS IS NOT A DQ11 IF I BRANCH
000304  010122                  MOV     R1,(R2)+                ;NOW THIS IS A DQ11 --STORE CSR
000306  052712  100000                  BIS     #SYNBIT,(R2)    ;SET FOR TWO SYNC CHARS
000312  005011                  CLR     (R1)                    ;CLEAR DQ ACTIVE BIT
000314  112761  000010  000005          MOVB    #10,5(R1)       ;SEL CHAR DET REGISTER
000322  012761  177777  000006          MOV     #-1,6(R1)       ;WRITE INTO CHAR DET REG
000330  005761  000006                  TST     6(R1)           ;WAS THE REGISTER WRITTEN?
000334  001402                  BEQ     .+6                     ;APPERENTLY NO B8 OPTION.
000336  052712  020000                  BIS     #B8BIT,(R2)     ;SET FOR B8 OPTION
000342  112761  000017  000005          MOVB    #17,5(R1)       ;SEL POLYNO. REGISTER
000350  012761  177777  000006          MOV     #-1,6(R1)       ;WRITE POLYNO.F GISTER
000356  005761  000006                  TST     6(R1)           ;WAS REG WRITTEN??
000362  001402                  BEQ     .+6                     ;BR IF NO AB OPTION
000364  052712  002000                  BIS     #ABBIT,(R2)     ;SET FOR AB OPTION
000370  012761  001400  000002          MOV     #1400,2(R1)     ;TRY TO SET .DTR. .RS.
000376  032761  001400  000002          BIT     #1400,2(R1)     ;DID ANY OF THEM SET
000404  001402                  BEQ     .+6                     ;BR IF NO BA OPTION
000406  052712  010000                  BIS     #BABIT,(R2)     ;SET FOR BA OPTION
000412  032761  030000  000002          BIT     #30000,2(R1)    ;DID .CS. .CO. SET
000420  001402                  BEQ     .+6                     ;BR IF NO JUMPER
000422  052712  040000                  BIS     #JUMBIT,(R2)    ;SET FOR JUMPER
000426  052712  004000                  BIS     #ACTBIT,(R2)    ;SET FOR ACTIVE ON FIRST NON-SYNC
000432  052712  001000                  BIS     #1000BIT,(R2)   ;SET FOR 000 VRC.......
000436  005722                  TST     (R2)+                   ;POP POINTER
000440  005011                  CLR     (R1)                    ;CLEAR RCSR
000442  005061  000002                  CLR     2(R1)           ;CLEAR TCSR
000446  005061  000002                  CLR     2(R1)           ;CLEAR AGAIN
000452  005061  000004                  CLR     4(R1)           ;CLEAR ERROR REG
000456  005061  000006                  CLR     6(R1)           ;CLEAR SEC REG
000462  005237  001504                  INC     DQNUM           ;UPDATE NUMBER OF DQ11S
000466  062701  000010          2$:     ADD     #10,R1          ;UPDATE CSR POINTER BY 10 (8)
000472  022701  164000                  CMP     #164000,R1      ;HAVE ALL FLOATING ADDRESSES BEEN CHECKED??
000476  001267                  BNE     1$                      ;BR IF NOT ALL DONE
000500  005037  001500                  CLR     DQACTV          ;ZERO ACTIVE DQ11S
000504  005737  001504                  TST     DQNUM           ;WERE ANY DQ11S FOUND
000510  001434                  BEQ     4$                      ;HEY BUDDY. NO DQ11S FOUND IN SYSTEM
000512  013701  001504                  MOV     DQNUM,R1        ;SAVE NUMBER OF DQ11S
000516  010137  001276                  MOV     R1,SAVNUM       ;SAVE NUMBER FOR ACT11
000522  000241          3$:     CLC                             ;CLEAR CARRY
000524  006137  001500                  ROL     DQACTV          ;+++++ ACTIVE ADDRESS
000530  005237  001500                  INC     DQACTV          ;SET BIT 0
000534  005301                  DEC     R1                      ;DEC NUMBER OF DQ11S
000536  001371                  BNE     3$                      ;BR IF MORE TO GO
```

```
DZDQD   MACY11 27(1006)  22-DEC-76  11:14  PAGE 23
DZDQD0.P11    21-DEC-76 16:32          ROUTINES USED FOR AUTO SIZING.

 1037  000540  012737  000006  000004          MOV     #6,@#4          ;RESET TIME OUT VECTOR
 1038  000546  013737  001500  001502          MOV     DQACTV,SAVACT   ;SAVE ACTIVE
 1039  000554  012737  000340  000022          MOV     #340,@#22       ;SET IOT TRAP PRIO: TO 7
 1040  000562  012702  001400                  MOV     #1400,R2        ;SET TABLE POINTER
 1041  000566  012700  000300                  MOV     #300,R0         ;SET VECTOR START
 1042  000572  012701  000302                  MOV     #302,R1         ;SET VECTOR+2 START
 1043  000576  000137  000056                  JMP     VECMAP          ;GO FIND THE VECTORS
 1044  000602  104402                  4$:     TYPE                    ;TYPE MESSAGE
 1045  000604  017402                          MERR2                   ;I DIDN'T FIND ANY DQ11S. DON'T USE AUTO SIZE.
 1046  000606  005000                          CLR     R0              ;
 1047  000610  000000                          HALT                    ;HOW CAN I TEST NO DQ11S
 1048  000612  000776                          BR      .-2             ;DON'T LET OPR HIT CONT. SW
 1049  000614  012716  000466          5$:     MOV     #2$,(SP)        ;ENTERED BY TIME OUT TRAP
 1050  000620  000002                          RTI                     ;GO HOME.
 1051
 1052
 1053          001000                  .=1000
 1054  001000  005377  040515  047111  MTITLE: .ASCIZ  <377><12>/MAINDEC-11-DZDQD-D/<377>/TRANSMITTER AND RECEIVER EXERCISER/<3
 1055  001006  042504  026503  030461
 1056  001014  042055  042132  042121
 1057  001022  042055  052377  040522
 1058  001030  051516  044515  052124
 1059  001036  051105  040440  042116
 1060  001044  051040  041505  044505
 1061  001052  042526  020122  054105
 1062  001060  051105  044503  042523
 1063  001066  177522     000
 1064
 1065          001200                  .=1200
 1066                                          ;INDIRECT POINTERS
 1067
 1068  001200  177570                  SWR:    177570                  ;SWITCH REGISTER POINTER
 1069  001202  177570                  LIGHTS: 177570                  ;DISPLAY REGISTER POINTER
 1070  001204  177560                  TKCSR:  177560                  ;TELETYPE KEYBOARD CONTROL REGISTER
 1071  001206  177562                  TKDBR:  177562                  ;TELETYPE KEYBOARD DATA BUFFER
 1072  001210  177564                  TPCSR:  177564                  ;TELEPRINTER CONTROL REGISTER
 1073  001212  177566                  TPDBR:  177566                  ;TELEPRINTER DATA BUFFER
 1074
 1075                                          ;PROGRAM CONTROL PARAMETERS
 1076
 1077  001214  000000                  RETURN: 0                       ;SCOPE ADDRESS FOR LOOP ON TEST
 1078  001216  000000                  NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
 1079  001220  000000                  LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT DATA
 1080  001222  000003                  ICOUNT: 3                       ;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE EXECUTED
 1081  001224  000000                  LPCNT:  0                       ;NUMBER OF ITEREATIONS COMPLETED
 1082  001226  000000                  TSTNO:  0                       ;NUMBER OF TEST IN PROGRESS
 1083  001230  000000                  PASCNT: 0                       ;NUMBER OF PASSES COMPLETED
 1084  001232  000000                  ERRCNT: 0                       ;TOTAL NUMBER OF ERRORS
 1085  001234  000000                  LSTERR: 0                       ;PC OF LAST ERROR CALL
 1086
 1087                                          ;PROGRAM VARIABLES
 1088
 1089  001236  000000                  CHAR1:  0
 1090  001240  000000                  CHAR2:  0
 1091  001242  000000                  CHAR3:  0
 1092  001244  000000                  TEMP1:  0                       ;TEMPORARY STORAGE
```

PROGRAM PARAMETERS, VARIABLES, AND TRAP CALLS.

```
  1093  001246  000000          TEMP2:  0                       ;TEMPORARY STORAGE
  1094  001250  000000          TEMP3:  0                       ;TEMPORARY STORAGE
  1095  001252  000000          TEMP4:  0                       ;TEMPORARY STORAGE
  1096  001254  000000          TEMP5:  0                       ;TEMPORARY STORAGE
  1097  001256  000000          SAVR0:  0                       ;R0 STORAGE
  1098  001260  000000          SAVR1:  0                       ;R1 STORAGE
  1099  001262  000000          SAVR2:  0                       ;R2 STORAGE
  1100  001264  000000          SAVR3:  0                       ;R3 STORAGE
  1101  001266  000000          SAVR4:  0                       ;R4 STORAGE
  1102  001270  000000          SAVR5:  0                       ;R5 STORAGE
  1103  001272  000000          SAVSP:  0                       ;STACK POINTER STORAGE
  1104  001274  000000          SAVPC:  0                       ;PROGRAM COUNTER STORAGE
  1105  001276  000000          SAVNUM: 0
  1106  001300  000001          CREAM:  .BLKW   1
  1107  001302  000000          RUNFLG: 0
  1108  001304  000000          RUN:    0
  1109  001306  000000          RUNCNT: 0
```

```
DZDQD   MACY11 27(1006)  22-DEC-76  11:14  PAGE 25
DZDQDD.P11    21-DEC-76 16:32          PROGRAM PARAMETERS, VARIABLES, AND TRAP CALLS.


                                               ;PROGRAM CONTROL FLAGS

001310      000                    INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
001311      000                    STFLG:  .BYTE   0               ;TEST START FLAG
001312      000                    ERRFLG: .BYTE   0               ;ERROR OCCURED FLAG
001313      000                    LOKFLG: .BYTE   0               ;LOCK ON CURRENT TEST FLAG
          000000                   $Y=0

                                               ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
                                               ;POINTERS TO SUBROUTINES CAN BE FOUND
                                               ;IN THE TABLE IMMEDIATLY FOLLOWING THE DEFINITIONS

                                   ;***************************************************************
                                   ;***************************************************************
001314                             .TRPTAB:
          104400                   SCOPE=TRAP+0            ;CALL TO SCOPE LOOP AND ITERATION HANDLER
001314    015314                           .SCOPE
          104401                   SCOP1=TRAP+1            ;CALL TO LOOP ON CURRENT DATA HANDLER
001316    015426                           .SCOP1
          104402                   TYPE=TRAP+2             ;CALL TO TELETYPE OUTPUT ROUTINE
001320    015446                           .TYPE
          104403                   INSTR=TRAP+3            ;CALL TO ASCII STRING INPUT ROUTINE
001322    015554                           .INSTR
          104404                   INSTER=TRAP+4           ;CALL TO INPUT ERROR HANDLER
001324    015672                           .INSTER
          104405                   PARAM=TRAP+5            ;CALL TO NUMERICAL DATA INPUT ROUTINE
001326    015724                           .PARAM
          104406                   SAVOS=TRAP+6            ;CALL TO REGISTER SAVE ROUTINE
001330    016140                           .SAVOS
          104407                   RESOS=TRAP+7            ;CALL TO REGISTER RESTORE ROUTINE
001332    016200                           .RESOS
          104410                   CONVRT=TRAP+10          ;CALL TO DATA OUTPUT ROUTINE
001334    016232                           .CONVRT
          104411                   CNVRT=TRAP+11           ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001336    016236                           .CNVRT
          104412                   MSTCLR=TRAP+12          ;CALL TO ISSUE MASTER CLEAR
001340    012114                           .MSTCLR
          104413                   MEMCLR=TRAP+13          ;CALL TO CLEAR ALL SCRATCH PAD MEMORIES
001342    011770                           .MEMCLR
          104414                   CKSWR=TRAP+14           ;CALL TO ALLOW SWREG TO BE LOADED FROM TTY
001344    017140                           .CKSWR
          104415                   CNTLU=TRAP+15           ;CALL TO ALLOW LOADING OF SWREG FROM TTY
001346    017214                           .CNTLU

                                   ;***************************************************************
                                   ;***************************************************************

                                               ;DQ11 VECTOR AND REGISTER INDIRECT POINTERS

001350    000000                 DQRVEC. 0               ;POINTER TO DQ11 RECEIVER INTERRUPT VECTOR
001352    000000                 DQRLVL: 0               ;POINTER TO DQ11 RECEIVER INTERRUPT SERVICE PS
001354    000000                 DQTVEC: 0               ;POINTER TO DQ11 TRANSMITTER INTERRUPT VECTOR
001356    000000                 DQTLVL: 0               ;POINTER TO DQ11 TRANSMITTER INTERRUPT SERVICE PS
001360    000000                 DQRCSR: 0               ;POINTER TO DQ11 RECEIVER CONTROL REGISTER
001362    000000                 DQRCSH: 0               ;POINTER TO HIGH BYTE OF DQ11 RECEIVER CONTROL REGISTER
```

```
1166  001364  000000  DQTCSR: 0          ;POINTER TO DQ11 TRANSMITTER CONTROL REGISTER
1167  001366  000000  DQERR:  0          ;POINTER TO DQ11 ERROR REGISTER
1168  001370  000000  DQREG:  0          ;POINTER TO HIGH BYTE OF ERROR REGISTER
1169  001372  000000  DQSEC:  0          ;POINTER TO DQ11 SECONDARY REGISTER
1170  001374  000000  DQSECH: 0          ;POINTER TO HIGH BYTE OF DQ11 SECONDARY REGISTER
1171
1172
1173
1174                                     ;DQ11 STATUS TABLE AND ADDRESS ASSIGNMENTS
1175
1176          001400  .=1400
1177  001400  000001  DQCR00: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 00
1178  001402  000001  DQST00: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 00
1179  001404  000001  DQCR01: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 01
1180  001406  000001  DQST01: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 01
1181  001410  000001  DQCR02: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 02
1182  001412  000001  DQST02: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 02
1183  001414  000001  DQCR03: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 03
1184  001416  000001  DQST03: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 03
1185  001420  000001  DQCR04: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 04
1186  001422  000001  DQST04: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 04
1187  001424  000001  DQCR05: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 05
1188  001426  000001  DQST05: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 05
1189  001430  000001  DQCR06: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 06
1190  001432  000001  DQST06: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 06
1191  001434  000001  DQCR07: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 07
1192  001436  000001  DQST07: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 07
1193  001440  000001  DQCR10: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 10
1194  001442  000001  DQST10: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 10
1195  001444  000001  DQCR11: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 11
1196  001446  000001  DQST11: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 11
1197  001450  000001  DQCR12: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 12
1198  001452  000001  DQST12: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 12
1199  001454  000001  DQCR13: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 13
1200  001456  000001  DQST13: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 13
1201  001460  000001  DQCR14: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 14
1202  001462  000001  DQST14: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 14
1203  001464  000001  DQCR15: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 15
1204  001466  000001  DQST15: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 15
1205  001470  000001  DQCR16: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 16
1206  001472  000001  DQST16: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 16
1207  001474  000001  DQCR17: .BLKW  1   ;CONTROL STATUS REGISTER FOR DEVICE NO: 17
1208  001476  000001  DQST17: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 17
1209  001500  000001  DQACTV: .BLKW  1   ;HOLD ACTIVE BITS FOR TESTING
1210  001502  000001  SAVACT: .BLKW  1   ;SAVE NUMBER OF ACTIVE DQ11S
1211  001504  000001  DQNUM:  .BLKW  1   ;OCTAL NUMBER OF TOTAL NUMBER OD DQ11S
1212  001506  000001  DQCSR:  .BLKW  1   ;CSR OF DQ11 UNDER TEST
1213  001510  000001  DQSTAT: .BLKW  1   ;VECTOR AND CONFIGURATION STATUS OF DQ11 UNDER TEST
1214
1215                          ;PROGRAM INITIALIZATION
1216                          ;LOCK OUT INTERRUPTS
1217                          ;SET UP PROCESSOR STACK
1218                          ;SET UP POWER FAIL VECTOR
1219                          ;CLEAR PROGRAM CONTROL FLAGS AND COUNTS
1220                          ;TYPE TITLE MESSAGE
1221
```

```
 1222  001512  012737  000340  177776  .START: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
 1223  001520  012706  001200                  MOV     #STACK,SP               ;SET UP STACK
 1224  001524  012737  017042  000024          MOV     #.PFAIL,@#24            ;SET UP POWER FAIL VECTOR
 1225  001532  013737  001504  001276          MOV     DONUM,SAVNUM
 1226  001540  105037  001311                  CLRB    STFLG                   ;CLEAR START FLAG
 1227  001544  005037  001230                  CLR     PASCNT                  ;CLEAR PASS COUNT
 1228  001550  105037  001312                  CLRB    ERRFLG                  ;CLEAR ERROR FLAG
 1229  001554  005037  001302                  CLR     RUNFLG
 1230  001560  012737  001400  001300          MOV     #1400,CREAM
 1231  001566  005037  001232                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
 1232  001572  005037  001234                  CLR     LSTERR                  ;CLEAR LAST ERROR POINTER
 1233  001576  012737  000001  001226          MOV     #1,TSTNO                ;SET UP FOR TEST 1
 1234  001604  012737  001512  001214          MOV     #.START,RETURN          ;SET UP FOR POWER FAIL BEFORE
 1235                                                                          ;TESTING STARTS
 1236  001612  105737  001310                  TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED
 1237  001616  001075                          BNE     12$
 1238  001620  104402  001000                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
 1239  001624  105137  001310                  COMB    INIFLG                  ;IF NOT SET FLAG AND DO
 1240
 1241  001630  012737  177570  001200          MOV     #DSWR,SWR               ;MOV HARDWARE SWR TO SWR
 1242  001636  012737  177570  001202          MOV     #DLIGHTS,LIGHTS         ;MOV DISPLAY LIGHTS TO LIGHTS
 1243  001644  013746  000006                  MOV     @#6,-(SP)               ;SAVE VECTORS
 1244  001650  013746  000004                  MOV     @#4,-(SP)
 1245  001654  012737  001674  000004          MOV     #64$,@#4                        ;SET UP FOR TIMEOUT
 1246  001662  012737  177777  177310          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
 1247  001670  001402                          BEQ     65$
 1248  001672  000407                          BR      66$
 1249  001674  022626                  64$:    CMP     (SP)+,(SP)+             ;ADJUST STACK
 1250  001676  012737  000176  001200  65$:    MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
 1251  001704  012737  000174  001202          MOV     #DISPREG,LIGHTS         ;POINT TO SOFT DISPLAY REG
 1252  001712  012637  000004          66$:    MOV     (SP)+,@#4               ;RESTORE VECTORS
 1253  001716  012637  000006                  MOV     (SP)+,@#6
 1254  001722  005737  000042                  TST     @#42                    ;UNDER MONITOR
 1255  001726  001005                          BNE     67$
 1256  001730  027737  000176  001200          CMP     #SWREG,SWR              ;IS SWREG USED
 1257  001736  001001                          BNE     67$
 1258  001740  104415                          CNTLU
 1259  001742  105777  177232          67$:    TSTB    @SWR
 1260  001746  100402                          BMI     .+6
 1261  001750  004737  000220                  JSR     PC,CSRMAP
 1262  001754  104402  017667                  TYPE    ,XHEAD
 1263  001760  012737  001400  001244          MOV     #1400,TEMP1
 1264  001766  017737  177252  001246          MOV     @TEMP1,TEMP2
 1265  001774  001406                          BEQ     .+16
 1266  001776  104410                          CONVRT
 1267  002000  017714                          XSTATQ
 1268  002002  062737  000002  001244          ADD     #2,TEMP1
 1269  002010  000766                          BR      .-22
 1270  002012  032777  000001  177160  12$:    BIT     #SW00,@SWR
 1271  002020  001424                          BEQ     1$
 1272  002022  104402                          TYPE
 1273  002024  017610                          MNEW
 1274  002026  005000                          CLR     R0
 1275  002030  000000                          HALT
 1276  002032  104414                          CKSWR
 1277  002034  027737  177140  001502          CMP     @SWR,SAVACT
```

```
 1278  002042  101404                          BLOS    11$
 1279  002044  104402                          TYPE
 1280  002046  017451                          MERR3
 1281  002050  000000                          HALT
 1282  002052  000776                          BR      .-2
 1283  002054  017737  177120  001500  11$:    MOV     @SWR,DQACTV
 1284  002062  013700  001500                  MOV     DQACTV,R0
 1285  002066  000000                          HALT
 1286  002070  104414                          CKSWR
 1287  002072  012700  000300          1$:     MOV     #300,R0
 1288  002076  012701  000302                  MOV     #302,R1
 1289  002102  010120                  2$:     MOV     R1,(R0)+
 1290  002104  005021                          CLR     (R1)+
 1291  002106  022021                          CMP     (R0)+,(R1)+
 1292  002110  022700  001000                  CMP     #1000,R0
 1293  002114  001372                          BNE     2$
 1294
 1295                                          ;TEST START AND RESTART
 1296
 1297  002116  012737  000340  177776  .BEGIN: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
 1298  002124  012706  001200                  MOV     #STACK,SP               ;SET UP STACK
 1299  002130  005737  000042                  TST     @#42                    ;IS PROGRAM UNDER MONITOR CONTROL
 1300  002134  001040                          BNE     3$
 1301  002136  104414                          CKSWR                           ;CHECK FOR (↑G)
 1302  002140  032777  000004  177032          BIT     #BIT2,@SWR              ;CHECK FOR LOCK ON TEST
 1303  002146  001411                          BEQ     1$
 1304  002150  104402  017507                  TYPE    ,MLOCK
 1305  002154  012737  000240  015324          MOV     #NOP,TTST
 1306  002162  012737  000240  015326          MOV     #NOP,TTST+2             ;SET UP TO LOCK
 1307  002170  000406                          BR      2$
 1308  002172  013737  015422  015324  1$:     MOV     BRW,TTST
 1309  002200  013737  015424  015326          MOV     BRX,TTST+2              ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
 1310  002206  032777  000002  176764  2$:     BIT     #SW01,@SWR              ;IF SW01=1, GET STARTING PC
 1311  002214  001410                          BEQ     3$
 1312  002216  104403                          INSTR
 1313  002220  017475                          MTSTPC
 1314  002222  104405                          PARAM
 1315  002224  002254                          TST1
 1316  002226  007754                          TLAST
 1317  002230  001214                          #RETURN
 1318  002232     001                  .BYTE   1
 1319  002233     001                  .BYTE   1
 1320  002234  000403                          BR      4$
 1321  002236  012737  002254  001214  3$:     MOV     #TST1,RETURN            ;START AT TEST 1
 1322  002244  104402  017377          4$:     TYPE    ,MR                     ;TYPE R
 1323  002250  000177  176740                  JMP     @RETURN                 ;START TESTING
 1324                                  ;  TEST 1
 1325                                  ;*****************************************************************************
 1326  002254  012737  000001  001226  TST1:   MOV     #1,TSTNO
 1327  002262  012737  002644  001214          MOV     #TST2,RETURN
 1328  002270  012737  002644  001216          MOV     #TST2,NEXT
 1329  002276  105737  001302                  TSTB    RUNFLG          ;IS THIS MY FIRST TIME HERE?
 1330  002302  001010                          BNE     1$              ;BR IF FLAG IS SET
 1331  002304  012737  000001  001304          MOV     #BIT0,RUN       ;SET RUN POINTER.
 1332  002312  012737  000020  001306          MOV     #16.,RUNCNT     ;SET FOR MAX OF 16 DQ11'S PER SYSTEM
 1333  002320  105137  001302                  COMB    RUNFLG          ;SET RUN FLAG
```

```
1334  002324  033737  001304  001500  1$:     BIT     RUN,DQACTV      ;FIND AN ACTIVE DQ11 TO TEST.
1335  002332  001032                          BNE     3$              ;BR IF I FOUND ONE TO TEST.
1336  002334  005737  001500                  TST     DQACTV          ;FIND OUT IF THERE ARE NO DQ11 ACTIVE.
1337  002340  001423                          BEQ     2$              ;BR TO FATAL ERROR. WHY AM I HERE IF NO ACTIVE DQ11'S???
1338  002342  000257                          CCC                     ;CLEAR ALL THE CONDITION CODES OF CPU
1339  002344  006137  001304                  ROL     RUN             ;UPDATE RUN POINTER
1340  002350  062737  000004  001300          ADD     #4,CREAM        ;UPDATE ADDRESS POINTER.
1341  002356  005337  001306                  DEC     RUNCNT          ;DEC NUMBER OF TIMES I LOOKED AT ACTIVE.
1342  002362  001360                          BNE     1$              ;BR AND KEEP LOOKING.
1343  002364  012737  000020  001306          MOV     #16.,RUNCNT     ;START RESTORING MY POINTERS.
1344  002372  012737  001400  001300          MOV     #1400,CREAM     ;RESTORE  ADDRESS POINTER
1345  002400  012737  000001  001304          MOV     #1,RUN          ;RESTORE RUN POINTER.
1346  002406  000746                          BR      1$              ;KEEP ON TESTING.
1347  002410  104402                  2$:     TYPE                    ;ALLERT OPERATOR OF FATAL ERROR
1348  002412  017402                          MERR2                   ;NO DQ11 ACTIVE. WHY AM I HERE???
1349  002414  000000                          HALT                    ;YOU MUST RELOAD DQ11 DIAGNOSTIC!!
1350  002416  000776                          BR      .-2             ;STICK HERE ON CONT.
1351  002420  000257                  3$:     CCC                     ;CLEAR CPU COND. CODES
1352  002422  006137  001304                  ROL     RUN             ;UPDATE RUN. ACTIVE DQ11 FOUND.
1353  002426  017737  176646  001506          MOV     @CREAM,DQCSR    ;PLACE ADDRESSS OF DQ11 AT DQCSR
1354  002434  062737  000002  001300          ADD     #2,CREAM        ;UPDATE ADDRESS POINTER
1355  002442  017737  176632  001510          MOV     @CREAM,DQSTAT   ;PLACE STATUS OF DQ11 AT DQSTAT
1356  002450  062737  000002  001300          ADD     #2,CREAM        ;UPDATE ADDRESS POINTER
1357  002456  013737  001506  001360          MOV     DQCSR,DQRCSR
1358  002464  013737  001510  001350          MOV     DQSTAT,DQRVEC
1359  002472  042737  177007  001350          BIC     #177007,DQRVEC
1360  002500  013737  001350  001352          MOV     DQRVEC,DQRLVL   ;GENERATE ADDRESS OF RECEIVER INTERRUPT SERVICE PS
1361  002506  062737  000002  001352          ADD     #2,DQRLVL
1362  002514  013737  001352  001354          MOV     DQRLVL,DQTVEC   ;GENERATE ADDRESS OF TRANSMITTER INTERRUPT VECTOR
1363  002522  062737  000002  001354          ADD     #2,DQTVEC
1364  002530  013737  001354  001356          MOV     DQTVEC,DQTLVL   ;GENERATE ADDRESS  OF TRANSMITTER INTERRUPT SERVICE PS
1365  002536  062737  000002  001356          ADD     #2,DQTLVL
1366  002544  013737  001360  001362          MOV     DQRCSR,DQRCSH
1367  002552  005237  001362                  INC     DQRCSH          ;GENERATE ADDRESS OF HIGH BYTE
1368  002556  013737  001360  001364          MOV     DQRCSR,DQTCSR   ;GENERATE ADDRESS OF TRANSMITTER CONTROL REGISTER
1369  002564  062737  000002  001364          ADD     #2,DQTCSR
1370  002572  013737  001364  001366          MOV     DQTCSR,DQERR    ;GENERATE ADDRESS OF ERROR REGISTER
1371  002600  062737  000002  001366          ADD     #2,DQERR
1372  002606  013737  001366  001370          MOV     DQERR,DQREG     ;GENERATE ADDRESS OF HIGH BYTE OF ERROR REGISTER
1373  002614  005237  001370                  INC     DQREG
1374  002620  013737  001370  001372          MOV     DQREG,DQSEC     ;GENERATE ADDRESS OF SECONDARY REGISTER
1375  002626  005237  001372                  INC     DQSEC
1376  002632  013737  001372  001374          MOV     DQSEC,DQSECH    ;GENERATE ADDRESS OF HIGH BYTE
1377  002640  005237  001374                  INC     DQSECH
1378                                          ;
1379                                          ;TEST TO SEE IF TRANSMITTER ACTIVE
1380                                          ;CAN SET.
1381                                          ;AND IF IT DOES SET CHECK TO
1382                                          ;SEE IF IT CAN BE CLEARED BY
1383                                          ;MASTER CLEAR.
1384                                          ;
1385                                  ;  TEST 2
1386                                  ;*****************************************************************
1387  002644  012737  000002  001226  TST2:   MOV     #2,TSTNO
1388  002652  012737  003002  001216          MOV     #CKSYN1,NEXT
1389  002660  112777  000002  176502          MOVB    #2,@DQREG       ;SEL TX BA PRI
```

```
1390  002666  012777  014066  176476          MOV     #TMPBUF,@DQSEC  ;LOAD TX BA
1391  002674  105277  176470                  INCB    @DQREG          ;SEL TTX CC PRI
1392  002700  012777  000200  176464          MOV     #200,@DQSEC     ;LOAD WITH 200
1393  002706  112777  000012  176454          MOVB    #MISC.,@DQREG   ;SEL MISC REGISTER
1394  002714  012777  004012  176450          MOV     #4012,@DQSEC    ;SELECT 8 BITS TEST LOOP AUTO STEP
1395  002722  005277  176436                  INC     @DQTCSR         ;SET TX GO
1396  002726  005277  176440                  INC     @DQSEC          ;PRIM THE
1397  002732  005377  176434                  DEC     @DQSEC          ;          TRANSMITTER
1398  002736  005277  176430                  INC     @DQSEC          ;CLOCK THE TRANSMITTER
1399  002742  032777  040000  176422          BIT     #BIT14,@DQSEC   ;CHECK TX ACTIVE.
1400  002750  001001                          BNE     .+4             ;BRANCH IF ACTIVE SET
1401  002752  104024                          HLT 24                  ;ERROR TX ACTIVE NOT SET!!
1402  002754  104412                          MSTCLR                  ;ISSUE
1403  002756  104412                          MSTCLR                  ;TWO MASTER CLEARS
1404  002760  112777  000012  176402          MOVB    #MISC.,@DQREG   ;RESELECT THE MISC REGISTER
1405  002766  032777  040000  176376          BIT     #BIT14,@DQSEC   ;DID TX ACTIVE CLEAR BY MST CLR
1406  002774  001401                          BEQ     .+4             ;BRANCH IF ACTIVE CLEAR
1407  002776  104001                          HLT 1                   ;ERROR TX ACTIVE NOT CLEARED BY MST CLR
1408  003000  104400                          SCOPE                   ;SCOPE TEST
1409
1410                                          ;ROUTINE TO SET
1411                                          ;TRANSMITTER POINTER
1412                                          ;CORRECTLY DEPENDING
1413                                          ;UPON THE NUMBER OF SYNC
1414                                          ;CHARACTERS.
1415
1416  003002  032737  100000  001510  CKSYN1: BIT     #SYNBIT,DQSTAT  ;CHECK TO FIND OUT IF ONE SYNC OR TWO.
1417  003010  001003                          BNE     1$              ;BRANCH IF TWO SYNC CHARS REQUIRED
1418  003012  105037  014522                  CLRB    SYNC            ;CLEAR THE FIRST SYNC CHAR
1419  003016  000403                          BR      2$              ;BR TO LEAVE ROUTINE
1420  003020  112737  000026  014522  1$:     MOVB    #26,SYNC        ;RESET SYNC CHAR TO 26
1421  003026  000240                  2$:     NOP                     ;FALL IN TO NEXT TEST
1422                                          ;
1423                                          ;TEST TO TRANSMITT ONE CHARACTER.
1424                                          ;
1425                                          ;TESTING TO MAKE SURE THAT THE
1426                                          ;CHARACTER COUNT INCREMENTS BY ONE.
1427                                          ;TESTING THAT THE CURRENT ADDRESS
1428                                          ;INCREMENTS BY ONE
1429                                          ;ALSO MAKING SURE THE PRI/SEC BIT SETS.
1430                                          ;
1431                                  ;  TEST 3
1432                                  ;*****************************************************************************
1433  003030  012737  000003  001226  TST3:   MOV     #3,TSTNO
1434  003036  012737  003054  001214          MOV     #A1$,RETURN
1435  003044  012737  003370  001216          MOV     #TST4,NEXT
1436  003052  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
1437  003054  104412                  A1$:    MSTCLR
1438  003056  112777  000002  176304          MOVB    #2,@DQREG       ;SELECT TX CURRENT ADD.
1439  003064  012777  014524  176300          MOV     #TXBUFF,@DQSEC  ;SET THE TX CURRENT ADD.
1440  003072  105277  176272                  INCB    @DQREG          ;SELECT THE TX CHAR CNT.
1441  003076  012777  177777  176266          MOV     #-1,@DQSEC      ;SET TX CHAR CNT FOR 1 CHARACTER.
1442  003104  112777  000012  176256          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER.
1443  003112  012777  004010  176252          MOV     #4010,@DQSEC    ;SET FOR EIGHT BITS. AND TEST LOOP
1444  003120  005037  014060                  CLR     DELAY           ;CLEAR THE DELAY
1445  003124  005277  176234                  INC     @DQTCSR         ;SET THE GO BIT AND GO!!
```

```
1446  003130  105777  176230          1$:     TSTB    @DQTCSR         ;PRIMARY DONE??
1447  003134  100405                          BMI     2$              ;BRANCH IF DONE
1448  003136  062737  000001  014060          ADD     #1,DELAY        ;STALL FOR DONE
1449  003144  001371                          BNE     1$              ;TO SET.
1450  003146  104002                          HLT 2                   ;TX PRI DONE FAILED TO SET.
1451  003150  112777  000003  176212  2$:     MOVB    #3,@DQREG       ;SELECT TX CHAR CNT
1452  003156  005777  176210                  TST     @DQSEC          ;MAKE SURE IT INCREMENTED
1453  003162  001401                          BEQ     .+4             ;BY ONE TO ZERO.
1454  003164  104003                          HLT 3                   ;TX PRI CHAR CNT NOT ZERO.
1455  003166  112777  000002  176174          MOVB    #2,@DQREG       ;SELECT TX CURRENT ADD.(PRI)
1456  003174  022777  014525  176170  3$:     CMP     #TXBUFF+1,@DQSEC        ;
1457  003202  001401                          BEQ     .+4
1458  003204  104005                          HLT 5                   ; CHAR CNT NOT INC BY +1
1459  003206  032777  000004  176150  4$:     BIT     #BIT2,@DQTCSR   ;DID PRI/SEC SET?
1460  003214  001001                          BNE     .+4
1461  003216  104006                          HLT 6                   ;TX PRI/SEC NOT SET.
1462                                          ;
1463                                          ;TEST THAT WITH A CHARACTER
1464                                          ;COUNT THAT IS EVEN THAT THE
1465                                          ;CURRENT ADDRESS INCREMENTS BY +2
1466                                          ;AND THAT THE CHAR CNT GOES TO ZERO.
1467                                          ;
1468
1469
1470  003220  112777  000006  176142  SECND:  MOVB    #6,@DQREG       ;SELECT TX CURRENT ADD.
1471  003226  012777  014524  176136          MOV     #TXBUFF,@DQSEC  ;SET THE TX CURRENT ADD.
1472  003234  105277  176130                  INCB    @DQREG          ;SELECT THE TX CHAR CNT.
1473  003240  012777  177776  176124          MOV     #-2,@DQSEC      ;SET TX CHAR CNT FOR TWO CHARS.
1474  003246  112777  000012  176114          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER.
1475  003254  012777  004010  176110          MOV     #4010,@DQSEC    ;SET FOR EIGHT BITS AND TEST LOOP
1476  003262  005037  014060                  CLR     DELAY           ;CLEAR THE DELAY
1477  003266  005277  176072                  INC     @DQTCSR         ;SET THE GO BIT AND GO!!
1478  003272  032777  000100  176064  1$:     BIT     #BIT6,@DQTCSR           ;SECONDARY DONE??
1479  003300  001005                          BNE     2$              ;BRANCH IF DONE
1480  003302  062737  000001  014060          ADD     #1,DELAY        ;STALL FOR DONE
1481  003310  001370                          BNE     1$              ;TO SET.
1482  003312  104002                          HLT 2                   ;TX SEC DONE FAILED TO SET.
1483  003314  112777  000007  176046  2$:     MOVB    #7,@DQREG       ;SELECT TX CHAR CNT
1484  003322  005777  176044                  TST     @DQSEC          ;MAKE SURE IT INCREMENTED
1485  003326  001401                          BEQ     .+4             ;BY ONE TO ZERO.
1486  003330  104003                          HLT 3                   ;TX SEC CHAR CNT NOT ZERO.
1487  003332  112777  000006  176030          MOVB    #6,@DQREG       ;SELECT TX CURRENT ADD.(PRI)
1488  003340  022777  014526  176024  3$:     CMP     #TXBUFF+2,@DQSEC        ;
1489  003346  001401                          BEQ     .+4
1490  003350  104004                          HLT 4                   ; CHAR CNT NOT INC BY +2
1491  003352  032777  000004  176004  4$:     BIT     #BIT2,@DQTCSR   ;DID PRI/SEC SET?
1492  003360  001401                          BEQ     .+4
1493  003362  104006                          HLT 6                   ;TX PRI/SEC NOT SET.
1494  003364  104413                          MEMCLR
1495  003366  104400                          SCOPE
1496                                          ;
1497                                          ;TRANSMITTER CHARACTER LENGTH TESTS.
1498                                          ;
1499                                          ;TEST TO TRANSMITT A CHARACTER
1500                                          ; 2 BITS LONG MAKING SURE THAT
1501                                          ;THE CHARACTER IS ALL ZERO'S
```

```
1502                                            ;AND THAT THE TX LINE GOES BACK TO
1503                                            ;A MARK STATE WHEN DONE.
1504                                            ;
1505
1506                                    ;  TEST 4
1507                                    ;*****************************************************************************
1508  003370  012737  000004  001226  TST4:    MOV     #4,TSTNO
1509  003376  012737  003416  001216          MOV     #TST5,NEXT
1510  003404  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1511  003410  000002                          2                       ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1512  003412  007000                          7000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1513  003414  104400                          SCOPE                   ;SCOPE TEST
1514
1515                                            ;TEST TO TRANSMITT A CHARACTER
1516                                            ; 3 BITS LONG MAKING SURE THAT
1517                                            ;THE CHARACTER IS ALL ZERO'S
1518                                            ;AND THAT THE TX LINE GOES BACK TO
1519                                            ;A MARK STATE WHEN DONE.
1520                                            ;
1521
1522                                    ;  TEST 5
1523                                    ;*****************************************************************************
1524  003416  012737  000005  001226  TST5:    MOV     #5,TSTNO
1525  003424  012737  003444  001216          MOV     #TST6,NEXT
1526  003432  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1527  003436  000003                          3                       ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1528  003440  006400                          6400                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1529  003442  104400                          SCOPE                   ;SCOPE TEST
1530
1531                                            ;TEST TO TRANSMITT A CHARACTER
1532                                            ; 4 BITS LONG MAKING SURE THAT
1533                                            ;THE CHARACTER IS ALL ZERO'S
1534                                            ;AND THAT THE TX LINE GOES BACK TO
1535                                            ;A MARK STATE WHEN DONE.
1536                                            ;
1537
1538                                    ;  TEST 6
1539                                    ;*****************************************************************************
1540  003444  012737  000006  001226  TST6:    MOV     #6,TSTNO
1541  003452  012737  003472  001216          MOV     #TST7,NEXT
1542  003460  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1543  003464  000004                          4                       ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1544  003466  006000                          6000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1545  003470  104400                          SCOPE                   ;SCOPE TEST
1546
1547                                            ;TEST TO TRANSMITT A CHARACTER
1548                                            ; 5 BITS LONG MAKING SURE THAT
1549                                            ;THE CHARACTER IS ALL ZERO'S
1550                                            ;AND THAT THE TX LINE GOES BACK TO
1551                                            ;A MARK STATE WHEN DONE.
1552                                            ;
1553
1554                                    ;  TEST 7
1555                                    ;*****************************************************************************
1556  003472  012737  000007  001226  TST7:    MOV     #7,TSTNO
1557  003500  012737  003520  001216          MOV     #TST10,NEXT
```

```
1558  003506  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1559  003512  000005                          5                       ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1560  003514  005400                          5400                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1561  003516  104400                          SCOPE                   ;SCOPE TEST
1562
1563                                          ;TEST TO TRANSMITT A CHARACTER
1564                                          ; 6 BITS LONG MAKING SURE THAT
1565                                          ;THE CHARACTER IS ALL ZERO'S
1566                                          ;AND THAT THE TX LINE GOES BACK TO
1567                                          ;A MARK STATE WHEN DONE.
1568                                          ;
1569
1570                                  ;  TEST 10
1571                                  ;*************************************************************************
1572  003520  012737  000010  001226  TST10:  MOV     #10,TSTNO
1573  003526  012737  003546  001216          MOV     #TST11,NEXT
1574  003534  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1575  003540  000006                          6                       ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1576  003542  005000                          5000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1577  003544  104400                          SCOPE                   ;SCOPE TEST
1578
1579                                          ;TEST TO TRANSMITT A CHARACTER
1580                                          ; 7 BITS LONG MAKING SURE THAT
1581                                          ;THE CHARACTER IS ALL ZERO'S
1582                                          ;AND THAT THE TX LINE GOES BACK TO
1583                                          ;A MARK STATE WHEN DONE.
1584                                          ;
1585
1586                                  ;  TEST 11
1587                                  ;*************************************************************************
1588  003546  012737  000011  001226  TST11:  MOV     #11,TSTNO
1589  003554  012737  003574  001216          MOV     #TST12,NEXT
1590  003562  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1591  003566  000007                          7                       ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1592  003570  004400                          4400                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1593  003572  104400                          SCOPE                   ;SCOPE TEST
1594
1595                                          ;TEST TO TRANSMITT A CHARACTER
1596                                          ; 8 BITS LONG MAKING SURE THAT
1597                                          ;THE CHARACTER IS ALL ZERO'S
1598                                          ;AND THAT THE TX LINE GOES BACK TO
1599                                          ;A MARK STATE WHEN DONE.
1600                                          ;
1601
1602                                  ;  TEST 12
1603                                  ;*************************************************************************
1604  003574  012737  000012  001226  TST12:  MOV     #12,TSTNO
1605  003602  012737  003622  001216          MOV     #TST13,NEXT
1606  003610  004537  010720                  JSR     R5,TXSTRB       ;JSR TO ROUTINE
1607  003614  000010                          8.                      ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1608  003616  004000                          4000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1609  003620  104400                          SCOPE                   ;SCOPE TEST
1610
1611                                          ;
1612                                          ;TEST OF CHARACTER LENGTH
1613                                          ;FOR CHARACTERS OVER 8 BITS LONG.
```

```
1614                                            ;
1615                                            ;
1616                                            ;TEST TO TRANSMITT A CHARACTER
1617                                            ; 9 BITS LONG MAKING SURE THAT
1618                                            ;THE CHARACTER IS ALL ZERO'S
1619                                            ;AND THAT THE TX LINE GOES BACK TO
1620                                            ;A MARK STATE WHEN DONE.
1621                                            ;
1622
1623                                    ;  TEST 13
1624                                    ;*************************************************************************
1625  003622  012737  000013  001226  TST13:  MOV     #13,TSTNO
1626  003630  012737  003650  001216          MOV     #TST14,NEXT
1627  003636  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
1628  003642  000011                          9.                      ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1629  003644  003400                          3400                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1630  003646  104400                          SCOPE                   ;SCOPE THE TEST
1631
1632                                            ;
1633                                            ;TEST TO TRANSMITT A CHARACTER
1634                                            ; 10 BITS LONG MAKING SURE THAT
1635                                            ;THE CHARACTER IS ALL ZERO'S
1636                                            ;AND THAT THE TX LINE GOES BACK TO
1637                                            ;A MARK STATE WHEN DONE.
1638                                            ;
1639
1640                                    ;  TEST 14
1641                                    ;*************************************************************************
1642  003650  012737  000014  001226  TST14:  MOV     #14,TSTNO
1643  003656  012737  003676  001216          MOV     #TST15,NEXT
1644  003664  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
1645  003670  000012                          10.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1646  003672  003000                          3000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1647  003674  104400                          SCOPE                   ;SCOPE THE TEST
1648
1649                                            ;
1650                                            ;TEST TO TRANSMITT A CHARACTER
1651                                            ; 11 BITS LONG MAKING SURE THAT
1652                                            ;THE CHARACTER IS ALL ZERO'S
1653                                            ;AND THAT THE TX LINE GOES BACK TO
1654                                            ;A MARK STATE WHEN DONE.
1655                                            ;
1656
1657                                    ;  TEST 15
1658                                    ;*************************************************************************
1659  003676  012737  000015  001226  TST15:  MOV     #15,TSTNO
1660  003704  012737  003724  001216          MOV     #TST16,NEXT
1661  003712  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
1662  003716  000013                          11.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1663  003720  002400                          2400                    ;BIT SELECTION TO BE PLACED INTO MISC REG
1664  003722  104400                          SCOPE                   ;SCOPE THE TEST
1665
1666                                            ;
1667                                            ;TEST TO TRANSMITT A CHARACTER
1668                                            ; 12 BITS LONG MAKING SURE THAT
1669                                            ;THE CHARACTER IS ALL ZERO'S
```

```
                                        ;AND THAT THE TX LINE GOES BACK TO
                                        ;A MARK STATE WHEN DONE.
                                        ;
                                        ;
                                ;  TEST 16
                                ;*************************************************************************
003724  012737  000016  001226  TST16:  MOV     #16,TSTNO
003732  012737  003752  001216          MOV     #TST17,NEXT
003740  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
003744  000014                          12.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
003746  002000                          2000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
003750  104400                          SCOPE                   ;SCOPE THE TEST

                                        ;
                                        ;TEST TO TRANSMITT A CHARACTER
                                        ; 13 BITS LONG MAKING SURE THAT
                                        ;THE CHARACTER IS ALL ZERO'S
                                        ;AND THAT THE TX LINE GOES BACK TO
                                        ;A MARK STATE WHEN DONE.
                                        ;
                                ;  TEST 17
                                ;*************************************************************************
003752  012737  000017  001226  TST17:  MOV     #17,TSTNO
003760  012737  004000  001216          MOV     #TST20,NEXT
003766  004537  01072C                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
003772  000015                          13.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
003774  001400                          1400                    ;BIT SELECTION TO BE PLACED INTO MISC REG
003776  104400                          SCOPE                   ;SCOPE THE TEST

                                        ;
                                        ;TEST TO TRANSMITT A CHARACTER
                                        ; 14 BITS LONG MAKING SURE THAT
                                        ;THE CHARACTER IS ALL ZERO'S
                                        ;AND THAT THE TX LINE GOES BACK TO
                                        ;A MARK STATE WHEN DONE.
                                        ;
                                ;  TEST 20
                                ;*************************************************************************
004000  012737  000020  001226  TST20:  MOV     #20,TSTNO
004006  012737  004026  001216          MOV     #TST21,NEXT
004014  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
004020  000016                          14.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
004022  001000                          1000                    ;BIT SELECTION TO BE PLACED INTO MISC REG
004024  104400                          SCOPE                   ;SCOPE THE TEST

                                        ;
                                        ;TEST TO TRANSMITT A CHARACTER
                                        ; 15 BITS LONG MAKING SURE THAT
                                        ;THE CHARACTER IS ALL ZERO'S
                                        ;AND THAT THE TX LINE GOES BACK TO
                                        ;A MARK STATE WHEN DONE.
                                        ;
                                ;  TEST 21
```

```
1726                                    ;*****************************************************************************
1727  004026  012737  000021  001226  TST21:  MOV     #21,TSTNO
1728  004034  012737  004054  001216           MOV     #TST22,NEXT
1729  004042  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
1730  004046  000017                          15.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1731  004050  000400                          400                     ;BIT SELECTION TO BE PLACED INTO MISC REG
1732  004052  104400                          SCOPE                   ;SCOPE THE TEST
1733                                          ;
1734                                          ;TEST TO TRANSMITT A CHARACTER
1735                                          ; 16 BITS LONG MAKING SURE THAT
1736                                          ;THE CHARACTER IS ALL ZERO'S
1737                                          ;AND THAT THE TX LINE GOES BACK TO
1738                                          ;A MARK STATE WHEN DONE.
1739                                          ;
1740
1741                                    ;  TEST 22
1742                                    ;*****************************************************************************
1743  004054  012737  000022  001226  TST22:  MOV     #22,TSTNO
1744  004062  012737  004102  001216           MOV     #TST23,NEXT
1745  004070  004537  010720                  JSR     R5,TXSTRB       ;DO JSR TO THE SUBROUTINE
1746  004074  000020                          16.                     ;NUMBER OF TIMES CHAR IS TO BE SHIFTED
1747  004076  000000                          0                       ;BIT SELECTION TO BE PLACED INTO MISC REG
1748  004100  104400                          SCOPE                   ;SCOPE THE TEST
1749                                          ;
1750
1751                                          ;
1752                                          ;TEST OF TRANSMITTER IDLE SYNC
1753                                          ;TEST THAT THE TRANSMITTER CAN
1754                                          ;REALLY IDLE SYNC CHARACTERS
1755
1756
1757                                    ;  TEST 23
1758                                    ;*****************************************************************************
1759  004102  012737  000023  001226  TST23:  MOV     #23,TSTNO
1760  004110  012737  004436  001216           MOV     #TST24,NEXT
1761  004116  005077  175242                  CLR     @DQTCSR         ;CLR TX STATUS
1762  004122  032777  000002  175234          BIT     #BIT1,@DQTCSR   ;IDLE SET?
1763  004130  001401                          BEQ     .+4
1764  004132  104000                          HLT                     ;IDLE SHOULD NOT BE SET!
1765  004134  052777  000002  175222          BIS     #BIT1,@DQTCSR   ;SET IDLE BIT
1766  004142  032777  000002  175214          BIT     #BIT1,@DQTCSR   ;IS IDLE SET?
1767  004150  001001                          BNE     .+4             ;BR IF SET.
1768  004152  104000                          HLT                     ;IDLE BIT SHOULD BE SET!
1769  004154  042777  000002  175202          BIC     #BIT1,@DQTCSR   ;CLEAR IDLE BIT.
1770  004162  032777  000002  175174          BIT     #BIT1,@DQTCSR   ;IS IDLE BIT SET?
1771  004170  001401                          BEQ     .+4             ;BR IF CLEAR.
1772  004172  104000                          HLT                     ;IDLE BIT NOT CLEARED.
1773  004174  052777  000002  175162          BIS     #BIT1,@DQTCSR   ;SET IDLE
1774  004202  104412                          MSTCLR
1775  004204  032777  000002  175152          BIT     #BIT1,@DQTCSR   ;IS IDLE SET?
1776  004212  001401                          BEQ     .+4
1777  004214  104000                          HLT                     ;IDLE BIT NOT CLEARED BY INIT!
1778  004216  012737  000005  001250          MOV     #5,TEMP3
```

```
 1782  004224  012737  000377  014056  1$:     MOV     #377,WORD
 1783  004232  112777  000011  175130          MOVB    #11,@DQREG
 1784  004240  013777  014520  175124          MOV     .SYNC,@DQSEC
 1785  004246  012737  000010  014062          MOV     #10,COUNT       ;PICK UP THE NUMBER OF SHIFTS
 1786  004254  012737  004000  014064          MOV     #4000,BITSEL    ;PICK UP NUMBER OF BIT PER CHAR.
 1787  004262  112777  000002  175100          MOVB    #2,@DQREG       ;SELECT THE TRANSMITTER BA PRI.
 1788  004270  012777  014056  175074          MOV     #WORD,@DQSEC    ;LOAD THE BA
 1789  004276  105277  175066                  INCB    @DQREG          ;SELECT THE TRANSMITTER CC PRI.
 1790  004302  012777  177777  175062          MOV     #-1,@DQSEC      ;LOAD THE CC WITH -1
 1791  004310  112777  000012  175052          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER.
 1792  004316  053777  014064  175046          BIS     BITSEL,@DQSEC   ;LOAD MISC REG WITH NUMBER OF BITS PER CHAR.
 1793  004324  052777  000012  175040          BIS     #12,@DQSEC      ;ADD TO THAT TEST LOOP AND AUTO STEP.
 1794  004332  052777  000002  175024          BIS     #BIT1,@DQTCSR   ;SET TRANSMITTER IDLE MODE.
 1795  004340  042737  001252                  CLR     TEMP4
 1796  004344  042737  001252          2$:     ROR     TEMP4           ;SHIFT THE STORAGE OF DATA FROM THE TRANSMITTER.
 1797  004350  052777  175016                  INC     @DQSEC          ;CLOCK THE TRANSMITTER -UP-
 1798  004354  005377  175012                  DEC     @DQSEC          ;CLOCK THE TRANSMITTER -DOWN-
 1799  004360  017702  175006                  MOV     @DQSEC,R2       ;MOVE THE MISC REG TO R2
 1800  004364  042702  177577                  BIC     #177577,R2      ;CLEAR ALL BUT THE BIT WINDOW.
 1801  004370  050237  001252          3$:     BIS     R2,TEMP4        ;PLACE DATA INTO TEMPORY LOCATION
 1802  004374  005337  014062                  DEC     COUNT           ;IS CHARACTER COMPLETELY SHIFTED OUT?
 1803  004400  001361                          BNE     2$              ;BRANCH IF MORE BITS TO GO.
 1804  004402  005137  001252                  COM     TEMP4           ;COMPLIMENT DATA STORAGE
 1805  004406  012737  000026  001254          MOV     #26,TEMP5
 1806  004414  123737  001254  001252          CMPB    TEMP5,TEMP4
 1807  004422  001401                          BEQ     .+4
 1808  004424  104012                          HLT     12
 1809  004426  005337  001250                  DEC     TEMP3
 1810  004432  001274                          BNE     1$
 1811  004434  104400                          SCOPE
 1812
 1813
 1814
 1815
 1816
 1817
 1818                                          ;
 1819                                          ;TRANSMITTER DATA REALIBILITY TEST.
 1820                                          ;TEST TO TRANSMITT AN EIGHT
 1821                                          ;BIT BINARY COUNT PATTERN (000-377)
 1822                                          ;
 1823                                          ;NOTE THIS TEST IS FOR UP TO EIGHT BITS PER CHARACTER.
 1824                                          ;PARITY WILL BE ENABLED WHEN "PARFLG" IS NON-ZERO
 1825                                          ;
 1826
 1827                                  ;  TEST 24
 1828                                  ;*****************************************************************************
 1829  004436  012737  000024  001226  TST24:  MOV     #24,TSTNO
 1830  004444  012737  004570  001216          MOV     #TST25,NEXT
 1831  004452  012737  004472  001220          MOV     #2$,LOCK
 1832  004460  105037  012602                  CLRB    PARFLG
 1833  004464  005000                  1$:     CLR     R0              ;SET DATA TO ZERO
 1834  004466  005037  014052                  CLR     EXTFLG          ;TELL SUBROUTINE THIS IS FOR EIGHT BITS
 1835  004472  010037  014056          2$:     MOV     R0,WORD         ;PLACE DATA FOR WORK.
 1836  004476  005037  001252                  CLR     TEMP4           ;CCLEAR WHERE CHAR IS TO BE STORED
 1837  004502  104412                          MSTCLR                  ;MASTER CLEAR
```

```
1838  004504  004537  011266                  JSR     R5,TXSTRD       ;GO TO ROUTINE
1839  004510  000010                          8.                      ;NUMBER OF SHIFTS REQUIRED
1840  004512  004000                          4000                    ;EIGHT BITS
1841  004514  105737  012602                  TSTB    PARFLG
1842  004520  001402                          BEQ     .+6
1843  004522  004737  012444                  JSR     PC,GENPAR
1844  004526  013737  014056  001254          MOV     WORD,TEMP5      ;STORE  GOOD CHARACTER
1845  004534  123737  001254  001252          CMPB    TEMP5,TEMP4     ;COMPARE GOOD CHAR TO TX CHAR
1846  004542  001401                          BEQ     .+4             ;BR IF SAME
1847  004544  104012                          HLT 12                  ;DATA COMPARISON ERROR
1848  004546  104401                          SCOP1                   ;DOES USER WANT TO LOCK ON THIS CHAR?
1849  004550  105200                          INCB    R0              ;UPDATE GOOD CHARACTER
1850  004552  001347                          BNE     2$              ;IF NOT ALL CHARACTERS GO DO AGAIN
1851  004554  012700  000200                  MOV     #200,R0
1852  004560  105137  012602                  COMB    PARFLG
1853  004564  001342                          BNE     2$
1854  004566  104400                          SCOPE                   ;SCOPE THIS TEST
1855                                          ;
1856                                          ;TRANSMITTER DATA REALIBILITY TEST
1857                                          ;TEST TO TRANSMITT AN EIGHT BIT
1858                                          ;BINARY COUNT PATTERN (000400-177400)
1859                                          ;
1860                                          ;PARITY WILL BE ENABLED WHEN "PARFLG" IS NON-ZERO
1861                                          ;NOTE THIS IS FOR 16 BITS PER CHAR. (LOW BYTE IS=0; THE HIGH BYTE =BINARY COUNT.
1862
1863                                  ;  TEST 25
1864                                  ;*****************************************************************************
1865  004570  012737  000025  001226  TST25:  MOV     #25,TSTNO
1866  004576  012737  004730  001216          MOV     #TST26,NEXT
1867  004604  012737  004626  001220          MOV     #2$,LOCK
1868  004612  112737  000377  014052          MOVB    #377,EXTFLG     ;TELL SUBROUTINE THIS IS FOR 16 BITS PER CHAR
1869  004620  105037  012602                  CLRB    PARFLG          ;NO PARITY CHECKING NOW
1870  004624  005000                  1$:     CLR     R0              ;ZERO DATA POINTER
1871  004626  010037  014056          2$:     MOV     R0,WORD         ;PREPARE DATA FOR SUBROUTINE
1872  004632  000337  014056                  SWAB    WORD            ;PUT DATA IN HIGH BYTE
1873  004636  005037  001252                  CLR     TEMP4           ;ZERO STORE AREA
1874  004642  104412                          MSTCLR                  ;INIT DQ11
1875  004644  004537  011266                  JSR     R5,TXSTRD       ;GOTO SUBROUTINE
1876  004650  000020                          16.                     ;THIS IS NUMBER OF SHIFTS.
1877  004652  000000                          0                       ;THIS IS BITS/PER/CHARACTER SELECT
1878  004654  105737  012602                  TSTB    PARFLG          ;IS PARITY ENABLED?
1879  004660  001402                          BEQ     .+6             ;BR IF NOT ENABLED
1880  004662  004737  012444                  JSR     PC,GENPAR       ;GO CALCULATE THE PARITY
1881  004666  013737  014056  001254          MOV     WORD,TEMP5      ;STORE THE CHARACTER
1882  004674  023737  001254  001252          CMP     TEMP5,TEMP4     ;IS THE CHARACETER CORRECT
1883  004702  001401                          BEQ     .+4             ;BR IF GOOD
1884  004704  104012                          HLT     12              ;DATA COMPARISON ERROR.
1885  004706  104401                          SCOP1                   ;LOCK ON DATA? (SW09=1)
1886  004710  105200                          INCB    R0              ;UPDATE DATA POINTER
1887  004712  001345                          BNE     2$              ;BR IF MORE TO GO
1888  004714  012700  000200                  MOV     #200,R0
1889  004720  105137  012602                  COMB    PARFLG          ;NOW ENABLE THE PARITY TEST.
1890  004724  001340                          BNE     2$              ;BR IF FIRST TIME FOR PARITY
1891  004726  104400                          SCOPE                   ;SCOPE THE TEST.
```

```
1892
1893                                            ;
1894                                            ;RECEIVER CHARACTER LENGTH TEST
1895                                            ;TEST THAT ALL CHARACTER
1896                                            ;LENGTHS WORK CORRECTLY.
1897                                            ;
1898                                            ;TEST OF RX CHARACTER LENGTH 2 BITS LONG.
1899                                            ;
1900                                        ;  TEST 26
1901                                        ;*****************************************************************************
1902  004730  012737  000026  001226    TST26:  MOV     #26,TSTNO
1903  004736  012737  004756  001216            MOV     #TST27,NEXT
1904  004744  004537  012132                    JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1905  004750  007000                            7000                    ;CHARACTER EXPECTED TO FIND
1906  004752  000002                            2                       ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1907  004754  104400                            SCOPE                   ;SCOPE THIS TEST
1908
1909                                            ;TEST OF RX CHARACTER LENGTH 3 BITS LONG.
1910                                            ;
1911                                        ;  TEST 27
1912                                        ;*****************************************************************************
1913  004756  012737  000027  001226    TST27:  MOV     #27,TSTNO
1914  004764  012737  005004  001216            MOV     #TST30,NEXT
1915  004772  004537  012132                    JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1916  004776  006400                            6400                    ;CHARACTER EXPECTED TO FIND
1917  005000  000004                            4                       ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1918  005002  104400                            SCOPE                   ;SCOPE THIS TEST
1919
1920                                            ;TEST OF RX CHARACTER LENGTH 4 BITS LONG.
1921                                            ;
1922                                        ;  TEST 30
1923                                        ;*****************************************************************************
1924  005004  012737  000030  001226    TST30:  MOV     #30,TSTNO
1925  005012  012737  005032  001216            MOV     #TST31,NEXT
1926  005020  004537  012132                    JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1927  005024  006000                            6000                    ;CHARACTER EXPECTED TO FIND
1928  005026  000010                            10                      ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1929  005030  104400                            SCOPE                   ;SCOPE THIS TEST
1930
1931                                            ;TEST OF RX CHARACTER LENGTH 5 BITS LONG.
1932                                            ;
1933                                        ;  TEST 31
1934                                        ;*****************************************************************************
1935  005032  012737  000031  001226    TST31:  MOV     #31,TSTNO
1936  005040  012737  005060  001216            MOV     #TST32,NEXT
1937  005046  004537  012132                    JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1938  005052  005400                            5400                    ;CHARACTER EXPECTED TO FIND
1939  005054  000020                            20                      ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1940  005056  104400                            SCOPE                   ;SCOPE THIS TEST
1941
1942                                            ;TEST OF RX CHARACTER LENGTH 6 BITS LONG.
1943                                            ;
1944                                        ;  TEST 32
1945                                        ;*****************************************************************************
1946  005060  012737  000032  001226    TST32:  MOV     #32,TSTNO
1947  005066  012737  005106  001216            MOV     #TST33,NEXT
```

```
1948  005074  004537  012132                  JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1949  005100  005000                          5000                    ;CHARACTER EXPECTED TO FIND
1950  005102  000040                          40                      ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1951  005104  104400                          SCOPE                   ;SCOPE THIS TEST
1952
1953                                          ;TEST OF RX CHARACTER LENGTH 7 BITS LONG.
1954                                          ;
1955                                  ;  TEST 33
1956                                  ;*****************************************************************
1957  005106  012737  000033  001226  TST33:  MOV     #33,TSTNO
1958  005114  012737  005134  001216          MOV     #TST34,NEXT
1959  005122  004537  012132                  JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1960  005126  004400                          4400                    ;CHARACTER EXPECTED TO FIND
1961  005130  000100                          100                     ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1962  005132  104400                          SCOPE                   ;SCOPE THIS TEST
1963
1964                                          ;TEST OF RX CHARACTER LENGTH 8 BITS LONG.
1965                                          ;
1966                                  ;  TEST 34
1967                                  ;*****************************************************************
1968  005134  012737  000034  001226  TST34:  MOV     #34,TSTNO
1969  005142  012737  005162  001216          MOV     #TST35,NEXT
1970  005150  004537  012132                  JSR     R5,RXLNG        ;GOTO JSR SUBROUTINE
1971  005154  004000                          4000                    ;CHARACTER EXPECTED TO FIND
1972  005156  000200                          200                     ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1973  005160  104400                          SCOPE                   ;SCOPE THIS TEST
1974
1975                                          ;
1976                                          ;RECEIVER CHARACTER LENGTH TEST
1977                                          ;FOR CHARACTERS OVER EIGHT BITS LONG.
1978                                          ;
1979                                          ;
1980                                          ;TEST OF CHARACTER LENGTH 9 BITS LONG.
1981                                          ;
1982                                  ;  TEST 35
1983                                  ;*****************************************************************
1984  005162  012737  000035  001226  TST35:  MOV     #35,TSTNO
1985  005170  012737  005210  001216          MOV     #TST36,NEXT
1986  005176  004537  012302                  JSR     R5,RXELNG       ;GOTO SUBROUTINE
1987  005202  003400                          3400                    ;CHARACTER EXPECTED TO BE FOUND
1988  005204  000400                          400                     ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
1989  005206  104400                          SCOPE                   ;SCOPE THIS TEST
1990
1991                                          ;TEST OF CHARACTER LENGTH 10 BITS LONG.
1992                                          ;
1993                                  ;  TEST 36
1994                                  ;*****************************************************************
1995  005210  012737  000036  001226  TST36:  MOV     #36,TSTNO
1996  005216  012737  005236  001216          MOV     #TST37,NEXT
1997  005224  004537  012302                  JSR     R5,RXELNG       ;GOTO SUBROUTINE
1998  005230  003000                          3000                    ;CHARACTER EXPECTED TO BE FOUND
1999  005232  001000                          1000                    ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2000  005234  104400                          SCOPE                   ;SCOPE THIS TEST
2001
2002                                          ;TEST OF CHARACTER LENGTH 11 BITS LONG.
2003                                          ;
```

```
2004                                    ;  TEST 37
2005                                    ;*****************************************************************************
2006  005236  012737  000037  001226    TST37:  MOV     #37,TSTNO
2007  005244  012737  005264  001216            MOV     #TST40,NEXT
2008  005252  004537  012302                    JSR     R5,RXELNG       ;GOTO SUBROUTINE
2009  005256  002400                            2400                    ;CHARACTER EXPECTED TO BE FOUND
2010  005260  002000                            2000                    ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2011  005262  104400                            SCOPE                   ;SCOPE THIS TEST
2012
2013                                            ;TEST OF CHARACTER LENGTH 12 BITS LONG.
2014                                            ;
2015                                    ;  TEST 40
2016                                    ;*****************************************************************************
2017  005264  012737  000040  001226    TST40:  MOV     #40,TSTNO
2018  005272  012737  005312  001216            MOV     #TST41,NEXT
2019  005300  004537  012302                    JSR     R5,RXELNG       ;GOTO SUBROUTINE
2020  005304  002000                            2000                    ;CHARACTER EXPECTED TO BE FOUND
2021  005306  004000                            4000                    ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2022  005310  104400                            SCOPE                   ;SCOPE THIS TEST
2023
2024                                            ;TEST OF CHARACTER LENGTH 13 BITS LONG.
2025                                            ;
2026                                    ;  TEST 41
2027                                    ;*****************************************************************************
2028  005312  012737  000041  001226    TST41:  MOV     #41,TSTNO
2029  005320  012737  005340  001216            MOV     #TST42,NEXT
2030  005326  004537  012302                    JSR     R5,RXELNG       ;GOTO SUBROUTINE
2031  005332  001400                            1400                    ;CHARACTER EXPECTED TO BE FOUND
2032  005334  010000                            10000                   ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2033  005336  104400                            SCOPE                   ;SCOPE THIS TEST
2034
2035                                            ;TEST OF CHARACTER LENGTH 14 BITS LONG.
2036                                            ;
2037                                    ;  TEST 42
2038                                    ;*****************************************************************************
2039  005340  012737  000042  001226    TST42:  MOV     #42,TSTNO
2040  005346  012737  005366  001216            MOV     #TST43,NEXT
2041  005354  004537  012302                    JSR     R5,RXELNG       ;GOTO SUBROUTINE
2042  005360  001000                            1000                    ;CHARACTER EXPECTED TO BE FOUND
2043  005362  020000                            20000                   ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2044  005364  104400                            SCOPE                   ;SCOPE THIS TEST
2045
2046                                            ;TEST OF CHARACTER LENGTH 15 BITS LONG.
2047                                            ;
2048                                    ;  TEST 43
2049                                    ;*****************************************************************************
2050  005366  012737  000043  001226    TST43:  MOV     #43,TSTNO
2051  005374  012737  005414  001216            MOV     #TST44,NEXT
2052  005402  004537  012302                    JSR     R5,RXELNG       ;GOTO SUBROUTINE
2053  005406  000400                            400                     ;CHARACTER EXPECTED TO BE FOUND
2054  005410  040000                            40000                   ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2055  005412  104400                            SCOPE                   ;SCOPE THIS TEST
2056
2057                                            ;TEST OF CHARACTER LENGTH 16 BITS LONG.
2058                                            ;
2059                                    ;  TEST 44
```

```
2060                                    ;*****************************************************************************
2061  005414  012737  000044  001226  TST44:  MOV     #44,TSTNO
2062  005422  012737  005442  001216           MOV     #TST45,NEXT
2063  005430  004537  012302                   JSR     R5,RXELNG       ;GOTO SUBROUTINE
2064  005434  000000                           0                       ;CHARACTER EXPECTED TO BE FOUND
2065  005436  100000                           100000                  ;BITS/PER/CHAR TO BE PLACED INTO MISC REG
2066  005440  104400                           SCOPE                   ;SCOPE THIS TEST
2067
2068                                           ;
2069                                           ;TEST THAT SYNC1 AND SYNC2
2070                                           ;SET WHEN RECEIVER ACTIVE SET
2071                                           ;AND IF THEY DO THE TEST THAT THEY
2072                                           ;CLEAR BY MASTER CLEAR.
2073                                           ;
2074                                    ;  TEST 45
2075                                    ;*****************************************************************************
2076  005442  012737  000045  001226  TST45:  MOV     #45,TSTNO
2077  005450  012737  005546  001216           MOV     #TST46,NEXT
2078  005456  112777  000012  173704           MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER
2079  005464  012777  000012  173700           MOV     #12,@DQSEC      ;SET TEST LOOP AND AUTO/STEP
2080  005472  052777  010000  173660           BIS     #BIT12,@DQRCSR  ;SET RX ACTIVE
2081  005500  017700  173666                   MOV     @DQSEC,R0       ;READ THE DQSEC
2082  005504  042700  147777                   BIC     #147777,R0      ;CLEAR ALL BUT SYNC 1 AND SYNC 2
2083  005510  022700  030000                   CMP     #30000,R0       ;DID BOTH OF THEM SET?
2084  005514  001401                           BEQ     .+4             ;BR IF GOOD
2085  005516  104016                           HLT 16                  ;SYNC 1 AND SYNC 2 NOT SET.
2086  005520  052777  000040  173644           BIS     #BIT5,@DQSEC    ;SET MASTER CLEAR
2087  005526  112777  000012  173634           MOVB    #MISC.,@DQREG   ;RESELECT THE MISC REGISTER
2088  005534  005777  173632                   TST     @DQSEC          ;IS THE DQSEC =0
2089  005540  001401                           BEQ     .+4             ;BR IF YES
2090  005542  104017                           HLT 17                  ;DQSEC NOT=0
2091  005544  104400                           SCOPE                   ;SCOPE THIS TEST.
2092
2093
2094
2095                                           ;SYNC TESTS.
2096                                           ;TEST THAT RECEIVER ACTIVE AND SYNC 1 AND SYNC 2
2097                                           ;ASSERT AT THE PROPER TIME.
2098                                           ;TEST INVOLVES BOTH SYNCING AN AN EIGHT BIT CHAR
2099                                           ;AND A SIXTEEN BIT CHAR.
2100
2101                                           ;LOOK AT LOCATION "WORD"
2102                                           ;IF "WORD IS EQUAL TO 377 THE THE EIGHT
2103                                           ;BIT PER CHAR IS BEING EXECUTED.
2104                                           ;IF "WORD" IS EQUAL TO 177777 THEN THE SYXTEEN
2105                                           ;BIT PER CHAR IS BEING EXECUTED.
2106
2107                                    ;  TEST 46
2108                                    ;*****************************************************************************
2109  005546  012737  000046  001226  TST46:  MOV     #46,TSTNO
2110  005554  012737  005576  001216           MOV     #TST47,NEXT
2111  005562  004537  005626                   JSR     R5,SYNTST       ;GOTO THE ACTUAL TEST.
2112  005566  000377                           377                     ;DATA CHAR FOR EIGHT BITS PER CHAR.
2113  005570  000010                           8.                      ;SHIFTS PER CHAR. NEEDED FOR TEST
2114  005572  004000                           4000                    ;BITS PER CHAR SELECTION FOR DQSEC.
2115  005574  104400                           SCOPE
```

DQ11 TRANSMITTER AND RECEIVER EXERCISER.

```
2116
2117                                    ;ABOVE TEST FOR EIGHT BITS PER CHAR.
2118                                    ;BELOW TEST FOR SIXTEEN BITS PER CHAR.
2119
2120                                    ;  TEST 47
2121                                    ;*************************************************************************
2122  005576  012737  000047  001226  TST47:  MOV     #47,TSTNO
2123  005604  012737  006236  001216          MOV     #TST50,NEXT
2124  005612  004537  005626                  JSR     R5,SYNTST       ;GOTO THE ACTUAL TEST
2125  005616  177777                          177777                  ;DATA FOR 16 BTS PER CHAR.
2126  005620  000020                          16.                     ;SHIFTS PER CHAR.
2127  005622  000000                          DDCD                    ;SELECTION FOR DQSEC BITS/PER CHAR.
2128  005624  104400                          SCOPE                   ;SCOPE THIS TEST
2129
2130
2131                                          ;
2132                                          ;TEST THAT SYNC 1 AND SYNC 2
2133                                          ;SET WHEN DATA IS RECEIVED
2134                                          ;THIS TEST WILL CHECK FOR EITHER
2135                                          ;1 OR 2 SYNC CHARACTERS.
2136                                          ;
2137  005626                          SYNTST:
2138  005626  012537  014056                  MOV     (R5)+,WORD      ;GET DATA CHARACTER
2139  005632  011537  005722                  MOV     (R5),4$         ;GET NUMBER OF SHIFTS.
2140  005636  011537  006044                  MOV     (R5),6$         ;" " "
2141  005642  162737  000002  006044          SUB     #2,6$           ;ADJUST SHIFTS.
2142  005650  012537  006166                  MOV     (R5)+,8$        ;GET THE SHIFTS
2143  005654  005337  006166                  DEC     8$              ;ADJUST THE SHIFTS.
2144  005660  011537  005724                  MOV     (R5),5$         ;GET THE BITS/PER CHAR.
2145  005664  011537  006046                  MOV     (R5),7$         ;" " "
2146  005670  012537  006170                  MOV     (R5)+,9$        ;" " "
2147  005674  010537  006234                  MOV     R5,10$          ;SAVE THE PC TO RETURN
2148  005700  104412                          MSTCLR                  ;INIT THE DQ11
2149  005702  112777  000011  173460          MOVB    #11,@DQREG      ;SEL THE SYNC REG
2150  005710  012777  177777  173454          MOV     #-1,@DQSEC      ;SET SYNC CHAR TO ALL 1'S
2151  005716  004537  011522                  JSR     R5,RXSTRA       ;GOTO THE SUBROUTINE
2152  005722  000001                  4$:     .BLKW 1                 ;NUMBER OF SHIFTS
2153  005724  000001                  5$:     .BLKW 1                 ;MISC   FUNCTION
2154  005726  112777  000012  173434          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER
2155  005734  032777  020000  173430          BIT     #BIT13,@DQSEC   ;IS SYNC 1 UP YET
2156  005742  001401                          BEQ     .+4             ;BR IF NO
2157  005744  104000                          HLT                     ;SYNC 1 UP TOO SOON
2158  005746  032777  010000  173404          BIT     #BIT12,@DQRCSR  ;ACTIVE UP?
2159  005754  001401                          BEQ     .+4             ;BR IF ACTIVE NOT UP
2160  005756  104000                          HLT                     ;ACTIVE UP TOO SOON.
2161  005760  005277  173406                  INC     @DQSEC          ;CLOCK UP
2162  005764  005377  173402                  DEC     @DQSEC          ;CLOCK DN
2163  005770  032737  100000  001510          BIT     #SYNBIT,DQSTAT  ;NUMBER OF SYNC CHARS=?
2164  005776  001003                          BNE     .+10            ;BR IF TWO SYNC CHAR.
2165  006000  005337  006166                  DEC     8$              ;ADJUST COUNT WHEN ONE SYNC SELECTED.
2166  006004  000442                          BR      1$              ;BR TO TEST ONE SYNC CHAR.
2167  006006  017700  173360                  MOV     @DQSEC,R0       ;READ DQSEC
2168  006012  042700  147777                  BIC     #147777,R0      ;CLEAR GARBAGE
2169  006016  022700  020000                  CMP     #20000,R0       ;IS SYNC 1 UP?
2170  006022  001401                          BEQ     .+4             ;BR IF YES
2171  006024  104000                          HLT                     ;SYNC ONE NOT SET OR SYNC 2 IS SET
```

```
2172  006026  032777  010000  173324          BIT     #BIT12,@DQRCSR  ;ACTIVE UP?
2173  006034  001401                          BEQ     .+4             ;BR IF ACTIVE =0
2174  006036  104000                          HLT                     ;ACTIVE UP TOO SOON
2175  006040  004537  011522                  JSR     R5,RXSTRA       ;GOTO THE SUBROUTINE
2176  006044  000001                  6$:     .BLKW 1                 ;NUMBER OF SHIFTS MINUS 2
2177  006046  000001                  7$:     .BLKW 1                 ;MISC FUNCTION (PERS PER CHAR).
2178  006050  017700  173316                  MOV     @DQSEC,R0       ;READ THE DQSEC
2179  006054  042700  147777                  BIC     #147777,R0      ;CLEAR ALL BUT SYNC 1 AND SYNC 2
2180  006060  022700  020000                  CMP     #20000,R0       ;ARE BOTH SYNC 1 *AND* SYNC 2 SET?
2181  006064  001401                          BEQ     .+4             ;BR IF YES
2182  006066  104000                          HLT                     ;EITHER OR BOTH SYNC 1 OR SYNC 2 NOT SET.
2183  006070  032777  010000  173262          BIT     #BIT12,@DQRCSR  ;ACTIVE UP??
2184  006076  001401                          BEQ     .+4             ;BR IF ACTIVE NOT SET.
2185  006100  104000                          HLT                     ;ACTIVE UP TOO SOON
2186  006102  005277  173264                  INC     @DQSEC          ;CLOCK UP.
2187  006106  005377  173260                  DEC     @DQSEC          ;CLOCK DN
2188  006112  017700  173254          1$:     MOV     @DQSEC,R0       ;READ AND SAVE DQSEC
2189  006116  042700  147777                  BIC     #147777,R0      ;CLEAR ALL BUT SYNC 1 AND SYNC 2
2190  006122  022700  030000                  CMP     #30000,R0       ;ARE BOTH SYNC 1 AND SYNC 2 SET?
2191  006126  001401                          BEQ     .+4             ;BR IF YES
2192  006130  104000                          HLT                     ;EITHER OR BOTH SYNC 1 OR SYNC 2 NOT SET.
2193  006132  032737  004000  001510          BIT     #ACTBIT,DQSTAT  ;WHEN DO YOU GO ACTIVE??
2194  006140  001006                          BNE     2$              ;BR IF ACTIVE ON FIRST NON-SYNC.
2195  006142  032777  010000  173210          BIT     #BIT12,@DQRCSR  ;IS ACTIVE UP?
2196  006150  001001                          BNE     .+4             ;*** NOW ACTIVE SHOULD BE SET***
2197  006152  104000                          HLT                     ;NOW ACTIVE SHOULD BE UP..
2198  006154  000424                          BR      3$              ;ALL DONE GO HOME
2199  006156  005037  014056          2$:     CLR     WORD            ;SET DATA TO NON-SYNC
2200  006162  004537  011522                  JSR     R5,RXSTRA       ;PUSH IT INTO THE RECEIVER
2201  006166  000001                  8$:     .BLKW 1                 ;NUMBER OF SHIFTS MINUS 1
2202  006170  000001                  9$:     .BLKW 1                 ;MISC FUNCTION.
2203  006172  032777  010000  173160          BIT     #BIT12,@DQRCSR  ;ACTIVE UP
2204  006200  001401                          BEQ     .+4             ;ONE MORE SHIFT BEFORE ACTIVE=1
2205  006202  104000                          HLT                     ;ACTIVE IS UP TOO SOON
2206  006204  005277  173162                  INC     @DQSEC          ;FINAL CLOCK UP
2207  006210  005377  173156                  DEC     @DQSEC          ;      CLOCK DN
2208  006214  032777  010000  173136          BIT     #BIT12,@DQRCSR  ;**** NOW ACTIVE SHOULD BE SET **
2209  006222  001001                          BNE     .+4             ;BR IF ACTIVE =1
2210  006224  104000                          HLT                     ;ACTIVE ON FIRST NON-SYNC NOT WORKING.
2211  006226  013705  006234          3$:     MOV     10$,R5          ;RESTORE PC POINTER
2212  006232  000205                          RTS     R5              ;GOTO MAIN TEST
2213  006234  000000                  10$:    0                       ;STORE R5 (PC) HERE.
2214
2215
2216
2217
2218                                          ;
2219                                          ;TEST OF RECEIVER CHARACTER COUNT AND BUSS
2220                                          ;ADDRESS. TEST TO MAKE SURE
2221                                          ;THAT THEY INCREMENT PROPPERELY.
2222                                          ;
2223                                          ;TEST WITH CHARACTER COUNT OF -1 (000)
2224                                          ;
2225
2226                                  ;  TEST 50
2227                                  ;*************************************************************************
```

```
2228  006236  012737  000050  001226  TST50:  MOV     #50,TSTNO
2229  006244  012737  006364  001216          MOV     #TST51,NEXT
2230  006252  104412                          MSTCLR                  ;INIT DQ11
2231  006254  105077  173110                  CLRB    @DQREG          ;SEL RX BA PRI.
2232  006260  012777  014116  173104          MOV     #RXBUFF,@DQSEC  ;SET RX BA PRI.
2233  006266  105277  173076                  INCB    @DQREG          ;SEL RX WC PRI.
2234  006272  012777  177777  173072          MOV     #-1,@DQSEC      ;ONE CHAR RECEIVE
2235  006300  112777  000012  173062          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REG.
2236  006306  012777  004010  173056          MOV     #4010,@DQSEC    ;SET EIGHT BITS AND TEST LOOP
2237  006314  012777  010001  173036          MOV     #10001,@DQRCSR  ;SET RX ACTIVE AND RX GO!!
2238  006322  105777  173032                  TSTB    @DQRCSR         ;RX PRI DONE?
2239  006326  100375                          BPL     .-4             ;HANG HERE TILL DONE.
2240  006330  105077  173034                  CLRB    @DQREG          ;GET RA BA PRI.
2241  006334  022777  014117  173030          CMP     #RXBUFF+1,@DQSEC        ;DID BA INC RIGHT?
2242  006342  001401                          BEQ     .+4             ;BR IF BA GOOD
2243  006344  104000                          HLT                     ;RX BA ERROR.
2244  006346  105277  173016                  INCB    @DQREG          ;GET RX WC PRI.
2245  006352  005777  173014                  TST     @DQSEC          ;DID IT GOTO ZERO?
2246  006356  001401                          BEQ     .+4             ;BR IF YES
2247  006360  104000                          HLT                     ;RX WC PRI NOT =0
2248  006362  104400                          SCOPE                   ;SCOPE THE TEST
2249
2250
2251
2252
2253                                          ;
2254                                          ;TEST OF RECEIVER CHARACTER COUNT
2255                                          ;AND BUSS ADDRESS
2256                                          ;WITH A CHARACTER COUNT OF -2 (EVEN)
2257                                          ;MAKING SURE THAT THE CC AND BA
2258                                          ;INCREMENT CORRECTLY.
2259
2260
2261                                  ;  TEST 51
2262                                  ;*************************************************************************
2263  006364  012737  000051  001226  TST51:  MOV     #51,TSTNO
2264  006372  012737  006512  001216          MOV     #TST52,NEXT
2265  006400  104412                          MSTCLR                  ;ISSUE CLEAR
2266  006402  105077  172762                  CLRB    @DQREG          ;SELECT THE RX BA PRI
2267  006406  012777  014116  172756          MOV     #RXBUFF,@DQSEC  ;SET RX BA PRI.
2268  006414  105277  172750                  INCB    @DQREG          ;SELECT RX WC PRI.
2269  006420  012777  177776  172744          MOV     #-2,@DQSEC      ;SET FOR TWO CHARS
2270  006426  112777  000012  172734          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER
2271  006434  012777  004010  172730          MOV     #4010,@DQSEC    ;SET EIGHT BITS AND TEST LOOP
2272  006442  012777  010001  172710          MOV     #10001,@DQRCSR  ;SET RX ACTIVE AND GO!!
2273  006450  105777  172704                  TSTB    @DQRCSR         ;WAIT FOR RX PRI DONE.
2274  006454  100375                          BPL     .-4             ;HANG HERE TILL DONE
2275  006456  105077  172706                  CLRB    @DQREG          ;SELECT THE RX BA PRI
2276  006462  022777  014120  172702          CMP     #RXBUFF+2,@DQSEC        ;DID RX BA INCREMENT RIGHT?
2277  006470  001401                          BEQ     .+4             ;BR IF GOOD
2278  006472  104000                          HLT                     ;RX BA ERROR
2279  006474  105277  172670                  INCB    @DQREG          ;SELECT THE RX WC PRI.
2280  006500  005777  172666                  TST     @DQSEC          ;DID IF GOTO ZERO
2281  006504  001401                          BEQ     .+4             ;BR IF YES
2282  006506  104000                          HLT                     ;RX WC NOT =ZERO
2283  006510  104400                          SCOPE                   ;SCOPE THE TEST
```

```
                                        ;RECEIVER DATA REALIBILITY TEST.
                                        ;TEST TO RECEIVE A SIXTEEN
                                        ;BIT BINARY COUNT PATTERN (000000-177777)
                                        ;
                                        ;NOTE: IF PARFLG IS NON-ZERO THE PARITY TEST IS
                                        ;      IN PROGRESS. THERE ARE NO ERRORS EXPECTED
                                        ;       PARITY TEST DATA (177400-177777)
                                        ;
                                ;  TEST 52
                                ;*************************************************************************
006512  012737  000052  001226  TST52:  MOV     #52,TSTNO
006520  012737  006660  001216          MOV     #TST53,NEXT
006526  012737  006550  001220          MOV     #1$,LOCK
006534  105037  012602                  CLRB    PARFLG          ;SET FOR NO PARITY NOW
006540  112737  000377  014052          MOVB    #377,EXTFLG     ;TELL SUBROUTINE 16 BIT CHAR.
006546  005000                          CLR     R0              ;ZERO DATA POINTER
006550  104412                  1$:     MSTCLR                  ;ISSUE CLEAR DQ11
006552  010037  014056                  MOV     R0,WORD         ;LOAD DATA FOR SUB ROUTINE
006556  105737  012602                  TSTB    PARFLG          ;IS PARITY ENABLED?
006562  001402                          BEQ     .+6             ;BR IF NO
006564  004737  012444                  JSR     PC,GENPAR       ;GO AND FIGURE PARITY.
006570  004537  011522                  JSR     R5,RXSTRA       ;GO PUSH CHARACTER INTO RECEIVER.
006574  000020                          16.                     ;NUMBER OF SHIFTS NEEDED
006576  000000                          0000                    ;BITS PER/CHAR FOR MISC REG
006600  013737  014116  001252          MOV     RXBUFF,TEMP4    ;GET EXPECTED
006606  013737  014056  001254          MOV     WORD,TEMP5      ;GET EXPECTED
006614  005777  172546          2$:     TST     @DQERR          ;ANY ERRORS?
006620  100001                          BPL     .+4             ;BR IF NO ERRORS
006622  104000                          HLT                     ;DQ11 ERROR FLAG SET CHECK SEL 4
006624  023737  001254  001252          CMP     TEMP5,TEMP4     ;DATA OK??
006632  001401                          BEQ     .+4             ;BR IF GOOD DATA
006634  104020                          HLT 20                  ;RECEIVER DATA COMPARISON ERROR.
006636  104401                          SCOPE1                  ;LOCK ON SLECTED DATA (SW09=1)
006640  005200                          INC     R0              ;UPDATE DATA POINTER.
006642  001342                          BNE     1$              ;BR IF MORE CHARS TO GO.
006644  012700  177400                  MOV     #177400,R0      ;SET FOR PARITY TEST.
006650  105137  012602                  COMB    PARFLG          ;TURN PARITY ON NOW
006654  001335                          BNE     1$              ;DO TEST WITH PARITY ENABLED NOW.
006656  104400                          SCOPE                   ;SCOPE THE TEST.
                                        ;RECEIVER PARITY ERROR TEST.
                                        ;THE PARITY WILL PURPOSELY BE MADE INCORRECT AND
                                        ;AN ERROR WILL BE EXPECTED EVERY TIME.
                                        ;
                                        ;TEST TO RECEIVE A SIXTEEN
                                        ;BIT BINARY COUNT PATTERN (000000-000177)
                                        ;
                                ;  TEST 53
                                ;*************************************************************************
```

DZDQDD.P11 21-DEC-76 16:32 DQ11 TRANSMITTER AND RECEIVER EXERCISER.

```
2340  006660  012737  000053  001226  TST53:  MOV     #53,TSTNO
2341  006666  012737  007032  001216          MOV     #TST54,NEXT
2342  006674  012737  006720  001220          MOV     #1$,LOCK
2343  006702  112737  000377  012602          MOVB    #377,PARFLG     ;TELL SUBROUTINE PARITY IS ENABLED.
2344  006710  112737  000377  014052          MOVB    #377,EXTFLG     ;TELL SUBROUTINE THIS IS A 16 BIT CHAR.
2345  006716  005000                          CLR     R0              ;CLEAR DATA POINTER
2346  006720  104412                  1$:     MSTCLR                  ;INIT DQ11
2347  006722  012737  000377  011766          MOV     #377,NPRFLG     ;SET FOR SUBROUTINE.
2348  006730  010037  014056                  MOV     R0,WORD         ;LOAD DATA
2349  006734  004737  012444                  JSR     PC,GENPAR       ;CALCULATE PARITY.
2350  006740  032737  100000  014056          BIT     #BIT15,WORD     ;CHECK PARITY BIT
2351  006746  001404                          BEQ     .+12            ;BR IF PARITY BIT CLEARED
2352  006750  042737  100000  014056          BIC     #BIT15,WORD     ;PARITY BIT SET ;; SO CLEAR IT.
2353  006756  000403                          BR      .+10            ;CONTINUE TEST
2354  006760  052737  100000  014056          BIS     #BIT15,WORD     ;PARITY BIT CLR ;; SO SET IT.
2355  006766  004537  011522                  JSR     R5,RXSTRA       ;PUSH CHARACTER INTO RECEIVER
2356  006772  000020                          16.                     ;SHIFTS NEEDED.
2357  006774  000000                          0000                    ;BITS PER CHAR SELECT.
2358  006776  013737  014116  001252          MOV     RXBUFF,TEMP4    ;GET ACTUAL..
2359  007004  013737  014056  001254          MOV     WORD,TEMP5      ;GET EXPECTED..
2360  007012  005777  172350          2$:     TST     @DQERR          ;DID THE ERROR FLAG SET..**..
2361  007016  100401                          BMI     .+4             ;BR IF AN ERROR OCCURED.
2362  007020  104000                          HLT                     ;ERROR NO ERROR (PARITY ERROR)
2363  007022  104401                          SCOP1                   ;LOCK ON CHARACTER? (SW09=1)
2364  007024  105200                          INCB    R0              ;UPDATE DATA POINTER.
2365  007026  100334                          BPL     1$              ;BR IF NOT 200(8) CHARS DONE.
2366  007030  104400                          SCOPE                   ;SCOPE THIS TEST
2367
2368
2369                                          ;
2370                                          ;TEST OF RECEIVER HALF DUPLEX
2371                                          ;TEST TO TRANSMITT
2372                                          ;A TWO HUNDRED CHARACTER BURST OF DATA CHARACTERS
2373                                          ;WITH THE RECEIVER IN HALF DUPLEX
2374                                          ;MAKING SURE THAT THE RECEIVER
2375                                          ;DOESNT RECEIVE ANY CHARACTERS.
2376
2377
2378                                  ;  TEST 54
2379                                  ;*****************************************************************************
2380  007032  012737  000054  001226  TST54:  MOV     #54,TSTNO
2381  007040  012737  007434  001216          MOV     #TST55,NEXT
2382  007046  005000                          CLR     R0              ;INIT DATA REG
2383  007050  012704  014524                  MOV     #TXBUFF,R4      ;PREPARE TO FILL TX BUFFER WITH BINARY COUNT.
2384  007054  110024                  1$:     MOVB    R0,(R4)+        ;START FILLING TX BUFF
2385  007056  105200                          INCB    R0              ;UPDATE DATA REG
2386  007060  100375                          BPL     1$              ;BRANCH IF BUFFER HASN'T BEEN FILLED
2387  007062  104413                  2$:     MEMCLR                  ;INIT THE DEVICE
2388  007064  005000                          CLR     R0              ;CLEAR COUNT REG
2389  007066  012704  014116                  MOV     #RXBUFF,R4      ;PREPARE TO CLEAR THE RECEIVER BUFFER.
2390  007072  105024                  3$:     CLRB    (R4)+           ;START CLEARING RX BUFF
2391  007074  105200                          INCB    R0              ;UPDATE THE COUNTER
2392  007076  001375                          BNE     3$              ;IS RX BUFF ALL CLEARED?
2393  007100  105077  172264                  CLRB    @DQREG          ;SELECT THE RECEIVER BA PRI
2394  007104  012777  014116  172260          MOV     #RXBUFF,@DQSEC  ;LOAD THE BA
2395  007112  105277  172252                  INCB    @DQREG          ;SELECT THE RECEIVER CC PRI
```

```
2396  007116  012777  177600  172246          MOV     #-200,@DQSEC    ;LOAD THE CC WITH -200 (I WANT TO RECEIVE 200 CHARACTERS
2397  007124  105277  172240                  INCB    @DQREG          ;SELECT THE TX BA PRI
2398  007130  012777  014522  172234          MOV     #SYNC,@DQSEC    ;LOAD THE TX BA WITH STARTING ADD OF TX DATA PLUS THE SY
2399  007136  105277  172226                  INCB    @DQREG          ;SELECT THE TX CC PRI
2400  007142  012777  177576  172222          MOV     #-202,@DQSEC    ;LOAD THE TX CC WITH -202 (FOUR HUNDRED CHARACTERS AND T
2401  007150  112777  000011  172212          MOVB    #11,@DQREG      ;SELECT THE SYNC REGISTER
2402  007156  013777  014520  172206          MOV     .SYNC,@DQSEC    ;LOAD IT WITH THE SYNC CHAR
2403  007164  105277  172200                  INCB    @DQREG          ;SELECT THE MISC REGISTER
2404  007170  012777  004010  172174          MOV     #4010,@DQSEC    ;LOAD IT WITH EIGHT BITS PER/CHAR AND TEST LOOP
2405  007176  005037  001244                  CLR     TEMP1           ;ZERO DELAY LOC1
2406  007202  012737  000020  001246          MOV     #20,TEMP2       ;SET DELAY FOR 20X177777 (8)
2407  007210  012777  000011  172142          MOV     #11,@DQRCSR     ;SET RECEIVER HALF DUPLEX AND GO!!
2408  007216  005277  172142                  INC     @DQTCSR         ;SET TRANSMITTER GO!!!
2409  007222  105777  172136          4$:     TSTB    @DQTCSR         ;TRANSMITTER DONE??
2410  007226  100407                  BMI     5$              ;BRANCH IF TRANSMITTER IS DONE.
2411  007230  005237  001244                  INC     TEMP1           ;START THE DELAY
2412  007234  001372                  BNE     4$              ;DELAY-----
2413  007236  005337  001246                  DEC     TEMP2           ;DELAY-----TRANSMITTER  DONE?
2414  007242  001367                  BNE     4$              ;DELAY-----
2415  007244  104000                  HLT                     ;TRANSMITTER DONE NEVER SET (PRI)
2416  007246  005000          5$:     CLR     R0              ;INIT COUNT REG
2417  007250  012705  014116                  MOV     #RXBUFF,R5      ;SET REC DATA POINTER
2418  007254  105725          6$:     TSTB    (R5)+           ;START THE DATA CHECK
2419  007256  001401                  BEQ     .+4             ;DATA GOOD SO FAR
2420  007260  104000                  HLT                     ;DATA COMPARISON ERROR
2421  007262  105200                  INCB    R0              ;UPDATE COUNTER
2422  007264  100373                  BPL     6$              ;BRANCH IF MORE DATA TO CHECK
2423
2424
2425                                  ;RECEIVER HALF DUPLEX TEST. PART 2
2426                                  ;TEST THAT WHEN TX IS NOT ACTIVE THAT THE RECEIVER
2427                                  ;CAN RECEIVE CHARS.
2428
2429  007266  104412                  MSTCLR                  ;INIT DQ11
2430  007270  005000                  CLR     R0              ;ZERO DATA POINTER
2431  007272  012704  014116                  MOV     #RXBUFF,R4      ;PREPARE TO ZERO RX BUFFER.
2432  007276  105024          7$:     CLRB    (R4)+           ;START CLEARING.
2433  007300  105200                  INCB    R0              ;DONE?
2434  007302  100375                  BPL     7$              ;BR IF MORE TO DO.
2435  007304  105077  172060                  CLRB    @DQREG          ;SEL RX BA PRI.
2436  007310  012777  014116  172054          MOV     #RXBUFF,@DQSEC  ;LOAD IT
2437  007316  105277  172046                  INCB    @DQREG          ;SEL RX WC PRI.
2438  007322  012777  177600  172042          MOV     #-200,@DQSEC    ;LOAD FOR 200 CHARS.
2439  007330  112777  000012  172032          MOVB    #MISC.,@DQREG   ;SLE MISC REGISTER.
2440  007336  012777  004010  172026          MOV     #4010,@DQSEC    ;SET EIGHT BITS AND TEST LOOP
2441  007344  005037  001244                  CLR     TEMP1           ;SET DELAY
2442  007350  012737  000002  001246          MOV     #2,TEMP2        ;" " "
2443  007356  012777  010011  171774          MOV     #10011,@DQRCSR  ;SET ACTIVE,HALF DUPLEX,GO
2444  007364  105777  171770          8$:     TSTB    @DQRCSR         ;RX DONE PRI?
2445  007370  100407                  BMI     9$              ;BR IF YES
2446  007372  005237  001244                  INC     TEMP1           ;DELAY
2447  007376  001372                  BNE     8$              ;" " "
2448  007400  005337  001246                  DEC     TEMP2           ;" " "
2449  007404  001367                  BNE     8$              ;" " "
2450  007406  104000                  HLT                     ;RX PRI. DONE NOT SET..
2451  007410  005000          9$:     CLR     R0              ;INIT COUNTER
```

```
007412  012705  014116                  MOV     #RXBUFF,R5      ;GET RX BUFFER.
007416  122725  000377          10$:    CMPB    #377,(R5)+      ;MARK STATE IN BUFFER?
007422  001401                          BEQ     .+4             ;BR IF YES
007424  104000                          HLT                     ;ERROR
007426  105200                          INCB    R0              ;ALL DONE?
007430  100372                          BPL     10$             ;BR IF NO.
007432  104400                          SCOPE                   ;SCOPE THIS TEST.
                                        ;
                                        ;TEST OF DQ11 TRANSMITTER AND RECEIVER
                                        ;DATA REALIBILITY.
                                        ;DATA IS TRANSFERED FULL RATE
                                        ;AT A FOUR HUNDRED CHARACTER BURST
                                        ;
                                ;  TEST 55
                                ;*****************************************************************************
007434  012737  000055  001226  TST55:  MOV     #55,TSTNO
007442  012737  007754  001216          MOV     #TST56,NEXT
007450  005000                          CLR     R0              ;INIT DATA REG
007452  012704  014524                  MOV     #TXBUFF,R4      ;PREPARE TO FILL TX BUFFER WITH BINARY COUNT.
007456  110024                  1$:     MOVB    R0,(R4)+        ;START FILLING TX BUFF
007460  105200                          INCB    R0              ;UPDATE DATA REG
007462  001375                          BNE     1$              ;BRANCH IF BUFFER HASN'T BEEN FILLED
007464  104413                  2$:     MEMCLR                  ;INIT THE DEVICE
007466  005000                          CLR     R0              ;CLEAR COUNT REG
007470  012704  014116                  MOV     #RXBUFF,R4      ;PREPARE TO CLEAR THE RECEIVER BUFFER.
007474  105024                  3$:     CLRB    (R4)+           ;START CLEARING RX BUFF
007476  105200                          INCB    R0              ;UPDATE THE COUNTER
007500  001375                          BNE     3$              ;IS RX BUFF ALL CLEARED?
007502  105077  171662                  CLRB    @DQREG          ;SELECT THE RECEIVER BA PRI
007506  012777  014116  171656          MOV     #RXBUFF,@DQSEC  ;LOAD THE BA
007514  105277  171650                  INCB    @DQREG          ;SELECT THE RECEIVER CC PRI
007520  012777  177400  171644          MOV     #-400,@DQSEC    ;LOAD THE CC WITH -400 (I WANT TO RECEIVE 400 CHARACTERS
007526  105277  171636                  INCB    @DQREG          ;SELECT THE TX BA PRI
007532  012777  014522  171632          MOV     #SYNC,@DQSEC    ;LOAD THE TX BA WITH STARTING ADD OF TX DATA PLUS THE SY
007540  105277  171624                  INCB    @DQREG          ;SELECT THE TX CC PRI
007544  012777  177376  171620          MOV     #-402,@DQSEC    ;LOAD THE TX CC WITH -402 (FOUR HUNDRED CHARACTERS AND T
007552  112777  000011  171610          MOVB    #11,@DQREG      ;SELECT THE SYNC REGISTER
007560  013777  014520  171604          MOV     .SYNC,@DQSEC    ;LOAD IT WITH THE SYNC CHAR
007566  105277  171576                  INCB    @DQREG          ;SELECT THE MISC REGISTER
007572  012777  004010  171572          MOV     #4010,@DQSEC    ;LOAD IT WITH EIGHT BITS PER/CHAR AND TEST LOOP
007600  005037  001244                  CLR     TEMP1           ;ZERO DELAY LOC1
007604  012737  000020  001246          MOV     #20,TEMP2       ;SET DELAY FOR 20X177777 (8)
007612  005277  171542                  INC     @DQRCSR         ;SET RECEIVER GO!!
007616  005277  171542                  INC     @DQXCSR         ;SET TRANSMITTER GO!!!
007622  105777  171532          4$:     TSTB    @DQRCSR         ;RECEIVER DONE??
007626  100407                          BMI     5$              ;BRANCH IF RECEIVER IS DONE.
007630  005237  001244                  INC     TEMP1           ;START THE DELAY
007634  001372                          BNE     4$              ;DELAY-----
007636  005337  001246                  DEC     TEMP2           ;DELAY----- REC DONE?
007642  001367                          BNE     4$              ;DELAY-----
007644  104000                          HLT                     ;RECEIVER DONE NEVER SET (PRI)
007646  005777  171514          5$:     TST     @DQERR
```

```
2508  007652  100001                        BPL     .+4
2509  007654  104000                        HLT
2510  007656  122777  000204  171474        CMPB    #204,@DQRCSR
2511  007664  001401                        BEQ     .+4
2512  007666  104000                        HLT
2513  007670  122777  000204  171466        CMPB    #204,@DQTCSR
2514  007676  001401                        BEQ     .+4
2515  007700  104000                        HLT
2516  007702  005000                        CLR     R0              ;INIT COUNT REG
2517  007704  012704  014524                MOV     #TXBUFF,R4      ;SET GOOD DATA POINTER
2518  007710  012705  014116                MOV     #RXBUFF,R5      ;SET REC DATA POINTER
2519  007714  005037  001254        6$:     CLR     TEMP5
2520  007720  005037  001252                CLR     TEMP4
2521  007724  112437  001254                MOVB    (R4)+,TEMP5
2522  007730  112537  001252                MOVB    (R5)+,TEMP4
2523  007734  023737  001254  001252        CMP     TEMP5,TEMP4
2524  007742  001401                        BEQ     .+4             ;DATA GOOD SO FAR
2525  007744  104025                        HLT     25              ;DATA COMPARISON ERROR
2526  007746  105200                        INCB    R0              ;UPDATE COUNTER
2527  007750  001361                        BNE     6$              ;BRANCH IF MORE DATA TO CHECK
2528  007752  104400                        SCOPE                   ;
2529
2530
2531                                        ;
2532                                        ;TEST OF THE THREE STRAP SELECTABLE
2533                                        ;CHARACTERS
2534                                        ;ON THE FIRST PASS THE CHARACTERS
2535                                        ;WILL BE TYPED OUT FOR VERIFICATION
2536                                        ;ON PASSES AFTER THAT THE CHARACTERS WILL BE VERIFIED.
2537                                        ;BY THE PROGRAM.
2538                                        ;
2539                                        ;NOTE: IF THE BB OPTION IS INSTALLED
2540                                        ;      PROCEED TO NEXT TEST.
2541                                  ;  TEST 56
2542                                  ;*****************************************************************************
2543  007754  012737  000056  001226  TST56:  MOV     #56,TSTNO
2544  007762  012737  015126  001216          MOV     #.EOP,NEXT
2545  007770  012737  010134  001220          MOV     #1$,LOCK
2546  007776  104413                          MEMCLR                  ;CLEAR ALL
2547  010000  005037  011766                  CLR     NPRFLG          ;
2548  010004  032737  020000  001510          BIT     #BBBIT,DQSTAT   ;DOES BB OPTION EXIST?
2549  010012  001405                          BEQ     .+14            ;BR IF BB NOT THERE.
2550  010014  013737  001216  001214          MOV     NEXT,RETURN     ;DO NEXT TEST.
2551  010022  000177  171166                  JMP     @RETURN         ;
2552  010026  012737  000010  010154          MOV     #8.,5$          ;EIGHT SHIFTS.
2553  010034  012737  004000  010156          MOV     #4000,6$        ;EIGHT BITS PER CHAR.
2554  010042  012737  000400  010272          MOV     #400,15$        ;LAST CHARACTER.
2555  010050  005000                          CLR     R0              ;ZERO DATA POINTER
2556                                  ;*************************************************************
2557                                  ;       MAINTAINCE AID.
2558                                  ;       THE FOLLOWING IS TO HELP TROBLE SHOOT
2559                                  ;       PROBLEMS IN THE CHARACTER DET. LOGIC
2560                                  ;       FASTER.
2561                                  ;*************************************************************
2562
2563                                  ;=============================================================
```

```
2564
2565  010052  000416                        BR      36$             ;CHANGE THIS LOCATION TO "240" (NOP)
2566                                                                  ;TO LOCK ON SELECTED 8 BIT CHAR.
2567  010054  000000                        HALT                    ;PUT SELECTED CHARACTER IN SWR.
2568                                                                  ;HIT CONT.
2569  010056  104414                        CKSWR                   ;CHECK FOR <^G>
2570  010060  017700  171114                MOV     @SWR,R0         ;LOAD CHARACTER.
2571  010064  000000                        HALT                    ;PUT DYNAMIC SWR SETTINGS IN SWR AND
2572                                                                  ;HIT CONT.
2573  010066  104414                        CKSWR                   ;CHECK FOR <^G>
2574  010070  000407                        BR      36$             ;CHANGE THIS LOCATION TO "240" (NOP)
2575                                                                  ;ALONG WITH THE ABOVE FOR 16 BIT CHAR
2576                                                                  ;NOTE: BOTH LOCATIONS ARE TO BE CHANGED
2577                                                                  ;FOR A 16 BIT CHAR.
2578  010072  012737  000020  010154          MOV     #16.,5$         ;SET FOR 16 SHIFTS.
2579  010100  005037  010156                 CLR     6$              ;SET "BITS/PER/CHAR"
2580  010104  005037  010272                 CLR     15$             ;SET LAST LIMIT.
2581                                ;
2582                                ;       NOTE SWR BIT 9 MUST BE SET TO LOCK ON THAT CHAR. SELECTED.
2583                                ;
2584                                ;=======================================================
2585
2586  010110  012704  014066        36$:    MOV     #TMPBUF,R4      ;STORAGE POINTER.
2587  010114  005024                        CLR     (R4)+           ;ZERO STORAGE
2588  010116  022704  014104                CMP     #TMPBUF+16,R4   ;ALL CLEAR?
2589  010122  001374                        BNE     .-6             ;BR IF NO.
2590  010124  005037  014114                CLR     NUMBER          ;HOW MANY FOUND.
2591  010130  012704  014066                MOV     #TMPBUF,R4      ;PREPARE POINTER
2592  010134  005137  011766        1$:     COM     NPRFLG          ;TELL SUBROUTINE NOT TO FORCE RX NPR.
2593  010140  005077  171214                CLR     @DQRCSR         ;CLEAR RX CSR
2594  010144  010037  014056                MOV     R0,WORD         ;LOAD CHARACTER
2595  010150  004537  011522                JSR     R5,RXSTRA       ;PUSH CHARACTER INTO RECEIVER.
2596  010154  000010                5$:     8.                      ;BEWARE THIS LOCATION WILL CHANGE.
2597  010156  004000                6$:     4000                    ;BEWARE THIS LOCATION WILL CHANGE.
2598  010160  005777  171174                TST     @DQRCSR         ;WAS A CHARACTER DETECTED?
2599  010164  100037                        BPL     2$              ;BR IF NO CHAR FOUND.
2600  010166  042777  100000  171164        BIC     #BIT15,@DQRCSR  ;CLEAR DETECED CHAR FLAG
2601  010174  005700                        TST     R0              ;WAS THE CHAR=0
2602  010176  001003                        BNE     18$             ;BR IF NO.
2603  010200  005737  014114                TST     NUMBER          ;HOW MANY WERE FOUND?
2604  010204  001410                        BEQ     19$             ;BR IF NONE YET.
2605  010206  012702  014066        18$:    MOV     #TMPBUF,R2      ;POINTER STORE.
2606  010212  020022                13$:    CMP     R0,(R2)+        ;WAS THIS CHARACTER FOUND BEFORE?
2607  010214  001423                        BEQ     2$              ;BR IF YES
2608  010216  005722                        TST     (R2)+           ;POP POINTER
2609  010220  022702  014106                CMP     #TMPBUF+20,R2   ;ALL CHARS CHECKED?
2610  010224  001372                        BNE     13$             ;BR IF NO.
2611  010226  010024                19$:    MOV     R0,(R4)+        ;STOE CHARACTER
2612  010230  017714  171124                MOV     @DQRCSR,(R4)    ;GET ADDRESS FOUND IN.
2613  010234  042714  170377                BIC     #170377,(R4)    ;CLEAR ALL GARBAGE.
2614  010240  000324                        SWAB    (R4)+           ;SWAP AROUND.
2615  010242  005237  014114                INC     NUMBER          ;UPDATE COUNTER.
2616  010246  022737  000005  014114        CMP     #5,NUMBER       ;TOO MANY CHARS FOUND??
2617  010254  001003                        BNE     2$              ;BR IF OK.
2618  010256  104000                        HLT                     ;ERROR MORE THAN 4 CHARS. WERE DETECTED.
2619  010260  000177  170730                JMP     @RETURN         ;RESTART TEST. DO NOT CONTINUE IN THIS TEST
```

```
2620  010264  104401                  2$:   SCOP1                   ;LOCK ON CHAR (SW09=1)
2621  010266  005200                        INC     R0              ;UPDATE CHARACTER
2622  010270  020027                        CMP     R0,(PC)+        ;ALL DONE?
2623  010272  000000                  15$:  0                       ;LAST CHAR STORED HERE.
2624  010274  001317                        BNE     1$              ;BR IF NOT DONE
2625  010276  005737  014114                TST     NUMBER          ;ANY CHARS FOUND?
2626  010302  001024                        BNE     30$             ;BR IF NONE FOUND
2627  010304  022737  000020  010154  31$:  CMP     #16.,5$         ;IS TEST ALL DONE?
2628  010312  001434                        BEQ     7$              ;BR IF YES
2629  010314  012737  000020  010154        MOV     #16.,5$         ;DO A 16 BIT CHAR NOW
2630  010322  005037  010156                CLR     6$              ;SET FOR 16 BITS PER CHAR.
2631  010326  112777  000012  171034        MOVB    #MISC.,@DQREG   ;SEL MISC REG
2632  010334  042777  177400  171030        BIC     #177400,@DQSEC  ;CLEAR THE HIGH BYTE
2633  010342  005037  010272                CLR     15$             ;SET LAST CHAR TO 0
2634  010346  005000                        CLR     R0              ;ZERO DATA POINTER
2635  010350  000137  010134                JMP     1$              ;GO AND DO IT AGAIN
2636  010354  022737  000001  014114  30$:  CMP     #1,NUMBER       ;WAS 1 CHAR FOUND?
2637  010362  001010                        BNE     7$              ;BR IF NO.
2638  010364  022737  000010  014070        CMP     #10,TMPBUF+2    ;WAS "SYNC DET" ENABLED?
2639  010372  001004                        BNE     7$              ;BR IF NO.
2640  010374  005337  014114                DEC     NUMBER          ;ZERO NUMBER.
2641  010400  024444                        CMP     -(R4),-(R4)     ;ADJUST POINTERS
2642  010402  000740                        BR      31$             ;KEEP GOING.
2643  010404  005737  014114          7$:   TST     NUMBER          ;ANY FOUND?
2644  010410  001004                        BNE     .+12            ;BR IF YES
2645  010412  104402  013116                TYPE    ,EM4            ;ALLERT OPERATOR NONE FOUND.
2646  010416  000137  010626                JMP     10$             ;LEAVE
2647  010422  105737  014112                TSTB    XYZFLG          ;WAS THIS DONE BEFORE?
2648  010426  001050                        BNE     3$              ;BR IF TEST WAS DONE BEFORE
2649  010430  012704  014066                MOV     #TMPBUF,R4      ;POINTER
2650  010434  012437  010700                MOV     (R4)+,.CHAR1    ;STORE CHARACTER 1
2651  010440  012437  010702                MOV     (R4)+,.ADDR1    ;STORE  ADDRESS 1
2652  010444  012437  010704                MOV     (R4)+,.CHAR2    ;STORE CHARACTER 2
2653  010450  012437  010706                MOV     (R4)+,.ADDR2    ;STORE  ADDRESS 2
2654  010454  012437  010710                MOV     (R4)+,.CHAR3    ;STORE CHARACTER 3
2655  010460  012437  010712                MOV     (R4)+,.ADDR3    ;STORE  ADDRESS 3
2656  010464  012437  010714                MOV     (R4)+,.CHAR4    ;STORE CHARACTER 4
2657  010470  012437  010716                MOV     (R4)+,.ADDR4    ;STORE  ADDRESS 4
2658  010474  013737  014114  001252        MOV     NUMBER,TEMP4    ;STORE NUMBER OF CHARACTER FOUND.
2659  010502  104402                        TYPE
2660  010504  013724                        MDETCH
2661  010506  104410                        CONVRT
2662  010510  010630                        XCHAR1
2663  010512  005337  001252                DEC     TEMP4
2664  010516  001414                        BEQ     3$
2665  010520  104410                        CONVRT
2666  010522  010642                        XCHAR2
2667  010524  005337  001252                DEC     TEMP4
2668  010530  001407                        BEQ     3$
2669  010532  104410                        CONVRT
2670  010534  010654                        XCHAR3
2671  010536  005337  001252                DEC     TEMP4
2672  010542  001402                        BEQ     3$
2673  010544  104410                        CONVRT
2674  010546  010666                        XCHAR4
2675  010550  022737  000001  001504  3$:   CMP     #1,DQNUM
```

DQ11 TRANSMITTER AND RECEIVER EXERCISER.

```
2676  010556  001003                          BNE     .+10
2677  010560  012737  177777  014112          MOV     #-1,XYZFLG
2678  010566  013737  014114  001252          MOV     NUMBER,TEMP4
2679  010574  012704  014066                  MOV     #TMPBUF,R4
2680  010600  012705  010700                  MOV     #.CHAR1,R5
2681  010604  022425                  4$:     CMP     (R4)+,(R5)+
2682  010606  001401                          BEQ     .+4
2683  010610  104022                          HLT 22
2684  010612  022425                          CMP     (R4)+,(R5)+
2685  010614  001401                          BEQ     .+4
2686  010616  104022                          HLT 22
2687  010620  005337  001252                  DEC     TEMP4
2688  010624  001367                          BNE     4$
2689  010626  104400                  10$:    SCOPE
2690  010630  000002                  XCHAR1: 2
2691  010632     006     002                  .BYTE   6,2
2692  010634  010700                          .CHAR1
2693  010636     004     002                  .BYTE   4,2
2694  010640  010702                          .ADDR1
2695  010642  000002                  XCHAR2: 2
2696  010644     006     002                  .BYTE   6,2
2697  010646  010704                          .CHAR2
2698  010650     004     002                  .BYTE   4,2
2699  010652  010706                          .ADDR2
2700  010654  000002                  XCHAR3: 2
2701  010656     006     002                  .BYTE   6,2
2702  010660  010710                          .CHAR3
2703  010662     004     002                  .BYTE   4,2
2704  010664  010712                          .ADDR3
2705  010666  000002                  XCHAR4: 2
2706  010670     006     002                  .BYTE   6,2
2707  010672  010714                          .CHAR4
2708  010674     004     002                  .BYTE   4,2
2709  010676  010716                          .ADDR4
2710  010700  000000          .CHAR1: 0
2711  010702  000000          .ADDR1: 0
2712  010704  000000          .CHAR2: 0
2713  010706  000000          .ADDR2: 0
2714  010710  000000          .CHAR3: 0
2715  010712  000000          .ADDR3: 0
2716  010714  000000          .CHAR4: 0
2717  010716  000000          .ADDR4: 0
```

```
2718                                    ;
2719                                    ;*****************************************************
2720                                    ;SUBROUTINE TO STROBE INTO THE TRANSMITTER
2721                                    ;THE CHARACTER "WORD".
2722                                    ;ENTERED BY A JSR       R5,TXSTRB
2723                                    ;THE NUMBER OF SHIFTS AND THE BIT
2724                                    ;LENGTH SELECT ARE UNDER THE JSR CALL
2725                                    ;*****************************************************
2726                                    ;
2727  010720  104412              TXSTRB: MSTCLR
2728  010722  005037  014056            CLR     WORD
2729  010726  010537  014054            MOV     R5,SAVEPC
2730  010732  012537  014062            MOV     (R5)+,COUNT
2731  010736  012537  014064            MOV     (R5)+,BITSEL
2732  010742  112777  000002  170420    MOVB    #2,@DQREG
2733  010750  012777  014056  170414    MOV     #WORD,@DQSEC
2734  010756  105277  170406            INCB    @DQREG
2735  010762  012777  177777  170402    MOV     #-1,@DQSEC
2736  010770  112777  000012  170372    MOVB    #MISC.,@DQREG
2737  010776  013777  014064  170366    MOV     BITSEL,@DQSEC
2738  011004  052777  000012  170360    BIS     #12,@DQSEC
2739  011012  005277  170346            INC     @DQTCSR
2740  011016  027777  170342  170340    CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2741  011024  027777  170334  170332    CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2742  011032  027777  170326  170324    CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2743  011040  005277  170326            INC     @DQSEC
2744  011044  005377  170322            DEC     @DQSEC
2745  011050  005277  170316        1$: INC     @DQSEC
2746  011054  005377  170312            DEC     @DQSEC
2747  011060  032777  000200  170304    BIT     #BIT7,@DQSEC
2748  011066  001001                    BNE     .+4
2749  011070  104023                    HLT 23
2750  011072  005337  014062            DEC     COUNT
2751  011076  001364                    BNE     1$
2752  011100  005277  170266            INC     @DQSEC
2753  011104  005377  170262            DEC     @DQSEC
2754  011110  032777  000200  170254    BIT     #BIT7,@DQSEC
2755  011116  001401                    BEQ     .+4
2756  011120  104007                    HLT     7
2757  011122  000205                    RTS     R5
2758
2759
2760
2761
2762
2763  011124  010537  014054      TXSTRC: MOV     R5,SAVEPC
2764  011130  012537  014062              MOV     (R5)+,COUNT
2765  011134  012537  014064              MOV     (R5)+,BITSEL
2766  011140  112777  000002  170222      MOVB    #2,@DQREG
2767  011146  012777  014056  170216      MOV     #WORD,@DQSEC
2768  011154  105277  170210              INCB    @DQREG
2769  011160  012777  177777  170204      MOV     #-1,@DQSEC
2770  011166  112777  000012  170174      MOVB    #MISC.,@DQREG
2771  011174  013777  014064  170170      MOV     BITSEL,@DQSEC
2772  011202  052777  000012  170162      BIS     #12,@DQSEC
2773  011210  005277  170150              INC     @DQTCSR
```

DQ11 TRANSMITTER AND RECEIVER EXERCISER.

```
2774  011214  027777  170144  170142          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2775  011222  027777  170136  170134          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2776  011230  027777  170130  170126          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2777  011236  005277  170130                  INC     @DQSEC
2778  011242  005377  170124                  DEC     @DQSEC
2779  011246  005277  170120          1$:     INC     @DQSEC
2780  011252  005377  170114                  DEC     @DQSEC
2781  011256  005337  014062                  DEC     COUNT
2782  011262  001371                          BNE     1$
2783  011264  000205                          RTS     R5
2784
2785
2786
2787
2788
2789  011266  010537  014054          TXSTRD: MOV     R5,SAVEPC       ;SAVE PC OF ROUTINE CALL
2790  011272  012537  014062                  MOV     (R5)+,COUNT     ;PICK UP THE NUMBER OF SHIFTS
2791  011276  012537  014064                  MOV     (R5)+,BITSEL    ;PICK UP NUMBER OF BITS PER CHARACTER
2792  011302  112777  000002  170060          MOVB    #2,@DQREG       ;SELECT THE TRANSMITTER BA PRI.
2793  011310  012777  014056  170054          MOV     #WORD,@DQSEC    ;LOAD THE BA
2794  011316  105277  170046                  INCB    @DQREG          ;SELECT THE TRANSMITTER CC PRI.
2795  011322  012777  177777  170042          MOV     #-1,@DQSEC      ;LOAD THE CC WITH -1
2796  011330  112777  000012  170032          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER.
2797  011336  013777  014064  170026          MOV     BITSEL,@DQSEC   ;LOAD MISC REG WITH NUMBER OF BITS PER CHAR.
2798  011344  052777  000012  170020          BIS     #12,@DQSEC      ;ADD TO THAT TEST LOOP AND AUTO STEP.
2799  011352  105737  012602                  TSTB    PARFLG          ;IS PARITY TO BE TURNED ON?
2800  011356  001403                          BEQ     .+10            ;BR IF NO
2801  011360  052777  100000  170004          BIS     #BIT15,@DQSEC   ;TURN PARITY ON.....
2802  011366  005277  167772                  INC     @DQTCSR         ;SET TRANSMITTER GO!!!!
2803  011372  027777  167766  167764          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2804  011400  027777  167760  167756          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2805  011406  027777  167752  167750          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2806  011414  005277  167752                  INC     @DQSEC          ;PRIME THE
2807  011420  005377  167746                  DEC     @DQSEC          ;       TRANSMITTER.
2808  011424  006037  001252          1$:     ROR     TEMP4           ;SHIFT THE STORAGE OF DATA FROM THE TRANSMITTER.
2809  011430  005277  167736                  INC     @DQSEC          ;CLOCK THE TRANSMITTER -UP-
2810  011434  005377  167732                  DEC     @DQSEC          ;CLOCK THE TRANSMITTER -DOWN-
2811  011440  017702  167726                  MOV     @DQSEC,R2       ;MOVE THE MISC REG TO R2
2812  011444  042702  177577                  BIC     #177577,R2      ;CLEAR ALL BUT THE BIT WINDOW.
2813  011450  105737  014052                  TSTB    EXTFLG          ;FIND OUT IF BIT PER CHAR >8
2814  011454  001404                          BEQ     2$              ;BRANCH IF BOR<8
2815  011456  106102                          ROLB    R2              ;SHIFT BIT WINDOW INTO CARRY BIT.
2816  011460  006002                          ROR     R2              ;SHIFT CARRY INTO R2 (BIT 15 OF R2)
2817  011462  042702  077777                  BIC     #77777,R2       ;CLEAR ALL BUT THAT BIT OF DATA
2818  011466  050237  001252          2$:     BIS     R2,TEMP4        ;PLACE DATA INTO TEMPORY LOCATION
2819  011472  005337  014062                  DEC     COUNT           ;IS CHARACTER COMPLETELY SHIFTED OUT?
2820  011476  001352                          BNE     1$              ;BRANCH IF MORE BITS TO GO.
2821  011500  105737  014052                  TSTB    EXTFLG
2822  011504  001003                          BNE     3$
2823  011506  105137  001252                  COMB    TEMP4
2824  011512  000402                          BR      4$
2825  011514  005137  001252          3$:     COM     TEMP4           ;COMPLIMENT DATA STORAGE
2826  011520  000205                  4$:     RTS     R5              ;LEAVE THE ROUTINE.
2827
2828
2829
```

```
2830
2831  011522  010537  014054          RXSTRA: MOV     RS,SAVEPC
2832  011526  012537  014062                  MOV     (RS)+,COUNT
2833  011532  012537  014064                  MOV     (RS)+,BITSEL
2834  011536  013737  014056  017770          MOV     WORD,TEMP
2835  011544  005137  017770                  COM     TEMP
2836  011550  105077  167614                  CLRB    @DQREG
2837  011554  012777  014116  167610          MOV     #RXBUFF,@DQSEC
2838  011562  105277  167602                  INCB    @DQREG
2839  011566  012777  000200  167576          MOV     #200,@DQSEC
2840  011574  112777  000011  167566          MOVB    #11,@DQREG
2841  011602  012777  177777  167562          MOV     #-1,@DQSEC
2842  011610  105277  167554                  INCB    @DQREG
2843  011614  053777  014064  167550          BIS     BITSEL,@DQSEC
2844  011622  052777  000012  167542          BIS     #12,@DQSEC
2845  011630  105737  012602                  TSTB    PARFLG          ;IS PARITY TO BE TURNED ON?
2846  011634  001403                          BEQ     .+10            ;BR IF NO
2847  011636  052777  100000  167526          BIS     #BIT15,@DQSEC   ;TURN PARITY ON.....
2848  011644  052777  000001  167506          BIS     #0001,@DQRCSR
2849  011652  005737  011766                  TST     NPRFLG
2850  011656  001403                          BEQ     .+10
2851  011660  052777  010000  167472          BIS     #BIT12,@DQRCSR
2852  011666  112777  000012  167474          MOVB    #MISC.,@DQREG
2853  011674  042777  000200  167470  2$:     BIC     #BIT7,@DQSEC
2854  011702  006037  017770                  ROR     TEMP
2855  011706  106037  001244                  RORB    TEMP1
2856  011712  042737  177577  001244          BIC     #177577,TEMP1
2857  011720  053777  001244  167444          BIS     TEMP1,@DQSEC
2858  011726  005277  167440                  INC     @DQSEC
2859  011732  005377  167434                  DEC     @DQSEC
2860  011736  005337  014062                  DEC     COUNT
2861  011742  001354                          BNE     2$
2862  011744  005737  011766                  TST     NPRFLG
2863  011750  001003                          BNE     .+10
2864  011752  052777  000020  167412          BIS     #BIT4,@DQSEC
2865  011760  005037  011766                  CLR     NPRFLG
2866  011764  000205                          RTS     RS
2867  011766  000000          NPRFLG: 0
2868  011770                  .MEMCLR:
2869  011770  005077  167364                  CLR     @DQRCSR
2870  011774  005077  167364                  CLR     @DQTCSR
2871  012000  005077  167362                  CLR     @DQERR
2872  012004  012705  000020                  MOV     #16.,R5
2873  012010  152777  000020  167352  1$:     BISB    #BIT4,@DQREG
2874  012016  142777  000140  167344          BICB    #140,@DQREG
2875  012024  005077  167342                  CLR     @DQSEC
2876  012030  105277  167334                  INCB    @DQREG
2877  012034  005305                          DEC     R5
2878  012036  001364                          BNE     1$
2879  012040  105077  167324                  CLRB    @DQREG
2880  012044  105077  167312                  CLRB    @DQRCSR
2881  012050  012705  000020                  MOV     #16.,R5
2882  012054  112777  000010  167306  2$:     MOVB    #10,@DQREG
2883  012062  005077  167304                  CLR     @DQSEC
2884  012066  112777  000014  167274          MOVB    #14,@DQREG
2885  012074  005077  167272                  CLR     @DQSEC
```

```
2895  012100  105277  167256          INCB    @DQRCSH
2896  012104  005305                  DEC     R5
2897  012106  001362                  BNE     2$
2898  012110  105077  167246          CLRB    @DQRCSH
2899  012114                .MSTCLR:
2900  012114  112777  000012  167246  MOVB    #MISC.,@DQREG
2901  012122  012777  000040  167242  MOV     #BIT5,@DQSEC
2902  012130  000002                  RTI
2903  012132  010537  014054  RXLNG:  MOV     R5,SAVEPC
2904  012136  104412                  MSTCLR
2905  012140  105077  167224          CLRB    @DQREG
2906  012144  012777  014116  167220  MOV     #RXBUFF,@DQSEC
2907  012152  005037  014116          CLR     RXBUFF
2908  012156  105277  167206          INCB    @DQREG
2909  012162  012777  000200  167202  MOV     #200,@DQSEC
2910  012170  112777  000011  167172  MOVB    #11,@DQREG
2911  012176  013777  014520  167166  MOV     .SYNC,@DQSEC
2912  012204  105277  167160          INCB    @DQREG
2913  012210  012577  167156          MOV     (R5)+,@DQSEC
2914  012214  052777  000012  167150  BIS     #12,@DQSEC
2915  012222  052777  000001  167130  BIS     #0001,@DQRCSR
2916  012230  042777  000200  167134  BIC     #BIT7,@DQSEC
2917  012236  005277  167130          INC     @DQSEC
2918  012242  005377  167124          DEC     @DQSEC
2919  012246  052777  000020  167116  BIS     #BIT4,@DQSEC
2920  012254  000240                  NOP
2921  012256  000240                  NOP
2922  012260  000240                  NOP
2923  012262  000337  014116          SWAB    RXBUFF
2924  012266  122537  014116  1$:     CMPB    (R5)+,RXBUFF
2925  012272  001401                  BEQ     .+4
2926  012274  104015                  HLT 1$
2927  012276  005205                  INC     R5
2928  012300  000205                  RTS     R5
2929  012302  010537  014054  RXELNG: MOV     R5,SAVEPC
2930  012306  104412                  MSTCLR
2931  012310  105077  167054          CLRB    @DQREG
2932  012314  012777  014116  167050  MOV     #RXBUFF,@DQSEC
2933  012322  005037  014116          CLR     RXBUFF
2934  012326  105277  167036          INCB    @DQREG
2935  012332  012777  000200  167032  MOV     #200,@DQSEC
2936  012340  112777  000011  167022  MOVB    #11,@DQREG
2937  012346  013777  014520  167016  MOV     .SYNC,@DQSEC
2938  012354  105277  167010          INCB    @DQREG
2939  012360  012577  167006          MOV     (R5)+,@DQSEC
2940  012364  052777  000012  167000  BIS     #12,@DQSEC
2941  012372  052777  000001  166760  BIS     #0001,@DQRCSR
2942  012400  042777  000200  166764  BIC     #BIT7,@DQSEC
2943  012406  005277  166760          INC     @DQSEC
2944  012412  005377  166754          DEC     @DQSEC
2945  012416  052777  000020  166746  BIS     #BIT4,@DQSEC
2946  012424  000240                  NOP
2947  012426  000240                  NOP
2948  012430  000240                  NOP
2949  012432  022537  014116          CMP     (R5)+,RXBUFF
2950  012436  001401                  BEQ     .+4
```

```
 2942  012440  104015                          HLT 15
 2943  012442  000205                          RTS     R5
 2944  012444                        GENPAR:
 2945  012444  010146                          MOV     R1,-(SP)
 2946  012446  010246                          MOV     R2,-(SP)
 2947  012450  010346                          MOV     R3,-(SP)
 2948  012452  105737  014052                  TSTB    EXTFLG
 2949  012456  001003                          BNE     .+10
 2950  012460  042737  000200  014056          BIC     #BIT7,WORD
 2951  012466  042737  100000  014056          BIC     #BIT15,WORD
 2952  012474  005002                          CLR     R2
 2953  012476  012703  000020                  MOV     #16.,R3
 2954  012502  013701  014056                  MOV     WORD,R1
 2955  012506  000241                          CLC
 2956  012510  006001                1$:       ROR     R1
 2957  012512  005502                          ADC     R2
 2958  012514  005303                          DEC     R3
 2959  012516  001374                          BNE     1$
 2960
 2961  012520  032737  001000  001510          BIT     #0008IT,DQSTAT
 2962  012526  001404                          BEQ     2$
 2963  012530  032702  000001                  BIT     #BIT0,R2
 2964  012534  001016                          BNE     4$
 2965  012536  000403                          BR      3$
 2966  012540  032702  000001          2$:     BIT     #BIT0,R2
 2967  012544  001412                          BEQ     4$
 2968  012546  105737  014052          3$:     TSTB    EXTFLG
 2969  012552  001004                          BNE     .+12
 2970  012554  052737  000200  014056          BIS     #BIT7,WORD
 2971  012562  000403                          BR      4$
 2972  012564  052737  100000  014056          BIS     #BIT15,WORD
 2973  012572  012603                4$:       MOV     (SP)+,R3
 2974  012574  012602                          MOV     (SP)+,R2
 2975  012576  012601                          MOV     (SP)+,R1
 2976  012600  000207                          RTS     PC
 2977  012602  000000                PARFLG:   0
```

```
 2978  012604                         .ERRTAB:
 2979  012604  000000                         0
 2980  012606  000000                         0       ;HALT 0
 2981  012610  000000                         0
 2982  012612  013010                         EM0
 2983  012614  013326                         DH1     ;HALT 1
 2984  012616  000000                         0
 2985  012620  013010                         EM0
 2986  012622  013347                         DH2     ;HALT 2
 2987  012624  000000                         0
 2988  012626  013026                         EM1
 2989  012630  013364                         DH3     ;HALT 3
 2990  012632  000000                         0
 2991  012634  013026                         EM1
 2992  012636  013375                         DH4     ;HALT 4
 2993  012640  000000                         0
 2994  012642  013026                         EM1
 2995  012644  013431                         DH5     ;HALT 5
 2996  012646  000000                         0
 2997  012650  013010                         EM0
 2998  012652  013465                         DH6     ;HALT 6
 2999  012654  000000                         0
 3000  012656  013010                         EM0
 3001  012660  013505                         DH7     ;HALT 7
 3002  012662  000000                         0
 3003  012664  013173                         EM6
 3004  012666  013540                         DH9     ;HALT 10
 3005  012670  000000                         0
 3006  012672  000000                         0
 3007  012674  013534                         DH8     ;HALT 11
 3008  012676  000000                         0
 3009  012700  013010                         EM0
 3010  012702  013546                         DH10    ;HALT 12
 3011  012704  014040                         DT0
 3012  012706  013064                         EM3
 3013  012710  013540                         DH9     ;HALT 13
 3014  012712  000000                         0
 3015  012714  013064                         EM3
 3016  012716  013534                         DH8     ;HALT 14
 3017  012720  000000                         0
 3018  012722  013173                         EM6
 3019  012724  013675                         DH13    ;HALT 15
 3020  012726  000000                         0
 3021  012730  013150                         EM5
 3022  012732  013534                         DH8     ;HALT 16
 3023  012734  000000                         0
 3024  012736  013150                         EM5
 3025  012740  013540                         DH9     ;HALT 17
 3026  012742  000000                         0
 3027  012744  013173                         EM6
 3028  012746  013546                         DH10    ;HALT 20
 3029  012750  014040                         DT0
 3030  012752  013116                         EM4
 3031  012754  000000                         0       ;HALT 21
 3032  012756  000000                         0
 3033  012760  013206                         EM7
```

```
  3034  012762  000000                          0       ;HALT 22
  3035  012764  000000                          0
  3036  012766  013254                          EM8
  3037  012770  0C  )00                         0       ;HALT 23
  3038  012772  00..J00                         0
  3039  012774  013010                          EM0
  3040  012776  013306                          DH0     ;HALT 24
  3041  013000  000000                          0
  3042  013002  000000                          0
  3043  013004  013546                          DH10    ;HALT 25
  3044  013006  014040                          DT0
  3045  013010  052377  040522  051516  EM0:    .ASCIZ <377>/TRANSMITTER /
        013026  052377  040522  051516  EM1:    .ASCIZ <377>/TRANSMITTER CHARACTER COUNT /
        013064  053377  041522  042440  EM3:    .ASCIZ <377>/VRC ERROR BIT SHOULD BE /
        013116  047377  020117  044103  EM4:    .ASCIZ <377>/NO CHARACTERS DETECTED./<0>
        013150  051777  047131  020103  EM5:    .ASCIZ <377>/SYNC 1 AND 2 NOT /
        013173     377  042522  04[illegible]03  EM6:    .ASCIZ <377>/RECEIVER /
        013206  041777  04[illegible]510  04  2  EM7:    .ASCIZ <377>/CH* ACTER DETECTION COMPARISON ERROR/
        013254  041777  040510  04  2  EM8:    .ASCIZ <377>/CH**ACTER NOT ALL ZERO'S/
        013306  041501  044524  04[illegible]6  DH0:    .ASCIZ /ACTIVE NOT SET./
        013326  041501  044524  0[illegible]6  DH1:    .ASCIZ /ACTIVE NOT CLEAR/
        013347     104  047117  0[illegible]5  DH2:    .ASCIZ /DONE NOT SET/
        013364  047516  020124  0[illegible]32  DH3:    .ASCIZ /NOT ZERO/
        013375     116  052117  044440  DH4:    .ASCIZ /NOT INCREMENTED BY PLUS TWO/
        013431     116  052117  044440  DH5:    .ASCIZ /NOT INCREMENTED BY PLUS ONE/
        013465     120  044522  051452  DH6:    .ASCIZ /PRI*SEC NOT SET/
        013505     114  047111  020105  DH7:    .ASCIZ /LINE NOT AT MARK STATE/
        013534  042523  000124          DH8:    .ASCIZ /SET/
        013540  046103  04[illegible]35  000122  DH9:    .ASCIZ  /CLEAR/
        013546  040504  040524  041440  DH10:   .ASCII /DATA COMPARISON ERROR/
        013573     377  054105  042520          .ASCIZ <377>/EXPECTED   RECEIVED /
        013621     123  052105  053440  DH11:   .ASCIZ /SET WHEN ACTIVE SET/
        013645     103  042514  051101  DH12:   .ASCIZ /CLEARED BY MASTER CLEAR/
        013675     103  040510  040522  DH13:   .ASCIZ  /CHARACTER LENGTH ERROR/
        013724  051777  042505  040440  MDETCH: .ASCII  <377>/SEE ABSTRACT OR TEST #56 FOR DETAILS/
        013771     377  044103  051101          .ASCII  <377>/CHARACTERS DETECTED:  /
        014020  041777  040510  027122          .ASCIZ  <377>/CHAR.   ADDR. /
                                        .EVEN
        014040  000002                  DT0:    2
  3046  014042     006     004          .BYTE   6,4
  3047  014044  001254                          TEMP5
  3048  014046     006     002          .BYTE   6,2
  3049  014050  001252                          TEMP4
  3050  014[illegible]2  000000                  EXTFLG: 0
  3051  014[illegible]4  000000                  SAVEPC: 0
  3052  014056  000000                  WORD:   0
  3053  014060  000000                  DELAY:  0
  3054  014[illegible]2  000000                  COUNT:  0
  3055  014[illegible]4  000000                  BITSEL: 0
  3056  014066  000012                  TMPBUF: .BLKW   12
  3057  014112  000000                  XYZFLG: 0
  3058  014114  000000                  NUMBER: 0
  3059  014116  000000                  RXBUFF: 0
  3060          014520                          .=.+400
  3061  014520     026     026          .SYNC:  .BYTE   26,26
  3062  014522     026     026          SYNC:   .BYTE   26,26
```

DQ11 TRANSMITTER AND RECEIVER EXERCISER.

```
3063  014524  000000                  TXBUFF: 0
3064          015126                          .=.+400
3065
3066                                          ;END OF PASS
3067                                          ;TYPE NAME OF TEST
3068                                          ;UPDATE PASS COUNT
3069                                          ;CHECK FOR EXIT TO ACT-11
3070                                          ;RESTART TEST
3071
3072  015126  005037  001234          .EOP:   CLR     LSTERR                  ;CLEAR LAST ERROR PC
3073  015132  005037  001312                  CLR     ERRFLG                  ;CLEAR ERROR FLAG
3074  015136  005237  001230                  INC     PASCNT                  ;UPDATE PASS COUNT
3075  015142  104402                          TYPE
3076  015144  017356                          MEPASS
3077  015146  104402                          TYPE
3078  015150  017536                          MCSRX
3079  015152  104411                          CNVRT
3080  015154  015264                          XCSR
3081  015156  104402                          TYPE
3082  015160  017544                          MVECX
3083  015162  104411                          CNVRT
3084  015164  015272                          XVEC
3085  015166  104402                          TYPE
3086  015170  017552                          MPASSX
3087  015172  104411                          CNVRT
3088  015174  015300                          XPASS
3089  015176  104402                          TYPE
3090  015200  017563                          MERRX
3091  015202  104411                          CNVRT
3092  015204  015306                          XERR
3093  015206  013777  001230  163766          MOV     PASCNT,@LIGHTS          ;DISPLAY PASS COUNT
3094  015214  005337  001276                  DEC     SAVNUM
3095  015220  001013                          BNE     RESTRT
3096  015222  013737  001504  001276          MOV     DQNUM,SAVNUM
3097  015230  013701  000042                  MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DOP
3098  015234  001405                          BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
3099  015236  000005                          RESET
3100  015240                          LOGICAL:
3101  015240  004711                          JSR     PC,(R1)
3102  015242  000240                          NOP
3103  015244  000240                          NOP
3104  015246  000240                          NOP
3105  015250  104414                  RESTRT: CKSWR
3106  015252  012737  002254  001214          MOV     #TST1,RETURN
3107  015260  000137  002254                  JMP     TST1
3108  015264  000001                  XCSR:   1
3109  015266     006     002                  .BYTE   6,2
3110  015270  001360                          DQRCSR
3111  015272  000001                  XVEC:   1
3112  015274     003     002                  .BYTE   3,2
3113  015276  001350                          DQRVEC
3114  015300  000001                  XPASS:  1
3115  015302     006     002                  .BYTE   6,2
3116  015304  001230                          PASCNT
3117  015306  000001                  XERR:   1
3118  015310     006     002                  .BYTE   6,2
```

```
 3119  015312  001232                          ERRCNT
 3120
 3121                                          ;SCOPE LOOP AND INTERATION HANDLER
 3122
 3123  015314  104414                  .SCOPE: CKSWR
 3124  015316  032777  040000  163654          BIT     #BIT14,@SWR
 3125  015324  001407                  TTST:   BEQ     1$
 3126  015326  000432                          BR      3$
 3127  015330  105777  163650                  TSTB    @TKCSR
 3128  015334  100027                          BPL     3$
 3129  015336  017700  163644                  MOV     @TKDBR,R0
 3130  015342  000412                          BR      2$
 3131  015344  032777  004000  163626  1$:     BIT     #SW11,@SWR
 3132  015352  001006                          BNE     2$
 3133  015354  005237  001224                  INC     LPCNT
 3134  015360  023737  001224  001222          CMP     LPCNT,ICOUNT
 3135  015366  001012                          BNE     3$
 3136  015370  105037  001312          2$:     CLRB    ERRFLG
 3137  015374  005037  001224                  CLR     LPCNT
 3138  015400  012737  000010  001222          MOV     #10,ICOUNT
 3139  015406  013737  001216  001214          MOV     NEXT,RETURN
 3140  015414  013716  001214          3$:     MOV     RETURN,(SP)
 3141  015420  000002                          RTI
 3142  015422  001407                  BRW:    1407
 3143  015424  000432                  BRX:    432
 3144
 3145                                          ;CHECK FOR FREEZE ON CURRENT DATA
 3146
 3147  015426  104414                  .SCOP1: CKSWR
 3148  015430  032777  001000  163542          BIT     #SW09,@SWR
 3149  015436  001402                          BEQ     1$
 3150  015440  013716  001220                  MOV     LOCK,(SP)
 3151  015444  000002                  1$:     RTI
 3152
 3153                                          ;TELETYPE OUTPUT ROUTINE
 3154
 3155  015446  010546                  .TYPE:  MOV     R5,-(SP)
 3156  015450  017605  000002                  MOV     @2(SP),R5
 3157  015454  062766  000002  000002          ADD     #2,2(SP)
 3158  015462  005737  017136          1$:     TST     @#ROSW
 3159  015466  001004                          BNE     300$
 3160  015470  032777  010000  163502          BIT     #SW12,@SWR
 3161  015476  001024                          BNE     3$
 3162  015500  105715                  300$:   TSTB    (R5)
 3163  015502  100014                          BPL     2$
 3164  015504  105777  163500                  TSTB    @TPCSR
 3165  015510  100375                          BPL     .-4
 3166  015512  012777  000015  163472          MOV     #15,@TPDBR
 3167  015520  105777  163464                  TSTB    @TPCSR
 3168  015524  100375                          BPL     .-4
 3169  015526  012777  000012  163456          MOV     #12,@TPDBR
 3170  015534  105777  163450          2$:     TSTB    @TPCSR
 3171  015540  100375                          BPL     2$
 3172  015542  112577  163444                  MOVB    (R5)+,@TPDBR
 3173  015546  001345                          BNE     1$
 3174  015550  012605                  3$:     MOV     (SP)+,R5
```

```
DZDQD   MACY11 27(1006)  22-DEC-76  11:14  PAGE 63
DZDQDD.P11    21-DEC-76 16:32           GENERAL UTILITIES (TYPE OUT,ERROR,SCOPE,ETC.)

  3175  015552  000002                          RTI
  3176
  3177                                          ;ASCII STRING INPUT ROUTINE
  3178
  3179  015554  010346                .INSTR:   MOV     R3,-(SP)
  3180  015556  010446                          MOV     R4,-(SP)
  3181  015560  017637  000004  015576          MOV     @4(SP),.MSG
  3182  015566  062766  000002  000004          ADD     #2,4(SP)
  3183  015574  104402                .INST1:   TYPE
  3184  015576  000000                .MSG:     0
  3185  015600  012704  017726                  MOV     #INBUF,R4
  3186  015604  012703  000007                  MOV     #7,R3
  3187  015610  105777  163370          1$:     TSTB    @TKCSR
  3188  015614  100375                          BPL     1$
  3189  015616  117714  163364                  MOVB    @TKDBR,(R4)
  3190  015622  142714  000200                  BICB    #200,(R4)
  3191  015626  121427  000025                  CMPB    (R4),#25                ;IS IT <^G>
  3192  015632  001003                          BNE     200$
  3193  015634  104402  017316                  TYPE,MCRLF
  3194  015640  000755                          BR      .INST1
  3195  015642  122427  000015          200$:   CMPB    (R4)+,#15
  3196  015646  001423                          BEQ     INSTR2
  3197  015650  117777  163332  163334          MOVB    @TKDBR,@TPDBR
  3198  015656  105777  163326          2$:     TSTB    @TPCSR
  3199  015662  100375                          BPL     2$
  3200  015664  005303                          DEC     R3
  3201  015666  001350                          BNE     1$
  3202  015670  000402                          BR      .INSTG
  3203  015672  010346                .INSTE:   MOV     R3,-(SP)
  3204  015674  010446                          MOV     R4,-(SP)
  3205  015676  104402                .INSTG:   TYPE
  3206  015700  017312                          MQM
  3207  015702  005737  017136                  TST     @#ROSW
  3208  015706  001402                          BEQ     400$
  3209  015710  104402  017316                  TYPE,MCRLF
  3210  015714  000727                400$:     BR      .INST1
  3211  015716  012604                INSTR2:   MOV     (SP)+,R4
  3212  015720  012603                          MOV     (SP)+,R3
  3213  015722  000002                          RTI
  3214
  3215                                          ;CONVERT ASCII STRING TO OCTAL
  3216
  3217  015724  010546                .PARAM:   MOV     R5,-(SP)
  3218  015726  010446                          MOV     R4,-(SP)
  3219  015730  016605  000004                  MOV     4(SP),R5
  3220  015734  012537  016130                  MOV     (R5)+,LOLIM
  3221  015740  012537  016132                  MOV     (R5)+,HILIM
  3222  015744  012537  016134                  MOV     (R5)+,DEVADR
  3223  015750  112537  016136                  MOVB    (R5)+,LOBITS
  3224  015754  112537  016137                  MOVB    (R5)+,ADRCNT
  3225  015760  010566  000004                  MOV     R5,4(SP)
  3226  015764  005005                PARAM1:   CLR     R5
  3227  015766  012704  017726                  MOV     #INBUF,R4
  3228  015772  122714  000015                  CMPB    #15,(R4)
  3229  015776  001420                          BEQ     PARERR
  3230  016000  121427  000060          1$:     CMPB    (R4),#60
```

```
3231  016004  002415                        BLT     PARERR
3232  016006  121427  000067                CMPB    (R4),#67
3233  016012  003012                        BGT     PARERR
3234  016014  142714  000060                BICB    #60,(R4)
3235  016020  152405                        BISB    (R4)+,R5
3236  016022  122714  000015                CMPB    #15,(R4)
3237  016026  001414                        BEQ     LIMITS
3238  016030  006305                        ASL     R5
3239  016032  006305                        ASL     R5
3240  016034  006305                        ASL     R5
3241  016036  000760                        BR      1$
3242  016040  122714  000015  PARERR: CMPB    #15,(R4)                ;IS FIRST CHARACTER A <CR>
3243  016044  001003                        BNE     120$
3244  016046  005737  017136                TST     @#RDSW                  ;IS CKSWR ROUTINE BEING USED
3245  016052  001023                        BNE     PARTI
3246  016054  104404                  120$: INSTER
3247  016056  000742                        BR      PARAM1
3248
3249                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
3250
3251  016060  020537  016132          LIMITS: CMP     R5,HILIM
3252  016064  101365                        BHI     PARERR
3253  016066  020537  016130                CMP     R5,LOLIM
3254  016072  103762                        BLO     PARERR
3255  016074  133705  016136                BITB    LOBITS,R5
3256  016100  001357                        BNE     PARERR
3257
3258                                        ;STORE NUMBER AT SPECIFIED ADDRESS
3259
3260  016102  013704  016134                MOV     DEVADR,R4
3261  016106  010524                  1$:   MOV     R5,(R4)+
3262  016110  062705  000002                ADD     #2,R5
3263  016114  105337  016137                DECB    ADRCNT
3264  016120  001372                        BNE     1$
3265  016122  012604                  PARTI: MOV     (SP)+,R4
3266  016124  012605                        MOV     (SP)+,R5
3267  016126  000002                        RTI
3268  016130  000000                  LOLIM: 0
3269  016132  000000                  HILIM: 0
3270  016134  000000                  DEVADR: 0
3271  016136  000000                  LOBITS: 0
3272          016137                  ADRCNT=LOBITS+1
3273
3274                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5
3275
3276  016140  016637  000004  001274 .SAVO5: MOV     4(SP),SAVPC
3277
3278                                        ;SAVE R0-R5
3279
3280  016146  010537  001270          SVO5:  MOV     R5,SAVR5
3281  016152  010437  001266                 MOV     R4,SAVR4
3282  016156  010337  001264                 MOV     R3,SAVR3
3283  016162  010237  001262                 MOV     R2,SAVR2
3284  016166  010137  001260                 MOV     R1,SAVR1
3285  016172  010037  001256                 MOV     R0,SAVR0
3286  016176  000002                        RTI
```

```
                                                        ;RESTORE R0-R5
016200  013700  001256          .RESO5: MOV     SAVR0,R0
016204  013701  001260                  MOV     SAVR1,R1
016210  013702  001262                  MOV     SAVR2,R2
016214  013703  001264                  MOV     SAVR3,R3
016220  013704  001266                  MOV     SAVR4,R4
016224  013705  001270                  MOV     SAVR5,R5
016230  000002                          RTI

                                                        ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER

016232  104402          .CONVR: TYPE
016234  017316                  MCRLF
016236  010046          .CNVRT: MOV     R0,-(SP)
016240  010146                  MOV     R1,-(SP)
016242  010346                  MOV     R3,-(SP)
016244  010446                  MOV     R4,-(SP)
016246  010546                  MOV     R5,-(SP)
016250  017601  000012          MOV     @12(SP),R1
016254  013737  017770  001250  MOV     TEMP,TEMP3
016262  062766  000002  000012  ADD     #2,12(SP)
016270  012137  016452          MOV     (R1)+,WRDCNT
016274  112137  016454  1$:     MOVB    (R1)+,CHRCNT
016300  112137  016455          MOVB    (R1)+,SPACNT
016304  013137  016456          MOV     @(R1)+,BINWRD
016310  013704  016456  2$:     MOV     BINWRD,R4
016314  113705  016454          MOVB    CHRCNT,R5
016320  012700  017770          MOV     #TEMP,R0
016324  010403  3$:     MOV     R4,R3
016326  042703  177770          BIC     #177770,R3
016332  062703  000060          ADD     #060,R3
016336  110320                  MOVB    R3,(R0)+
016340  000241                  CLC
016342  006004                  ROR     R4
016344  000241                  CLC
016346  006004                  ROR     R4
016350  000241                  CLC
016352  006004                  ROR     R4
016354  005305                  DEC     R5
016356  001362                  BNE     3$
016360  012703  020032          MOV     #MDATA,R3
016364  114023  4$:     MOVB    -(R0),(R3)+
016366  105337  016454          DECB    CHRCNT
016372  001374                  BNE     4$
016374  105737  016455          TSTB    SPACNT
016400  001405                  BEQ     6$
016402  112723  000040  5$:     MOVB    #040,(R3)+
016406  105337  016455          DECB    SPACNT
016412  001373                  BNE     5$
016414  105013  6$:     CLRB    (R3)
016416  104402                  TYPE
016420  020032                  MDATA
016422  005337  016452          DEC     WRDCNT
016426  001322                  BNE     1$
```

```
3343  016430  013737  001250  017770          MOV     TEMP3,TEMP
3344  016436  012605                          MOV     (SP)+,R5
3345  016440  012604                          MOV     (SP)+,R4
3346  016442  012603                          MOV     (SP)+,R3
3347  016444  012601                          MOV     (SP)+,R1
3348  016446  012600                          MOV     (SP)+,R0
3349  016450  000002                          RTI
3350  016452  000000                  WRDCNT: 0
3351  016454  000000                  CHRCNT: 0
3352          016455                  SPACNT=CHRCNT+1
3353  016456  000000                  BINWRD: 0
3354                                          ;TRAP DISPATCH SERVICE
3355                                          ;ARGUMENT OF TRAP IS EXTRACTED
3356                                          ;AND USED AS OFFSET TO OBTAIN POINTER
3357                                          ;TO SELECTED SUBROUTINE
3358
3359  016460  011646                  .TRPSR: MOV     (SP),-(SP)              ;GET PC OF RETURN
3360  016462  162716  000002                  SUB     #2,(SP)                 ;=PC OF TRAP
3361  016466  017616  000000                  MOV     @(SP),(SP)              ;GET TRP
3362  016472  006316                  TRPOK:  ASL     (SP)                    ;MULTIPLY TRAP ARG BY 2
3363  016474  042716  177001                  BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
3364  016500  062716  001314                  ADD     #.TRPTAB,(SP)           ;POINTER TO SUBROUTINE ADDRESS
3365  016504  017616  000000                  MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
3366  016510  000136                          JMP     @(SP)+                  ;GO TO SUBROUTINE
3367
3368                                          ;ERROR HANDLER
3369
3370  016512  104414                  .HLT:   CKSWR
3371  016514  032777  010000  162456          BIT     #SW12,@SWR
3372  016522  001406                          BEQ     XBX
3373  016524  105777  162460                  TSTB    @TPCSR
3374  016530  100003                          BPL     XBX
3375  016532  112777  000207  162452          MOVB    #207,@TPDBR
3376  016540  032777  020000  162432  XBX:    BIT     #SW13,@SWR
3377  016546  001074                          BNE     HALTS
3378  016550  021637  001234                  CMP     (SP),LSTERR
3379  016554  001404                          BEQ     1$
3380  016556  011637  001234                  MOV     (SP),LSTERR
3381  016562  105037  001312                  CLRB    ERRFLG
3382  016566  104406                  1$:     SAVDS
3383  016570  011605                          MOV     (SP),R5
3384  016572  162705  000002                  SUB     #2,R5
3385  016576  011504                          MOV     (R5),R4
3386  016600  006304                          ASL     R4
3387  016602  061504                          ADD     (R5),R4
3388  016604  006304                          ASL     R4
3389  016606  042704  177001                  BIC     #177001,R4
3390  016612  062704  012604                  ADD     #.ERRTAB,R4
3391  016616  012437  016710                  MOV     (R4)+,ERRMSG
3392  016622  012437  016722                  MOV     (R4)+,DATAHD
3393  016626  011437  016734                  MOV     (R4),DATABP
3394  016632  105737  001312                  TSTB    ERRFLG
3395  016636  001403                          BEQ     TYPMSG
3396  016640  005737  016734                  TST     DATABP
3397  016644  001027                          BNE     TYPDAT
3398  016646  104402                  TYPMSG: TYPE
```

```
3399  016650  017574                          MTSTN
3400  016652  104411                          CNVRT
3401  016654  017034                          XTSTN
3402  016656  104402                          TYPE
3403  016660  017662                          MERRPC
3404  016662  104411                          CNVRT
3405  016664  017026                          ERTABO
3406  016666  104402                          TYPE
3407  016670  017316                          MCRLF
3408  016672  112737  177777  001312          MOVB    #-1,ERRFLG
3409  016700  005737  016710                  TST     ERRMSG
3410  016704  001402                          BEQ     WRKO.FM
3411  016706  104402                          TYPE
3412  016710  000000                  ERRMSG: 0
3413  016712                          WRKO.FM:
3414  016712  005737  016722                  TST     DATAHO
3415  016716  001402                          BEQ     TYPDAT
3416  016720  104402                          TYPE
3417  016722  000000                  DATAHO: 0
3418  016724  005737  016734          TYPDAT: TST     DATABP
3419  016730  001402                          BEQ     RESREG
3420  016732  104410                          CONVRT
3421  016734  000000                  DATABP: 0
3422  016736  104407                  RESREG: RESOS
3423  016740  005777  162234          HALTS:  TST     @SWR
3424  016744  100005                          BPL     EXITER
3425  016746  010046                          PUSHRO
3426  016750  016600  000002                  MOV     2(SP),RO
3427  016754  000000                          HALT
3428  016756  012600                          POPRO
3429  016760  104414                  EXITER: CKSWR
3430  016762  005237  001232                  INC     ERRCNT
3431  016766  032777  000400  162204          BIT     #SW08,@SWR
3432  016774  001007                          BNE     1$
3433  016776  032777  002000  162174          BIT     #SW10,@SWR
3434  017004  001407                          BEQ     2$
3435  017006  013737  001216  001214          MOV     NEXT,RETURN
3436  017014  012706  001200          1$:     MOV     #STACK,SP
3437  017020  000177  162170                  JMP     @RETURN
3438  017024  000002                  2$:     RTI
3439  017026  000001                  ERTABO: 1
3440  017030     006     002                  .BYTE   6,2
3441  017032  001274                          SAVPC
3442  017034  000001                  XTSTN:  1
3443  017036     003     002                  .BYTE   3,2
3444  017040  001226                          TSTNO
3445                                          ;ENTER HERE ON POWER FAILURE
3446
3447
3448  017042                          .PFAIL:
3449  017042  012737  017054  000024          MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
3450  017050  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
3451  017052  000777                          BR      .
3452
3453                                          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
3454
```

```
DZDOO   MACY11 27(1006)  22-DEC-76  11:14  PAGE 68
DZDOOO.P11    21-DEC-76 16:32           GENERAL UTILITIES (TYPE OUT,ERROR,SCOPE,ETC.)

  3455  017054                          RESTAR:
  3456  017054  012737  017042  000024          MOV     #.PFAIL,24              ;SET UP FOR POWER FAILURE
  3457  017062  012706  001200                  MOV     #STACK,SP
  3458  017066  005037  017770                  CLR     TEMP
  3459  017072  005237  017770                  INC     TEMP
  3460  017076  001375                          BNE     .-4
  3461  017100  104402                          TYPE
  3462  017102  017320                          MPFAIL
  3463  017104  104411                          CNVRT
  3464  017106  017130                          PFTAB
  3465  017110  005037  001312                  CLR     ERRFLG
  3466  017114  005037  001234                  CLR     LSTERR
  3467  017120  104412                          MSTCLR
  3468  017122  104413                          MEMCLR
  3469  017124  000177  162064                  JMP     @RETURN
  3470  017130  000001                  PFTAB:  1
  3471  017132     003     002           .BYTE   3,2
  3472  017134  001226                          TSTNO
  3473
  3474
  3475                                          ;CHECK SWITCH REGISTER ROUTINE. CHECKS FOR ↑G TO ALLOW CHANGING
  3476                                          ;OF LOC.176.
  3477                                          ;LOCATIONS USED:
  3478  017136  000000                  RDSW:   .WORD   0
  3479
  3480
  3481  017140  005737  000042          .CKSWR: TST     @#42
  3482  017144  001042                          BNE     OUT
  3483  017146  022737  000176  001200          CMP     #SWREG,SWR      ;SOFTWARE SWITCH REGISTER PRESENT
  3484  017154  001036                          BNE     OUT             ;NO, GET OUT
  3485  017156  105777  162022                  TSTB    @TKCSR          ;YES,WAIT FOR
  3486  017162  100033                          BPL     OUT             ;READY, GET CHARACTER
  3487  017164  017737  162016  015576          MOV     @TKDBR,.MSG     ;AND STRIP OFF
  3488  017172  042737  177600  015576          BIC     #177600,.MSG    ;THE GARBAGE
  3489  017200  122737  000007  015576          CMPB    #7,.MSG         ;IS IT A <↑G>
  3490  017206  001021                          BNE     OUT
  3491  017210  104402  017266                  TYPE,$CNTG
  3492  017214  005137  017136          .CNTLU: COM     @#RDSW
  3493  017220  104402  017272                  TYPE,$MSWR
  3494  017224  104411  017260                  CNVRT,SWREGC
  3495  017230  104403  017301                  INSTR,$MNEW
  3496  017234  104405                          PARAM
  3497  017236  000000                          0
  3498  017240  177777                          177777
  3499  017242  000176                          SWREG
  3500  017244     000     001           .BYTE   0,1
  3501  017246  104402  017316                  TYPE,MCRLF
  3502  017252  005037  017136          OUT:    CLR     @#RDSW
  3503  017256  000002                          RTI
  3504  017260  000001                  SWREGC: 1
  3505  017262     006     002           .BYTE   6,2
  3506  017264  000176                          SWREG
  3507  017266  057377  000107          $CNTG:  .ASCIZ  <377>/↑G/
  3508  017272  051777  051127  020075  $MSWR:  .ASCIZ  <377>/SWR= /
  3509  017300     000
  3510  017301     040  047040  053505  $MNEW:  .ASCIZ  /  NEW= /
```

```
3511  017306  020075     000
3512          017312                 .EVEN
3513  017312  020040  000077         MQM:     .ASCIZ  /  ?/
3514  017316  000377                 MCRLF:   .ASCIZ  <377>
3515  017320  050377  051127  043040 MPFAIL:  .ASCIZ  <377>/PWR FAILED. RESTART AT TEST /
3516  017326  044501  042514  027104
3517  017334  051040  051505  040524
3518  017342  052122  040440  020124
3519  017350  044524  052123  000040
3520  017356  042777  042116  050040 MEPASS:  .ASCIZ  <377>/END PASS DZDQD /
3521  017364  051501  020123  055104
3522  017372  050504  020104     000
3523  017377     377  000122         MR:      .ASCIZ  <377>/R/
3524  017402  050377  047522  051107 MERR2:   .ASCIZ  <377>/PROGRAM INDICATES NO DEVICES PRESENT./
3525  017410  046501  044440  042116
3526  017416  041511  052101  051505
3527  017424  047040  020117  042504
3528  017432  044526  042503  020123
3529  017440  051120  051505  047105
3530  017446  027124     000
3531  017451     377  047111  052523 MERR3:   .ASCIZ  <377>/INSUFFICIENT DATA!/
3532  017456  043106  041511  042511
3533  017464  052116  042040  052101
3534  017472  020501     000
3535  017475     377  042524  052123 MTSTPC:  .ASCIZ  <377>/TEST PC-/
3536  017502  050040  026503     000
3537  017507     377  047514  045503 MLOCK:   .ASCIZ  <377>/LOCK ON SELECTED TEST/
3538  017514  047440  020116  042523
3539  017522  047514  052103  042105
3540  017530  052040  051505  000124
3541  017536  051503  035122  000040 MCSRX:   .ASCIZ   /CSR: /
3542  017544  042526  035103  000040 MVECX:   .ASCIZ  /VEC: /
3543  017552  040520  051523  051505 MPASSX:  .ASCIZ  /PASSES: /
3544  017560  020072     000
3545  017563     105  051122  051117 MERRX:   .ASCIZ  /ERRORS: /
3546  017570  035123  000040
3547  017574  177777  042524  052123 MTSTN:   .ASCIZ  <377><377> /TEST NO: /
3548  017602  047040  035117  000040
3549  017610  051777  052105  051440 MNEW:    .ASCIZ  <377>/SET SWITCH REG TO DQ11'S DESIRED ACTIVE./
3550  017616  044527  041524  020110
3551  017624  042522  020107  047524
3552  017632  042040  030521  023461
3553  017640  020123  042504  044523
3554  017646  042522  020104  041501
3555  017654  044524  042526  000056
3556  017662  041520  020072     000 MERRPC:  .ASCIZ  /PC: /
3557  017667     377  040515  020120 XHEAD:   .ASCIZ  <377>/MAP OF DQ11 STATUS/<377>
3558  017674  043117  042040  030521
3559  017702  020061  052123  052101
3560  017710  051525  000377
3561                                 .EVEN
3562  017714  000002                 XSTATQ: 2
3563  017716     006      003                .BYTE   6,3
3564  017720  001244                        TEMP1
3565  017722     006      002                .BYTE   6,2
3566  017724  001246                        TEMP2
```

```
DZDQD   MACY11 27(1006)  22-DEC-76  11:14  PAGE 70
DZDQDD.P11    21-DEC-76 16:32          GENERAL UTILITIES (TYPE OUT,ERROR,SCOPE,ETC.)

                                       .EVEN

                                               ;BUFFERS FOR INPUT-OUTPUT

017726  000000                         INBUF:  0
        017770                         .=.+40
017770  000000                         TEMP:   0
        020032                         .=.+40
020032  000000                         MDATA:  0
        020074                         .=.+40
        000001                         .END
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
ABBIT = 002000           637#   1007
ACTBIT= 004000           638#   1015    2193
ADRCNT= 016137          3224#   3263#   3272#
A1$     003054          1434    1437#
BABIT = 010000           639#   1011
BBBIT = 020000           640#   1002    2548
BINWRD  016456          3313#   3314    3353#
BITSEL  014064          1786#   1792    2731#   2737    2765#   2771    2791#   2797    2833#   2843    3055#
BIT0  = 000001           632#   1331    2963    2966
BIT1  = 000002           631#   1765    1768    1769    1772    1773    1776    1778    1794
BIT10 = 002000           622#
BIT11 = 004000           621#
BIT12 = 010000           620#   2080    2158    2172    2183    2195    2203    2208    2851
BIT13 = 020000           619#   2155
BIT14 = 040000           618#   1399    1405    3124
BIT15 = 100000           617#   2350    2352    2354    2600    2801    2847    2951    2972
BIT2  = 000004           630#   1302    1459    1491
BIT3  = 000010           629#
BIT4  = 000020           628#   2864    2873    2910    2936
BIT5  = 000040           627#   2086    2892
BIT6  = 000100           626#   1478
BIT7  = 000200           625#   2747    2754    2853    2907    2933    2950    2970
BIT8  = 000400           624#
BIT9  = 001000           623#
BRW     015422          1308    3142#
BRX     015424          1309    3143#
CHARDT= 000010           657#
CHAR1   001236          1089#
CHAR2   001240          1090#
CHAR3   001242          1091#
CHRCNT  016454          3311#   3315    3331#   3351#   3352
CKSWR = 104414          1150#   1276    1286    1301    2569    2573    3105    3123    3147    3370    3429
CKSYN1  003002          1388    1416#
CNTLW = 104415          1152#   1258
CNVRT = 104411          1144#   3079    3083    3087    3091    3400    3404    3463    3494
CONVRT= 104410          1142#   1266    2661    2665    2669    2673    3420
COUNT   014062          1785#   1802#   2730#   2750#   2764#   2781#   2790#   2819#   2832#   2860#   3054#
CREAM   001300          1106#   1230#   1340#   1344#   1353    1354#   1355    1356#
CSRMAP  000220           982#   1261
DATABP  016734          3393#   3396    3418    3421#
DATAHD  016722          3392#   3414    3417#
DELAY   014060          1444#   1448#   1476#   1480#   3053#
DEVADR  016134          3222#   3260    3270#
DH0     013306          3040    3045#
DH1     013[illegible]6          2983    3045#
DH10    013546          3010    3028    3043    3045#
DH11    013621          3045#
DH12    013645          3045#
DH13    013675          3019    3045#
DH2     013347          2986    3045#
DH3     013364          2989    3045#
DH4     013375          2992    3045#
DH5     013431          2995    3045#
DH6     013465          2998    3045#
DH7     013505          3001    3045#
DH8     013534          3007    3016    3022    3045#
```

DZDQQQ.P11 21-DEC-76 16:32 CROSS REFERENCE TABLE -- USER SYMBOLS

```
DH9     013540            3004    3013    3025    3045#
DISPRE  000174             973#   1251
DLIGHT= 177570             602#   1242
DQACTV  001500             953    1027*   1033*   1034*   1038    1209#   1283*   1284    1334    1336
DQCR00  001400            1177#
DQCR01  001404            1179#
DQCR02  001410            1181#
DQCR03  001414            1183#
DQCR04  001420            1185#
DQCR05  001424            1187#
DQCR06  001430            1189#
DQCR07  001434            1191#
DQCR10  001440            1193#
DQCR11  001444            1195#
DQCR12  001450            1197#
DQCR13  001454            1199#
DQCR14  001460            1201#
DQCR15  001464            1203#
DQCR16  001470            1205#
DQCR17  001474            1207#
DQCSR   001506            1212#   1353*   1357
DQERR   001366            1167#   1370*   1371*   1372    2313    2360    2507    2871*
DQNUM   001504             986*   1023*   1028    1030    1211#   1225    2675    3096
DQRCSH  001362            1165#   1366*   1367*   2880*   2886*   2889*
DQRCSR  001360            1164#   1357*   1366    1368    2080*   2158    2172    2183    2195    2203    2208    2237*   2238
                          2272*   2273    2407*   2443*   2444    2498*   2500    2510    2593*   2598    2600*   2612    2848*
                          2851*   2869*   2906*   2932*   3110
DQREG   001370            1168#   1372*   1373*   1374    1389*   1391*   1393*   1404*   1438*   1440*   1442*   1451*   1455*
                          1470*   1472*   1474*   1483*   1487*   1783*   1787*   1789*   1791*   2078*   2087*   2149*   2154*
                          2231*   2233*   2235*   2240*   2244*   2266*   2268*   2270*   2275*   2279*   2393*   2395*   2397*
                          2399*   2401*   2403*   2435*   2437*   2439*   2484*   2486*   2488*   2490*   2492*   2494*   2631*
                          2732*   2734*   2736*   2766*   2768*   2770*   2792*   2794*   2796*   2836*   2838*   2840*   2842*
                          2852*   2873*   2874*   2876*   2879*   2882*   2884*   2891*   2896*   2899*   2901*   2903*   2922*
                          2925*   2927*   2929*
DQRLVL  001352            1161#   1360*   1361*   1362
DQRVEC  001350            1160#   1358*   1359*   1360    3113
DQSEC   001372            1169#   1374*   1375*   1376    1390*   1392*   1394*   1396*   1397*   1398*   1399    1405    1439*
                          1441*   1443*   1452    1456    1471*   1473*   1475*   1484    1488    1784*   1788*   1790*   1792*
                          1793*   1797*   1798*   1799    2079*   2081    2086*   2088    2150*   2155    2161*   2162*   2167
                          2178    2186*   2187*   2188    2206*   2207*   2232*   2234*   2236*   2241    2245    2267*   2269*
                          2271*   2276    2280    2394*   2396*   2398*   2400*   2402*   2404*   2436*   2438*   2440*   2485*
                          2487*   2489*   2491*   2493*   2495*   2632*   2733*   2735*   2737*   2738*   2743*   2744*   2745*
                          2746*   2747    2752*   2753*   2754    2767*   2769*   2771*   2772*   2777*   2778*   2779*   2780*
                          2793*   2795*   2797*   2798*   2801*   2806*   2807*   2809*   2810*   2811    2837*   2839*   2841*
                          2843*   2844*   2847*   2853*   2857*   2858*   2859*   2864*   2875*   2883*   2885*   2892*   2897*
                          2900*   2902*   2904*   2905*   2907*   2908*   2909*   2910*   2923*   2926*   2928*   2930*   2931*
                          2933*   2934*   2935*   2936*
DQSECH  001374            1170#   1376*   1377*
DQSTAT  001510            1213#   1355*   1358    1416    2163    2193    2548    2961
DQST00  001402            1178#
DQST01  001406            1180#
DQST02  001412            1182#
DQST03  001416            1184#
DQST04  001422            1186#
DQST05  001426            1188#
DQST06  001432            1190#
```

DZDQDD.P11 21-DEC-76 16:32 CROSS REFERENCE TABLE -- USER SYMBOLS

```
DQST07  001436          1192#
DQST10  001442          1194#
DQST11  001446          1196#
DQST12  001452          1198#
DQST13  001456          1200#
DQST14  001462          1202#
DQST15  001466          1204#
DQST16  001472          1206#
DQST17  001476          1208#
DQTCSR  001364          1166#  1368*  1369*  1370   1395*  1445*  1446   1459   1477*  1478   1491   1764*  1765
                        1768*  1769   1772*  1773   1776*  1778   1794*  2408*  2409   2499*  2513   2739*  2740
                        2741   2742   2773*  2774   2775   2776   2802*  2803   2804   2805   2870*
DQTLVL  001356          1163#  1364*  1365*
DQTVEC  001354          1162#  1362*  1363*  1364
DSWR  = 177570           601#  1241
DTO     014040          3011   3029   3044   3045#
EM0     013010          2982   2985   2997   3000   3009   3039   3045#
EM1     013026          2988   2991   2994   3045#
EM3     013064          3012   3015   3045#
EM4     013116          2645   3030   3045#
EM5     013150          3021   3024   3045#
EM6     013173          3003   3018   3027   3045#
EM7     013206          3033   3045#
EM8     013254          3036   3045#
ERRCNT  001232          1084#  1231*  3119   3430*
ERRFLG  001312          1115#  1228*  3073*  3136*  3381*  3394   3408*  3465*
ERRMSG  016710          3391*  3409   3412#
ERTAB   017026          3405   3439#
EXITER  016760          3424   3429#
EXTFLG  014052          1834*  1868*  2301*  2344*  2813   2821   2948   2968   3050#
GENPAR  012444          1843   1880   2307   2349   2944#
HALTS   016740          3377   3423#
HILIM   016132          3221*  3251   3269#
ICOUNT  001222          1080#  3134   3138*
INBUF   017726          3185   3227   3571#
INIFLG  001310          1113#  1236   1239*
INSTER= 104404          1134#  3246
INSTR = 104403          1132#  1312   3495
INSTR2  015716          3196   3211#
JUMBIT= 040000           641#  1014
LIGHTS  001202          1069#  1242*  1251*  3093#
LIMITS  016060          3237   3251#
LOBITS  016136          3223*  3255   3271#  3272
LOCK    001220          1079#  1831*  1867*  2299*  2342*  2545*  3150
LOGICA  015240           935   3100#
LOKFLG  001313          1116#
LOLIM   016130          3220*  3253   3268#
LPCNT   001224          1081#  3133*  3134   3137*
LSTERR  001234          1085#  1232*  3072*  3378   3380*  3466#
MCRLF   017316          3193   3209   3301   3407   3501   3514#
MCSRX   017536          3078   3541#
MDATA   020032          3329   3340   3575#
MDETCH  013724          2660   3045#
MEMCLR= 104413          1148#  1436   1494   2387   2478   2546   3468
MEPASS  017356          3076   3520#
MERRPC  017662          3403   3556#
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
MERRX   017563          3090    3545#
MERR2   017402          1045    1348    3524#
MERR3   017451          1280    3531#
MISC. = 000012           659#   1393    1404    1442    1474    1791    2078    2087    2154    2235    2270    2439    2631
                        2736    2770    2796    2852    2891
MLOCK   017507          1304    3537#
MNEW    017610          1273    3549#
MPASSX  017552          3086    3543#
MPFAIL  017320          3462    3515#
MQM     017312          3206    3513#
MR      017377          1322    3523#
MSTCLR= 104412          1146#   1402    1403    1437    1777    1837    1874    2148    2230    2265    2303    2346    2429
                        2727    2895    2921    3467
MTITLE  001000          1054#   1238
MTSTN   017574          3399    3547#
MTSTPC  017475          1313    3535#
MVECX   017544          3082    3542#
NEXT    001216          1078#   1328#   1388#   1435#   1509#   1525#   1541#   1557#   1573#   1589#   1605#   1626#   1643#
                        1660#   1677#   1694#   1711#   1728#   1745#   1763#   1830#   1866#   1903#   1914#   1925#   1936#
                        1947#   1958#   1969#   1985#   1996#   2007#   2018#   2029#   2040#   2051#   2062#   2077#   2110#
                        2123#   2259#   2264#   2298#   2341#   2381#   2472#   2544#   2550    3139    3435
NPRFLG  011766          2347#   2547#   2542#   2849    2862    2865#   2867#
NUMBER  014114          2590#   2603    2615#   2616    2625    2636    2640#   2643    2658    2678    3058#
OCTBIT= 001000           642#   1016    2961
OUT     017252          3482    3484    3486    3490    3502#
PARAM = 104405          1136#   1314    3496
PARAM1  015764          3226#   3247
PAR ERR 016040          3229    3231    3233    3242#   3252    3254    3256
PARFLG  012602          1832#   1841    1852#   1869#   1878    1889#   2300#   2305    2323#   2343#   2799    2845    2977#
PARTI   016122          3245    3265#
PASCNT  001230          1083#   1227#   3074#   3093    3116
PFTAB   017130          3464    3470#
POLY. = 000017           664#
POPRO = 012600           611#   3428
POP1SP= 005726           609#
POP2SP= 022626           613#
PS    = 177776           603#    956#   1222#   1297#
PUSHRO= 010046           610#   3425
PUSH1S= 005746           608#
PUSH2S= 024646           612#
RDSW    017136          3158    3207    3244    3478#   3492#   3502#
RESREG  016736          3419    3422#
RESTAB  017054          3449    3455#
RESTRT  015250          3095    3098    3105#
RESOS = 104407          1140#   3422
RETURN  001214          1077#   1234#   1317    1321#   1323    1327#   1434#   2550#   2551    2619    3106#   3139#   3140
                        3435#   3437    3469
RUN     001304          1108#   1331#   1334    1339#   1345#   1352#
RUNCNT  001306          1109#   1332#   1341#   1343#
RUNFLG  001302          1107#   1229#   1329    1333#
RXBA.P= 000000           648#
RXBA.S= 000004           652#
RXBUFF  014116          2232    2241    2267    2276    2311    2358    2389    2394    2417    2431    2436    2452    2480
                        2485    2518    2837    2897    2898#   2914#   2915    2923    2924#   2940    3059#
RXELNG  012302          1986    1997    2008    2019    2030    2041    2052    2063    2920#
RXLNG   012132          1904    1915    1926    1937    1948    1959    1970    2894#
```

DZDQDD.P11 21-DEC-76 16:32 CROSS REFERENCE TABLE -- USER SYMBOLS

```
RXSTRA  011522          2151    2175    2200    2308    2355    2595    2831#
RQWC.P= 000001           649#
RQWC.S= 000005           653#
RX.BCC= 000015           662#
SAVACT  001502          1038#   1210#   1277
SAVEPC  014054          2729#   2763#   2789#   2831#   2894#   2920#   3051#
SAVNUM  001276          1031#   1105#   1225#   3094#   3096#
SAVPC   001274          1104#   3276#   3441
SAVR0   001256          1097#   3285#   3290
SAVR1   001260          1098#   3284#   3291
SAVR2   001262          1099#   3283#   3292
SAVR3   001264          1100#   3282#   3293
SAVR4   001266          1101#   3281#   3294
SAVR5   001270          1102#   3280#   3295
SAVSP   001272          1103#
SAVOS = 104406          1138#   3382
SCOPE = 104400          1126#   1408    1495    1513    1529    1545    1561    1577    1593    1609    1630    1647    1664
                        1681    1698    1715    1732    1749    1811    1854    1891    1907    1918    1929    1940    1951
                        1962    1973    1989    2000    2011    2022    2033    2044    2055    2066    2091    2115    2128
                        2248    2283    2325    2366    2458    2528    2689
SCOP1 = 104401          1128#   1848    1885    2319    2363    2620
SECND   003220          1470#
SEQ.  = 000014           661#
SPACNT= 016455          3312#   3333    3336#   3352#
STACK = 001200           604#   1223    1298    3436    3457
STFLG   001311          1114#   1226#
SVOS    016146          3280#
SWR     001200          1068#   1241#   1246    1250#   1256    1259    1270    1277    1283    1302    1310    2570    3124
                        3131    3148    3160    3371    3376    3423    3431    3433    3483
SWREG   000176           974#   1250    1256    3483    3499    3506
SYSGC   017260          3494    3504#
SW00  = 000001           584#   1270
SW01  = 000002           583#   1310
SW02  = 000004           582#
SW03  = 000010           581#
SW04  = 000020           580#
SW05  = 000040           579#
SW06  = 000100           578#
SW08  = 000400           577#   3431
SW09  = 001000           576#   3148
SW10  = 002000           575#   3433
SW11  = 004000           574#   3131
SW12  = 010000           573#   3160    3371
SW13  = 020000           572#   3376
SW14  = 040000           571#
SW15  = 100000           570#
SYMBIT= 100000           643#    996    1416    2163
SYNC    014522          1418#   1420#   2398    2489    3062#
SYNC. = 000011           658#
SYNTST  002026          2111    2124    2137#
TEMP    017770          2834#   2835#   2854#   3308    3316    3343#   3458#   3459#   3573#
TEMP1   001244           953#    954#   1092#   1263#   1264    1268#   2405#   2411#   2441#   2446#   2496#   2502#   2855#
                        2856#   2857    3564
TEMP2   001246          1093#   1264#   2406#   2413#   2442#   2448#   2497#   2504#   3566
TEMP3   001250          1094#   1781#   1809#   3308#   3343
TEMP4   001252          1095#   1795#   1796#   1801#   1804#   1806    1836#   1845    1873#   1882    2311#   2316    2358#
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
                          2520*  2522*  2523   2658*  2663*  2667*  2671*  2678*  2687*  2808*  2818*  2823*  2825*
                          3049
TEMPS   001254            1096*  1805*  1806   1844*  1845   1881*  1882   2312*  2316   2359*  2519*  2521*  2523
                          3047
TKCSR   001204            1070*  3127   3187   3485
TKDBR   001206            1071*  3129   3189   3197   3487
TLAST = 007754            1316   3066*
TMPBUF  014066            1390   2586   2588   2591   2605   2609   2638   2649   2679   3056*
TPCSR   001210            1072*  3164   3167   3170   3198   3373
TPDBR   001212            1073*  3166*  3169*  3172*  3197*  3375*
TRPOK   016472            3362*
TSTNO   001226            1082*  1233*  1326*  1387*  1433*  1508*  1524*  1540*  1556*  1572*  1588*  1604*  1625*
                          1642*  1659*  1676*  1693*  1710*  1727*  1744*  1762*  1829*  1865*  1902*  1913*  1924*
                          1935*  1946*  1957*  1968*  1984*  1995*  2006*  2017*  2028*  2039*  2050*  2061*  2076*
                          2109*  2122*  2228*  2263*  2297*  2340*  2380*  2471*  2543*  3444   3472
TST1    002254            1315   1321   1326*  3106   3107
TST10   003520            1557   1572*
TST11   003546            1573   1589*
TST12   003574            1589   1604*
TST13   003622            1605   1625*
TST14   003650            1626   1642*
TST15   003676            1643   1659*
TST16   003724            1660   1676*
TST17   003752            1677   1693*
TST2    002644            1327   1328   1387*
TST20   004000            1694   1710*
TST21   004026            1711   1727*
TST22   004054            1728   1744*
TST23   004102            1745   1762*
TST24   004436            1763   1829*
TST25   004570            1830   1865*
TST26   004730            1866   1902*
TST27   004756            1903   1913*
TST3    003030            1433*
TST30   005004            1914   1924*
TST31   005032            1925   1935*
TST32   005060            1936   1946*
TST33   005106            1947   1957*
TST34   005134            1958   1968*
TST35   005162            1969   1984*
TST36   005210            1985   1995*
TST37   005236            1996   2006*
TST4    003370            1435   1508*
TST40   005264            2007   2017*
TST41   005312            2018   2028*
TST42   005340            2029   2039*
TST43   005366            2040   2050*
TST44   005414            2051   2061*
TST45   005442            2062   2076*
TST46   005546            2077   2109*
TST47   005576            2110   2122*
TST5    003416            1509   1524*
TST50   006236            2123   2228*
TST51   006364            2229   2263*
TST52   006512            2264   2297*
TST53   006660            2298   2340*
```

  CROSS REFERENCE TABLE -- USER SYMBOLS

```
TST54   007032          2341    2380#
TST55   007434          2381    2471#
TST56   007754          2472    2543#   3066
TST57 = ****** U        2544
TST6    003444          1525    1540#
TST7    003472          1541    1556#
TTST    015324          1305*   1306*   1308*   1309*   3125#
TXBA.P= 000002           650#
TXBC.S= 000006           654#
TXBUFF  014524          1439    1456    1471    1488    2383    2474    2517    3063#
TXSTRB  010720          1510    1526    1542    1558    1574    1590    1606    1627    1644    1661    1678    1695    1712
                        1729    1746    2727#
TXSTRC  011124          2763#
TXSTRD  011266          1838    1875    2789#
TXWC.P= 000003           651#
TXWC.S= 000007           655#
TX.BCC= 000016           663#
TX.MUX= 000013           660#
TYPDAT  016724          3397    3415    3418#
TYPE  = 104402          1044    1130#   1238    1262    1272    1279    1304    1322    1347    2645    2659    3075    3077
                        3081    3085    3089    3183    3193    3205    3209    3300    3339    3398    3402    3406    3411
                        3416    3461    3491    3493    3501
TYPMSG  016646          3395    3398#
VECMAP  000056           946#   1043
WORD    014056          1782*   1788    1835*   1844    1871*   1872*   1881    2138*   2199*   2304*   2312    2348*   2350
                        2352*   2354*   2359    2594*   2728*   2733    2767    2793    2834    2950*   2951*   2954    2970*
                        2972*   3052#
WRDCNT  016452          3310*   3341*   3350#
WRKO.F  016712          3410    3413#
XBX     016540          3372    3374    3376#
XCHAR1  010630          2662    2690#
XCHAR2  010642          2666    2695#
XCHAR3  010654          2670    2700#
XCHAR4  010666          2674    2705#
XCSR    015264          3080    3108#
XERR    015306          3092    3117#
XHEAD   017667          1262    3557#
XPASS   015300          3088    3114#
XSTATQ  017714          1267    3562#
XTSTN   017034          3401    3442#
XVEC    015272          3084    3111#
XYZFLG  014112          2647    2677#   3057#
$CNTG   017266          3491    3507#
$E    = 000060             1#   1328    1329#   1389#   1435    1436#   1509    1510#   1525    1526#   1541    1542#   1557
                        1558#   1573    1574#   1589    1590#   1605    1606#   1626    1627#   1643    1644#   1660    1661#
                        1677    1678#   1694    1695#   1711    1712#   1728    1729#   1745    1746#   1763    1764#   1830
                        1832#   1866    1868#   1903    1904#   1914    1915#   1925    1926#   1936    1937#   1947    1948#
                        1958    1959#   1969    1970#   1985    1986#   1996    1997#   2007    2008#   2018    2019#   2029
                        2030#   2040    2041#   2051    2052#   2062    2063#   2077    2078#   2110    2111#   2123    2124#
                        2229    2230#   2264    2265#   2298    2300#   2341    2343#   2381    2382#   2472    2473#   2544
                        2546#
$MNEW   017301          3495    3510#
$MSWR   017272          3493    3508#
$N    = 000056             1#   1324    1329#   1385    1389#   1431    1436#   1506    1510#   1522    1526#   1538    1542#
                        1554    1558#   1570    1574#   1586    1590#   1602    1606#   1623    1627#   1640    1644#   1657
                        1661#   1674    1678#   1691    1695#   1708    1712#   1725    1729#   1742    1746#   1760    1764#
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
                        1827   1832#  1863   1868#  1900   1904#  1911   1915#  1922   1926#  1933   1937#  1944
                        1948#  1955   1959#  1966   1970#  1982   1986#  1993   1997#  2004   2008#  2015   2019#
                        2026   2030#  2037   2041#  2048   2052#  2059   2063#  2074   2078#  2107   2111#  2120
                        2124#  2226   2230#  2261   2265#  2295   2300#  2338   2343#  2378   2382#  2469   2473#
                        2541   2546#  3066#
SY      = 000016           1#  1117#  1126   1128#  1130#  1132#  1134#  1136#  1138#  1140#  1142#  1144#  1146#
                        1148#  1150#  1152#  1154#
.       = 020074         668#   669    671    673    675    677    679    681    683    685    687    689    691
                         693    695    697    699    701    703    705    707    709    711    713    715    717
                         719    721    723    725    727    729    731    733    735    737    739    741    743
                         745    747    749    751    753    755    757    759    761    763    765    767    769
                         771    773    775    777    779    781    783    785    787    789    791    793    795
                         797    799    801    803    805    807    809    811    813    815    817    819    821
                         823    825    827    829    831    833    835    837    839    841    843    845    847
                         849    851    853    855    857    859    861    863    865    867    869    871    873
                         875    877    879    881    883    885    887    889    891    893    895    897    899
                         901    903    905    907    909    911    913    915    917    919    921    923    927#
                         934#   936#   944#   960    972#   978#   981#   985    1001   1006   1010   1013   1048
                        1053#  1065#  1106#  1176#  1177#  1178#  1179#  1180#  1181#  1182#  1183#  1184#  1185#
                        1186#  1187#  1188#  1189#  1190#  1191#  1192#  1193#  1194#  1195#  1196#  1197#  1198#
                        1199#  1200#  1201#  1202#  1203#  1204#  1205#  1206#  1207#  1208#  1209#  1210#  1211#
                        1212#  1213#  1260   1265   1269   1282   1350   1400   1406   1453   1457   1460   1485
                        1489   1492   1766   1770   1774   1779   1807   1842   1846   1879   1883   2084   2089
                        2152#  2153#  2156   2159   2164   2170   2173   2176#  2177#  2181   2184   2191   2196
                        2201#  2202#  2204   2209   2239   2242   2246   2274   2277   2281   2306   2314   2317
                        2351   2353   2361   2419   2454   2508   2511   2514   2524   2549   2589   2644   2676
                        2682   2685   2748   2755   2800   2846   2850   2863   2916   2941   2949   2969   3056#
                        3060#  3064#  3165   3168   3451   3460   3512#  3572#  3574#  3576#
.ADDR1  010702          2651#  2694   2711#
.ADDR2  010706          2653#  2699   2713#
.ADDR3  010712          2655#  2704   2715#
.ADDR4  010716          2657#  2709   2717#
.BEGIN  002116          1297#
.CHAR1  010700          2650#  2680   2692   2710#
.CHAR2  010704          2652#  2697   2712#
.CHAR3  010710          2654#  2702   2714#
.CHAR4  010714          2656#  2707   2716#
.CKSWR  017140          1151   3481#
.CNTLU  017214          1153   3492#
.CNVRT  016236          1145   3302#
.CONVR  016232          1143   3300#
.EOP    015126          2544   3072#
.ERRTA  012604          2978#  3390
.HLT    016512           930   3370#
.INSTE  015672          1135   3203#
.INSTG  015676          3202   3205#
.INSTR  015554          1133   3179#
.INST1  015574          3183#  3194   3210
.MEMCL  011770          1149   2868#
.MSG    015576          3181#  3184#  3487#  3488#  3489
.MSTCL  012114          1147   2890#
.PARAM  015724          1137   3217#
.PFAIL  017042           928   1224   3448#  3456
.RESOS  016200          1141   3290#
.SAVOS  016140          1139   3276#
.SCOPE  015314          1127   3123#
```

  CROSS REFERENCE TABLE -- USER SYMBOLS

```
DQEND       1#   3065
DQFRNT      1#    550
HLT       614#   1401   1407   1450   1454   1458   1461   1482   1486   1490   1493   1767   1771   1775   1780
         1808    1847   1884   2085   2090   2157   2160   2171   2174   2182   2185   2192   2197   2205   2210
         2243    2247   2278   2282   2315   2318   2362   2415   2420   2450   2455   2506   2509   2512   2515
         2525    2618   2683   2686   2749   2756   2917   2942
IDENT       1#
ORANGL      1#   1324
TESTA1      1#
TESTB1      1#
TESTC1      1#
TESTD1      1#     50
TESTE1      1#
TESTF1      1#
TESTH1      1#
TESTH2      1#
$AAA     1499#   1515   1531   1547   1563   1579   1595
$ BB     1615#   1632   1649   1666   1683   1700   1717   1734
$BEGIN      1#   1294
$BUFFE      1#   3568
$CATCH      1#    667
$CCC     1898#   1909   1920   1931   1942   1953   1964
$CLRVE      1#   1259
$CONVR      1#   3297
$DDD     1980#   1991   2002   2013   2024   2035   2046   2057
$EOP        1#   3065
$GETFL      1#
$GETPA      1#   1312
$HEADE      1#    550
$HLT        1#   3367
$INSTR      1#   3176
$INTMP      1#
$MAINT      1#
$MSG        1#   3513
$PARAM      1#   3214
$PFAIL      1#   3445
$REG        1#   3273
$SCOPE      1#   3120
$SCOPI      1#   3144
$SETFL      1#
$SETVE      1#    925
$START      1#   1214
$SYMBO      1#    567
$TRAPS      1#   1117
$TRPDE      1#   1126   1128   1130   1132   1134   1136   1138   1140   1142   1144   1146   1148   1150   1152
$TRPSR      1#   3354
$TSTN       1#   1324   1385   1431   1506   1522   1538   1554   1570   1586   1602   1623   1640   1657   1674
         1691    1708   1725   1742   1760   1827   1863   1900   1911   1922   1933   1944   1955   1966   1982
         1993    2004   2015   2026   2037   2048   2059   2074   2107   2120   2226   2261   2295   2338   2378
         2469    2541
$TYPE       1#   3152
$VARIA      1#   1052

. ABS.  020074     000
```

```
DZDQD   MACY11 27(1006)  22-DEC-76  11:14  PAGE 83
DZDQDD.P11    21-DEC-76 16:32          CROSS REFERENCE TABLE -- MACRO NAMES


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 MULE:DZDQDD.BIN,MULE:DZDQDD.SEQ/SOL/CRF=DSKZ:UNIV.P11,DSKZ:DZDQDD.P11
 RUN-TIME: 21 34 3 SECONDS
 RUN-TIME RATIO: 263/60=4.3
 CORE USED:  19K  (37 PAGES)
```