DQ11

MISC & BCC TESTS

CZDQEE0

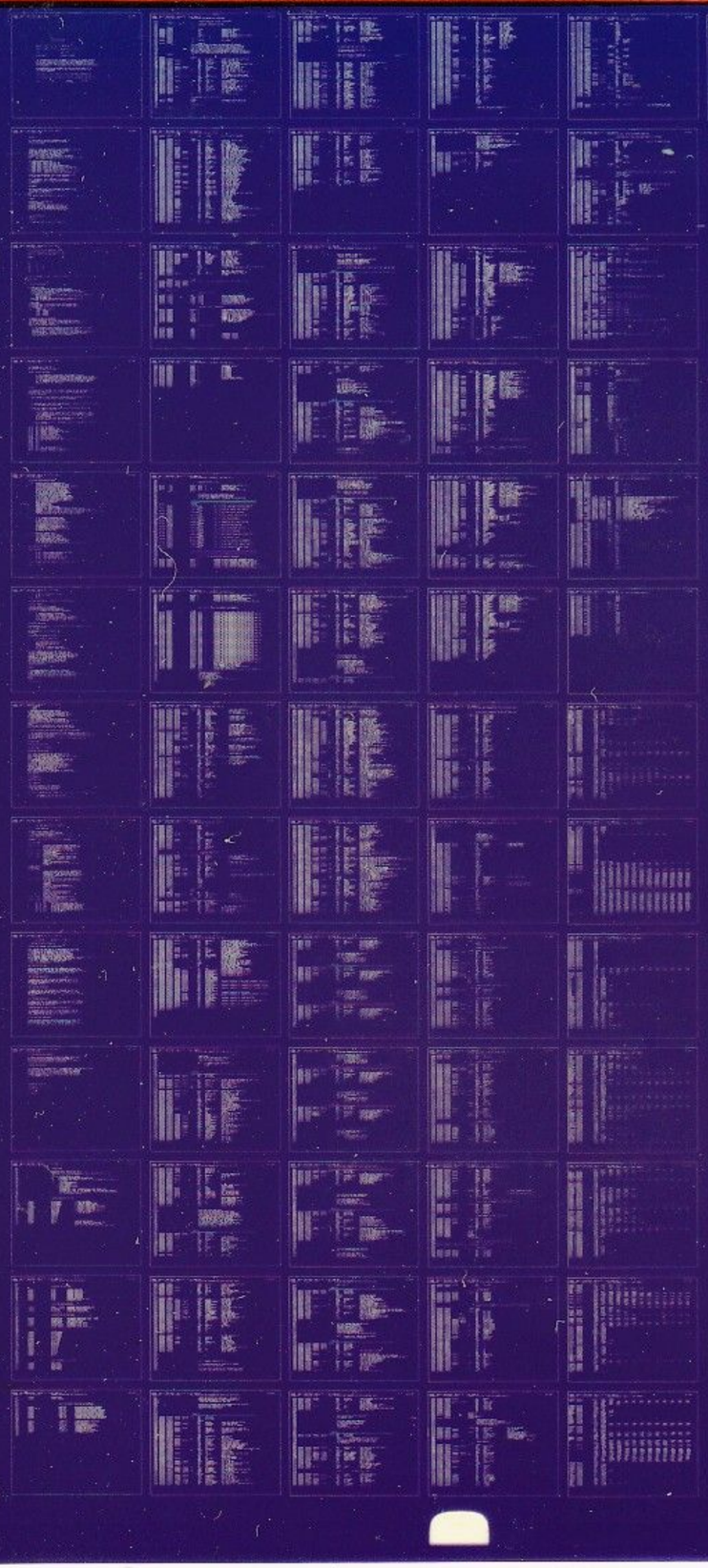
AH-8623E-MC

FICHE 1 OF 1

JAN 1979

digital

MADE IN USA



IDENTIFICATION

PRODUCT CODE: AC-8622E-MC

PRODUCT NAME: CZDQEE0 MISC & BCC TST

DATE: JUNE 1978

MAINTAINER: DIAGNOSTIC GROUP

1. ABSTRACT

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

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. CZDQA [REV] BASIS R/W TEST #1
2. CZDQB [REV] BASIC R/W TEST #2
3. CZDQC [REV] BASIC NPR AND INTERUPT TEST
4. CZDQD [REV] RECEIVER TRANSMITTER EXERCISER TEST
5. CZDQE [REV] MISC. RX AND TX TESTS. PLUS BCC TESTS.
6. CZDQF [REV] CHARACTER DETECT TESTS.
7. CZDQH [REV] CHARACTER LENGTH AND INTERRUPT TESTS.

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

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

2. REQUIREMENTS

2.1 EQUIPMENT

ANY PDP11 FAMILY CPU (WITH MINIMUM 4K 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 4K 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 DQ'11'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 DQ11'S 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 2 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 AC-8622E-MC 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
DQST00-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? ***NOTE:CZDQE ONLY***

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 UR 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

                                ;CZDQEE0/<377>/ MISC & BCC TST
                                ;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 ''CZDQEE0/<377>/ MISC & BCC TST''
                                ;       ;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
```

```
559
560
561                             ;REGISTER DEFINITIONS
562
563     000000                  R0=%0           ;GENERAL REGISTER
564     000001                  R1=%1           ;GENERAL REGISTER
565     000002                  R2=%2           ;GENERAL REGISTER
566     000003                  R3=%3           ;GENERAL REGISTER
567     000004                  R4=%4           ;GENERAL REGISTER
568     000005                  R5=%5           ;GENERAL REGISTER
569     000006                  SP=%6           ;PROCESSOR STACK POINTER
570     000007                  PC=%7           ;PROGRAM COUNTER
571
572                             ;LOCATION EQUIVALENCIES
573
574     177570                  DSWR=   177570  ;HARDWARE SWITCH REGISTER LOC.
575     177570                  DLIGHTS=177570  ;HARDWARE DISPLAY REGISTER LOC.
576     177776                  PS=177776       ;PROCESSOR STATUS WORD
577     001200                  STACK=1200      ;START OF PROCESSOR STACK
578
579                             ;INSTRUCTION DEFINITIONS
580
581     005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
582     005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
583     010046                  PUSHR0=10046    ;SAVE R0 ON STACK
584     012600                  POPR0=12600     ;RESTORE R0 FROM STACK
585     024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE
586     022626                  POP2SP=22626    ;INCREMENT STACK TWICE
587                             .EQUIV  EMT,HLT ;BASIC DEFINITION OF ERROR CALL
588
589
590     100000                  BIT15=100000
591     040000                  BIT14=40000
592     020000                  BIT13=20000
593     010000                  BIT12=10000
594     004000                  BIT11=4000
595     002000                  BIT10=2000
596     001000                  BIT9=1000
597     000400                  BIT8=400
598     000200                  BIT7=200
599     000100                  BIT6=100
600     000040                  BIT5=40
601     000020                  BIT4=20
602     000010                  BIT3=10
603     000004                  BIT2=4
604     000002                  BIT1=2
605     000001                  BIT0=1
606
607
608                             ;DQ11 OPTIONAL DEFINITIONS
609
610     002000                  ABBIT=2000
611     004000                  ACTBIT=4000
612     010000                  BABIT=10000
613     020000                  BBBIT=20000
614     040000                  JUMBIT=40000
```

```
615          001000                  ODDBIT=1000
616          100000                  SYNBIT=100000
617
618
619                                  ;DQ11 SECONDARY REGISTER DEFINATIONS
620
621          000000                  RXBA.P=0        ;RECEIVER BUS ADDRESS PRIMARY.
622          000001                  RXWC.P=1        ;RECEIVER WORD COUNT PRIMARY.
623          000002                  TXBA.P=2        ;TRANSMITTER BUS ADDRESS PRIMARY.
624          000003                  TXWC.P=3        ;TRANSMITTER BUS ADDRESS PRIMARY.
625          000004                  RXBA.S=4        ;RECEIVER BUS ADDRESS SECONDARY.
626          000005                  RXWC.S=5        ;RECEIVER WORD COUNT SECONDARY.
627          000006                  TXBA.S=6        ;TRANSMITTER BUS ADDRESS SECONDARY.
628          000007                  TXWC.S=7        ;TRANSMITTER WORD COUNT SECONDARY.
629
630          00001?                  CHARDT=10       ;CHARACTER DETECT REGISTER.
631          0000                    SYNC.=11        ;SYNC REGISTER.
632          000012                  MISC.=12        ;MISCELLANEOUS REGISTER.
633          000013                  TX.MUX=13       ;TRANSMITTER MUX REGISTER.
634          000014                  SEQ.=14         ;SEQUENCE REGISTER.
635          000015                  RX.BCC=15       ;RECEIVER BCC REGISTER.
636          000016                  TX.BCC=16       ;TRANSMITTER BCC REGISTER.
637          000017                  POLY.=17        ;POLYNOMIAL REGISTER.
638
639
```

```
                                        ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
000000                          .=0
                                        ;STANDARD INTERRUPT VECTORS

000024                          .=24
000024  014300                          .PFAIL                  ;POWER FAIL HANDLER
000026  000340                          340                     ;SERVICE AT LEVEL 7
000030  013750                          .HLT                    ;ERROR HANDLER
000032  000340                          340                     ;SERVICE AT LEVEL 7
000034  013716                          .TRPSRV                 ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                          340                     ;SERVICE AT LEVEL 7
000046                          .=46
000046  012476                          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
```

```
696  000200  000137  001512                  JMP     .START          ;GO TO START OF PROGRAM
697
698          000220                  .=220
699  000220  012702  001400          CSRMAP: MOV     #1400,R2        ;CLEAR ALL STATUS TABLE
700  000224  005022                          CLR     (R2)+           ;DO CLEAR
701  000226  022702  001512                  CMP     #1512,R2        ;ALL TABLE DONE
702  000232  001374                          BNE     .-6             ;BR IF MORE TO GO
703  000234  005037  001504                  CLR     DQNUM           ;SET NUMBER OF DQ11S TO 0
704  000240  012702  001400                  MOV     #1400,R2        ;SET TABLE POINTER
705  000244  012701  160000                  MOV     #160000,R1      ;GET FIRST FLOATING ADDRESS
706  000250  012737  000614  000004          MOV     #5$,@#4         ;SET FOR TIME OUT TRAP--NO DEVICE--
707  000256  112761  000012  000005  1$:     MOVB    #12,5(R1)       ;TRY AND SEL MISC REGISTER
708  000264  005061  000006                  CLR     6(R1)           ;TRY AND CLEAR MISC REG
709  000270  012711  010000                  MOV     #10000,(R1)     ;TRY AND SET RX ACTIVE
710  000274  022761  030000  000006          CMP     #30000,6(R1)    ;LOOK FOR SYNC 1 AND SYNC 2
711  000302  001071                          BNE     2$              ;THIS IS NOT A DQ11 IF I BRANCH
712  000304  010122                          MOV     R1,(R2)+        ;NOW THIS IS A DQ11 --STORE CSR
713  000306  052712  100000                  BIS     #SYNBIT,(R2)    ;SET FOR TWO SYNC CHARS
714  000312  005011                          CLR     (R1)            ;CLEAR DQ ACTIVE BIT
715  000314  112761  000010  000005          MOVB    #10,5(R1)       ;SEL CHAR DET REGISTER
716  000322  012761  177777  000006          MOV     #-1,6(R1)       ;WRITE INTO CHAR DET REG
717  000330  005761  000006                  TST     6(R1)           ;WAS THE REGISTER WRITTEN?
718  000334  001402                          BEQ     .+6             ;APPERENTLY NO BB OPTION.
719  000336  052712  020000                  BIS     #BBBIT,(R2)     ;SET FOR BB OPTION
720  000342  112761  000017  000005          MOVB    #17,5(R1)       ;SEL POLYNO. REGISTER
721  000350  012761  177777  000006          MOV     #-1,6(R1)       ;WRITE POLYNO.REGISTER
722  000356  005761  000006                  TST     6(R1)           ;WAS REG WRITTEN??
723  000362  001402                          BEQ     .+6             ;BR IF NO AB OPTION
724  000364  052712  002000                  BIS     #ABBIT,(R2)     ;SET FOR AB OPTION
725  000370  012761  001400  000002          MOV     #1400,2(R1)     ;TRY TO SET .DTR. .RS.
726  000376  032761  001400  000002          BIT     #1400,2(R1)     ;DID ANY OF THEM SET
727  000404  001402                          BEQ     .+6             ;BR IF NO BA OPTION
728  000406  052712  010000                  BIS     #BABIT,(R2)     ;SET FOR BA OPTION
729  000412  032761  030000  000002          BIT     #30000,2(R1)    ;DID .CS. .CO. SET
730  000420  001402                          BEQ     .+6             ;BR IF NO JUMPER
731  000422  052712  040000                  BIS     #JUMBIT,(R2)    ;SET FOR JUMPER
732  000426  052712  004000                  BIS     #ACTBIT,(R2)    ;SET FOR ACTIVE ON FIRST NON-SYNC
733  000432  052712  001000                  BIS     #ODDBIT,(R2)    ;SET FOR ODD VRC.......
734  000436  005722                          TST     (R2)+           ;POP POINTER
735  000440  005011                          CLR     (R1)            ;CLEAR RCSR
736  000442  005061  000002                  CLR     2(R1)           ;CLEAR TCSR
737  000446  005061  000002                  CLR     2(R1)           ;CLEAR AGAIN
738  000452  005061  000004                  CLR     4(R1)           ;CLEAR ERROR REG
739  000456  005061  000006                  CLR     6(R1)           ;CLEAR SEC REG
740  000462  005237  001504                  INC     DQNUM           ;UPDATE NUMBER OF DQ11S
741  000466  062701  000010          2$:     ADD     #10,R1          ;UPDATE CSR POINTER BY 10 (8)
742  000472  022701  164000                  CMP     #164000,R1      ;HAVE ALL FLOATING ADDRESSES BEEN CHECKED??
743  000476  001267                          BNE     1$              ;BR IF NOT ALL DONE
744  000500  005037  001500                  CLR     DQACTV          ;ZERO ACTIVE DQ11S
745  000504  005737  001504                  TST     DQNUM           ;WERE ANY DQ11S FOUND
746  000510  001434                          BEQ     4$              ;HEY BUDDY. NO DQ11S FOUND IN SYSTEM
747  000512  013701  001504                  MOV     DQNUM,R1        ;SAVE NUMBER OF DQ11S
748  000516  010137  001276                  MOV     R1,SAVNUM       ;SAVE NUMBER FOR ACT11
749  000522  000241          3$:     CLC                             ;CLEAR CARRY
750  000524  006137  001500                  ROL     DQACTV          ;       ACTIVE ADDRESS
751  000530  005237  001500                  INC     DQACTV          ;SET BIT 0
```

```
                                                DEC     R1              ;DEC NUMBER OF DQ11S
                                                BNE     3$              ;BR IF MORE TO GO
                                                MOV     #6,@#4          ;RESET TIME OUT VECTOR
                                                MOV     DQACTV,SAVACT   ;SAVE ACTIVE
                                                MOV     #340,@#22       ;SET IOT TRAP PRIO: TO 7
                                                MOV     #1400,R2        ;SET TABLE POINTER
                                                MOV     #300,R0         ;SET VECTOR START
                                                MOV     #302,R1         ;SET VECTOR+2 START
                                                JMP     VECMAP          ;GO FIND THE VECTORS
                                        4$:     TYPE                    ;TYPE MESSAGE
                                                MERR2                   ;I DIDN'T FIND ANY DQ11S. DON'T USE AUTO SIZE.
                                                CLR     R0              ;
                                                HALT                    ;HOW CAN I TEST NO DQ11S
                                                BR      .-2             ;DON'T LET OPR HIT CONT. SW
                                        5$:     MOV     #2$,(SP)        ;ENTERED BY TIME OUT TRAP
                                                RTI                     ;GO HOME.

                                .-1000
001000  005377  055103  050504  MTITLE: .ASCIZ  <377><12>/CZDQEE0/<377>/ MISC & BCC TST/<377>
001006  042505  177460  046440
001014  051511  020103  020046
001022  041502  020103  051524
001030  177524     000

                                .=1200
                                        ;INDIRECT POINTERS

001200  177570                  SWR:    177570                  ;SWITCH REGISTER POINTER
001202  177570                  LIGHTS: 177570                  ;DISPLAY REGISTER POINTER
001204  177560                  TKCSR:  177560                  ;TELETYPE KEYBOARD CONTROL REGISTER
001206  177562                  TKDBR:  177562                  ;TELETYPE KEYBOARD DATA BUFFER
001210  177564                  TPCSR:  177564                  ;TELEPRINTER CONTROL REGISTER
001212  177566                  TPDBR:  177566                  ;TELEPRINTER DATA BUFFER

                                        ;PROGRAM CONTROL PARAMETERS

001214  000000                  RETURN: 0                       ;SCOPE ADDRESS FOR LOOP ON TEST
001216  000000                  NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
001220  000000                  LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT DATA
001222  000003                  ICOUNT: 3                       ;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE EXECUTED
001224  000000                  LPCNT:  0                       ;NUMBER OF ITEREATIONS COMPLETED
001226  000000                  TSTNO:  0                       ;NUMBER OF TEST IN PROGRESS
001230  000000                  PASCNT: 0                       ;NUMBER OF PASSES COMPLETED
001232  000000                  ERRCNT: 0                       ;TOTAL NUMBER OF ERRORS
001234  000000                  LSTERR: 0                       ;PC OF LAST ERROR CALL

                                        ;PROGRAM VARIABLES

001236  000000                  CHAR1:  0
001240  000000                  CHAR2:  0
001242  000000                  CHAR3:  0
001244  000000                  TEMP1:  0                       ;TEMPORARY STORAGE
001246  000000                  TEMP2:  0                       ;TEMPORARY STORAGE
001250  000000                  TEMP3:  0                       ;TEMPORARY STORAGE
001252  000000                  TEMP4:  0                       ;TEMPORARY STORAGE
```

```
  808  001254  000000                TEMP5:  0                       ;TEMPORARY STORAGE
  809  001256  000000                SAVR0:  0                       ;R0 STORAGE
  810  001260  000000                SAVR1:  0                       ;R1 STORAGE
  811  001262  000000                SAVR2:  0                       ;R2 STORAGE
  812  001264  000000                SAVR3:  0                       ;R3 STORAGE
  813  001266  000000                SAVR4:  0                       ;R4 STORAGE
  814  001270  000000                SAVR5:  0                       ;R5 STORAGE
  815  001272  000000                SAVSP:  0                       ;STACK POINTER STORAGE
  816  001274  000000                SAVPC:  0                       ;PROGRAM COUNTER STORAGE
  817  001276  000000                SAVNUM: 0
  818  001300  000001                CREAM:  .BLKW   1
  819  001302  000000                RUNFLG: 0
  820  001304  000000                RUN:    0
  821  001306  000000                RUNCNT: 0
```

```

                                          ;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     012552                 .SCOPE
           104401         SCOP1=TRAP+1            ;CALL TO LOOP ON CURRENT DATA HANDLER
001316     012664                 .SCOP1
           104402         TYPE=TRAP+2             ;CALL TO TELETYPE OUTPUT ROUTINE
001320     012704                 .TYPE
           104403         INSTR=TRAP+3            ;CALL TO ASCII STRING INPUT ROUTINE
001322     013012                 .INSTR
           104404         INSTER=TRAP+4           ;CALL TO INPUT ERROR HANDLER
001324     013130                 .INSTER
           104405         PARAM=TRAP+5            ;CALL TO NUMERICAL DATA INPUT ROUTINE
001326     013162                 .PARAM
           104406         SAV05=TRAP+6            ;CALL TO REGISTER SAVE ROUTINE
001330     013376                 .SAV05
           104407         RES05=TRAP+7            ;CALL TO REGISTER RESTORE ROUTINE
001332     013436                 .RES05
           104410         CONVRT=TRAP+10          ;CALL TO DATA OUTPUT ROUTINE
001334     013470                 .CONVRT
           104411         CNVRT=TRAP+11           ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001336     013474                 .CNVRT
           104412         MSTCLR=TRAP+12          ;CALL TO ISSUF MASTER CLEAR
001340     012346                 .MSTCLR
           104413         MEMCLR=TRAP+13          ;CALL TO CLEAR ALL SCRATCH PAD MEMORIES
001342     012222                 .MEMCLR
           104414         CKSWR=TRAP+14           ;CALL TO ALLOW SWREG TO BE LOADED FROM TTY
001344     014376                 .CKSWR
           104415         CNTLU=TRAP+15           ;CALL TO ALLOW LOADING OF SWREG FROM TTY
001346     014452                 .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
```

```
878  001364  000000                DQTCSR: 0               ;POINTER TO DQ11 TRANSMITTER CONTROL REGISTER
879  001366  000000                DQERR:  0               ;POINTER TO DQ11 ERROR REGISTER
880  001370  000000                DQREG:  0               ;POINTER TO HIGH BYTE OF ERROR REGISTER
881  001372  000000                DQSEC:  0               ;POINTER TO DQ11 SECONDARY REGISTER
882  001374  000000                DQSECH: 0               ;POINTER TO HIGH BYTE OF DQ11 SECONDARY REGISTER
883
884
885
886                                     ;DQ11 STATUS TABLE AND ADDRESS ASSIGNMENTS
887
888          001400                .=1400
889  001400  000001                DQCR00: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 00
890  001402  000001                DQST00: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 00
891  001404  000001                DQCR01: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 01
892  001406  000001                DQST01: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 01
893  001410  000001                DQCR02: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 02
894  001412  000001                DQST02: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 02
895  001414  000001                DQCR03: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 03
896  001416  000001                DQST03: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 03
897  001420  000001                DQCR04: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 04
898  001422  000001                DQST04: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 04
899  001424  000001                DQCR05: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 05
900  001426  000001                DQST05: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 05
901  001430  000001                DQCR06: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 06
902  001432  000001                DQST06: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 06
903  001434  000001                DQCR07: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 07
904  001436  000001                DQST07: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 07
905  001440  000001                DQCR10: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 10
906  001442  000001                DQST10: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 10
907  001444  000001                DQCR11: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 11
908  001446  000001                DQST11: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 11
909  001450  000001                DQCR12: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 12
910  001452  000001                DQST12: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 12
911  001454  000001                DQCR13: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 13
912  001456  000001                DQST13: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 13
913  001460  000001                DQCR14: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 14
914  001462  000001                DQST14: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 14
915  001464  000001                DQCR15: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 15
916  001466  000001                DQST15: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 15
917  001470  000001                DQCR16: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 16
918  001472  000001                DQST16: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 16
919  001474  000001                DQCR17: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 17
920  001476  000001                DQST17: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 17
921  001500  000001                DQACTV: .BLKW   1       ;HOLD ACTIVE BITS FOR TESTING
922  001502  000001                SAVACT: .BLKW   1       ;SAVE NUMBER OF ACTIVE DQ11S
923  001504  000001                DQNUM:  .BLKW   1       ;OCTAL NUMBER OF TOTAL NUMBER OD DQ11S
924  001506  000001                DQCSR:  .BLKW   1       ;CSR OF DQ11 UNDER TEST
925  001510  000001                DQSTAT: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS OF DQ11 UNDER TEST
926
927                                     ;PROGRAM INITIALIZATION
928                                     ;LOCK OUT INTERRUPTS
929                                     ;SET UP PROCESSOR STACK
930                                     ;SET UP POWER FAIL VECTOR
931                                     ;CLEAR PROGRAM CONTROL FLAGS AND COUNTS
932                                     ;TYPE TITLE MESSAGE
933
```

```
   934  001512  012737  000340  177776  .START: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
   935  001520  012706  001200                  MOV     #STACK,SP               ;SET UP STACK
   936  001524  012737  014300  000024          MOV     #.PFAIL,@#24            ;SET UP POWER FAIL VECTOR
   937  001532  013737  001504  001276          MOV     DQNUM,SAVNUM
   938  001540  105037  001311                  CLRB    STFLG                   ;CLEAR START FLAG
   939  001544  005037  001230                  CLR     PASCNT                  ;CLEAR PASS COUNT
   940  001550  105037  001312                  CLRB    ERRFLG                  ;CLEAR ERROR FLAG
   941  001554  005037  001302                  CLR     RUNFLG
   942  001560  012737  001400  001300          MOV     #1400,CREAM
   943  001566  005037  001232                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
   944  001572  005037  001234                  CLR     LSTERR                  ;CLEAR LAST ERROR POINTER
   945  001576  012737  000001  001226          MOV     #1,TSTNO                ;SET UP FOR TEST 1
   946  001604  012737  001512  001214          MOV     #.START,RETURN          ;SET UP FOR POWER FAIL BEFORE
   947                                                                          ;TESTING STARTS
   948  001612  012737  177570  001200          MOV     #DSWR,SWR               ;MOV HARDWARE SWR TO SWR
   949  001620  012737  177570  001202          MOV     #DLIGHTS,LIGHTS         ;MOV DISPLAY LIGHTS TO LIGHTS
   950  001626  013746  000006                  MOV     @#6,-(SP)               ;SAVE VECTORS
   951  001632  013746  000004                  MOV     @#4,-(SP)
   952  001636  012737  001656  000004          MOV     #64$,@#4                        ;SET UP FOR TIMEOUT
   953  001644  022777  177777  177326          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
   954  001652  001402                          BEQ     65$
   955  001654  000407                          BR      66$
   956  001656  022626                  64$:    CMP     (SP)+,(SP)+             ;ADJUST STACK
   957  001660  012737  000176  001200  65$:    MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
   958  001666  012737  000174  001202          MOV     #DISPREG,LIGHTS         ;POINT TO SOFT DISPLAY REG
   959  001674  012637  000004          66$:    MOV     (SP)+,@#4               ;RESTORE VECTORS
   960  001700  012637  000006                  MOV     (SP)+,@#6
   961  001704  005737  000042                  TST     @#42                    ;UNDER MONITOR
   962  001710  001014                          BNE     67$
   963                                  ;;******THE NEXT 4 LINES OF CODE MOVED TO SOLVE PR#2757 (JUNE 78)******
   964  001712  105737  001310                  TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED?
   965  001716  001035                          BNE     12$                     ;IF YES, BR
   966  001720  104402  001000                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
   967  001724  105137  001310                  COMB    INIFLG          ;IF NOT SET FLAG AND INIT
   968  001730  022737  000176  001200          CMP     #SWREG,SWR              ;IS SWREG USED
   969  001736  001001                          BNE     67$
   970  001740  104415                          CNTLU
   971  001742  105777  177232          67$:    TSTB    @SWR
   972  001746  100402                          BMI     .+6
   973  001750  004737  000220                  JSR     PC,CSRMAP
   974  001754  104402  015126                  TYPE    ,XHEAD
   975  001760  012737  001400  001244          MOV     #1400,TEMP1
   976  001766  017737  177252  001246          MOV     @TEMP1,TEMP2
   977  001774  001406                          BEQ     .+16
   978  001776  104410                          CONVRT
   979  002000  015154                          XSTATQ
   980  002002  062737  000002  001244          ADD     #2,TEMP1
   981  002010  000766                          BR      .-22
   982  002012  032777  000001  177160  12$:    BIT     #SW00,@SWR
   983  002020  001424                          BEQ     1$
   984  002022  104402                          TYPE
   985  002024  015047                          MNEW
   986  002026  005000                          CLR     R0
   987  002030  000000                          HALT
   988  002032  104414                          CKSWR
   989  002034  027737  177140  001502          CMP     @SWR,SAVACT
```

```
  990  002042  101404                        BLOS    11$
  991  002044  104402                        TYPE
  992  002046  014710                        MERR3
  993  002050  000000                        HALT
  994  002052  000776                        BR      .-2
  995  002054  017737  177120  001500  11$:  MOV     @SWR,DQACTV
  996  002062  013700  001500                MOV     DQACTV,R0
  997  002066  000000                        HALT
  998  002070  104414                        CKSWR
  999  002072  012700  000300          '$:   MOV     #300,R0
 1000  002076  012701  000302                MOV     #302,R1
 1001  002102  010120                  2$:   MOV     R1,(R0)+
 1002  002104  005021                        CLR     (R1)+
 1003  002106  022021                        CMP     (R0)+,(R1)+
 1004  002110  022700  001000                CMP     #1000,R0
 1005  002114  001372                        BNE     2$
 1006
 1007                                        ;TEST START AND RESTART
 1008
 1009  002116  012737  000340  177776  .BEGIN: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
 1010  002124  012706  001200                MOV     #STACK,SP               ;SET UP STACK
 1011  002130  005737  000042                TST     @#42                    ;IS PROGRAM UNDER MONITOR CONTROL
 1012  002134  001040                        BNE     3$
 1013  002136  104414                        CKSWR                           ;CHECK FOR <^G>
 1014  002140  032777  000004  177032        BIT     #BIT2,@SWR              ;CHECK FOR LOCK ON TEST
 1015  002146  001411                        BEQ     1$
 1016  002150  104402  014746                TYPE    ,MLOCK
 1017  002154  012737  000240  012562        MOV     #NOP,TTST
 1018  002162  012737  000240  012564        MOV     #NOP,TTST+2             ;SET UP TO LOCK
 1019  002170  000406                        BR      2$
 1020  002172  013737  012660  012562  1$:   MOV     BRW,TTST
 1021  002200  013737  012662  012564        MOV     BRX,TTST+2              ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
 1022  002206  032777  000002  176764  2$:   BIT     #SW01,@SWR              ;IF SW01=1, GET STARTING PC
 1023  002214  001410                        BEQ     3$
 1024  002216  104403                        INSTR
 1025  002220  014734                        MTSTPC
 1026  002222  104405                        PARAM
 1027  002224  002254                        TST1
 1028  002226  007472                        TLAST
 1029  002230  001214                        #RETURN
 1030  002232     001                .BYTE   1
 1031  002233     001                .BYTE   1
 1032  002234  000403                        BR      4$
 1033  002236  012737  002254  001214  3$:   MOV     #TST1,RETURN            ;START AT TEST 1
 1034  002244  104402  014636          4$:   TYPE    ,MR                     ;TYPE R
 1035  002250  000177  176740                JMP     @RETURN                 ;START TESTING
 1036                                  ;  TEST 1
 1037                                  ;*************************************************************************
 1038  002254  012737  000001  001226  TST1:  MOV     #1,TSTNO
 1039  002262  012737  002646  001214        MOV     #TST2,RETURN
 1040  002270  012737  002646  001216        MOV     #TST2,NEXT
 1041  002276  105737  001302                TSTB    RUNFLG          ;IS THIS MY FIRST TIME HERE?
 1042  002302  001010                        BNE     1$              ;BR IF FLAG IS SET
 1043  002304  012737  000001  001304        MOV     #BIT0,RUN       ;SET RUN POINTER.
 1044  002312  012737  000020  001306        MOV     #'',RUNCNT      ;SET FOR MAX OF 16 DQ11'S PER SYSTEM
 1045  002320  105137  001302                COMB    RUNFLG          ;SET RUN FLAG
```

```
1046  002324  033737  001304  001500  1$:     BIT     RUN,DQACTV      ;FIND AN ACTIVE DQ11 TO TEST.
1047  002332  001032                          BNE     3$              ;BR IF I FOUND ONE TO TEST.
1048  002334  005737  001500                  TST     DQACTV          ;FIND OUT IF THERE ARE NO DQ11 ACTIVE.
1049  002340  001423                          BEQ     2$              ;BR TO FATAL ERROR. WHY AM I HERE IF NO ACTIVE DQ11'S???
1050  002342  000257                          CCC                     ;CLEAR ALL THE CONDITION CODES OF CPU
1051  002344  006137  001304                  ROL     RUN             ;UPDATE RUN POINTER
1052  002350  062737  000004  001300          ADD     #4,CREAM        ;UPDATE ADDRESS POINTER.
1053  002356  005337  001306                  DEC     RUNCNT          ;DEC NUMBER OF TIMES I LOOKED AT ACTIVE.
1054  002362  001360                          BNE     1$              ;BR AND KEEP LOOKING.
1055  002364  012737  000020  001306          MOV     #16.,RUNCNT     ;START RESTORING MY POINTERS.
1056  002372  012737  001400  001300          MOV     #1400,CREAM     ;RESTORE  ADDRESS POINTER
1057  002400  012737  000001  001304          MOV     #1,RUN          ;RESTORE RUN POINTER.
1058  002406  000746                          BR      1$              ;KEEP ON TESTING.
1059  002410  104402                  2$:     TYPE                    ;ALLERT OPERATOR OF FATAL ERROR
1060  002412  014641                          MERR2                   ;NO DQ11 ACTIVE. WHY AM I HERE???
1061  002414  000000                          HALT                    ;YOU MUST RELOAD DQ11 DIAGNOSTIC!!
1062  002416  000776                          BR      .-2             ;STICK HERE ON CONT.
1063  002420  000257                  3$:     CCC                     ;CLEAR CPU COND. CODES
1064  002422  006137  001304                  ROL     RUN             ;UPDATE RUN. ACTIVE DQ11 FOUND.
1065  002426  017737  176646  001506          MOV     @CREAM,DQCSR    ;PLACE ADDRESSS OF DQ11 AT DQCSR
1066  002434  062737  000002  001300          ADD     #2,CREAM        ;UPDATE ADDRESS POINTER
1067  002442  017737  176632  001510          MOV     @CREAM,DQSTAT   ;PLACE STATUS OF DQ11 AT DQSTAT
1068  002450  062737  000002  001300          ADD     #2,CREAM        ;UPDATE ADDRESS POINTER
1069  002456  013737  001506  001360          MOV     DQCSR,DQRCSR
1070  002464  013737  001510  001350          MOV     DQSTAT,DQRVEC
1071  002472  042737  177007  001350          BIC     #177007,DQRVEC
1072  002500  013737  001350  001352          MOV     DQRVEC,DQRLVL   ;GENERATE ADDRESS OF RECEIVER INTERRUPT SERVICE PS
1073  002506  062737  000002  001352          ADD     #2,DQRLVL
1074  002514  013737  001352  001354          MOV     DQRLVL,DQTVEC   ;GENERATE ADDRESS OF TRANSMITTER INTERRUPT VECTOR
1075  002522  062737  000002  001354          ADD     #2,DQTVEC
1076  002530  013737  001354  001356          MOV     DQTVEC,DQTLVL   ;GENERATE ADDRESS  OF TRANSMITTER INTERRUPT SERVICE PS
1077  002536  062737  000002  001356          ADD     #2,DQTLVL
1078  002544  013737  001360  001362          MOV     DQRCSR,DQRCSH
1079  002552  005237  001362                  INC     DQRCSH          ;GENERATE ADDRESS OF HIGH BYTE
1080  002556  013737  001360  001364          MOV     DQRCSR,DQTCSR   ;GENERATE ADDRESS OF TRANSMITTER CONTROL REGISTER
1081  002564  062737  000002  001364          ADD     #2,DQTCSR
1082  002572  013737  001364  001366          MOV     DQTCSR,DQERR    ;GENERATE ADDRESS OF ERROR REGISTER
1083  002600  062737  000002  001366          ADD     #2,DQERR
1084  002606  013737  001366  001370          MOV     DQERR,DQREG     ;GENERATE ADDRESS OF HIGH BYTE OF ERROR REGISTER
1085  002614  005237  001370                  INC     DQREG
1086  002620  013737  001370  001372          MOV     DQREG,DQSEC     ;GENERATE ADDRESS OF SECONDARY REGISTER
1087  002626  005237  001372                  INC     DQSEC
1088  002632  013737  001372  001374          MOV     DQSEC,DQSECH    ;GENERATE ADDRESS OF HIGH BYTE
1089  002640  005237  001374                  INC     DQSECH
1090  002644  000240                  NOP
1091
1092
1093
1094
1095
```

```
1096                                        ;
1097                                        ;CABLE TEST.
1098                                        ;TEST OF DATA REALIBILITY THROUGH
1099                                        ;CABLE AND LEVEL CONVERTERS.
1100
1101                                        ;NOTE: IF JUMPER IS NOT INSTALLED
1102                                        ;      AT END OF CABLE THIS TEST IS NOT
1103                                        ;       DONE
1104                                        ;
1105
1106
1107                                  ;  TEST 2
1108                                  ;*****************************************************************************
1109  002646  012737  000002  001226  TST2:  MOV     #2,TSTNO
1110  002654  012737  003230  001216        MOV     #TST3,NEXT
1111
1112  002662  032737  100000  001510  CKSYN1: BIT     #SYNBIT,DQSTAT  ;ADJUST POINTER FOR NUMBER OF SYNC CHARS.
1113  002670  001004                        BNE     1$              ;BR IF TWO SYNC CHARS SELECTED.
1114  002672  112737  000377  015374        MOVB    #377,SYNC       ;SET SYNC TO MARK                          ;;++E
1115  002700  000403                        BR      CKDN            ;BR TO CONT.
1116  002702  112737  000026  015374  1$:   MOVB    #26,SYNC        ;RESET FIRST SYNC TO 26
1117  002710  000240                  CKDN: NOP                     ;CONTINUE TEST.
1118
1119  002712  032737  040000  001510        BIT     #JUMBIT,DQSTAT  ;DOES THE TEST JUMPER EXIST.
1120  002720  001005                        BNE     .+14            ;BR IF YES
1121  002722  013737  001216  001214        MOV     NEXT,RETURN     ;PREPARE TO DO NEXT TEST.
1122  002730  000177  176260                JMP     @RETURN         ;GOTO NEXT TEST
1123  002734  005000                        CLR     R0              ;ZERO DATA POINTER.
1124  002736  012704  015376                MOV     #TXBUFF,R4      ;SET BUFFER POINTER
1125  002742  110024                  1$:   MOVB    R0,(R4)+        ;FILL TX BUFFER WITH BINARY COUNT PATTERN
1126  002744  105200                        INCB    R0              ;UPDATE CHAR.
1127  002746  001375                        BNE     1$              ;BR IF MORE TO DO.
1128  002750  104413                  2$:   MEMCLR                  ;CLEAR DQ11 MEMORIES.
1129  002752  005000                        CLR     R0              ;ZERO COUNTER POINTER
1130  002754  012704  016000                MOV     #RXBUFF,R4      ;PREPARE TO ZERO ALL RX BUFFER.
1131  002760  105024                  3$:   CLRB    (R4)+           ;START CLEARING.
1132  002762  105200                        INCB    R0              ;UPDATE
1133  002764  001375                        BNE     3$              ;BR IF NOT ALL CLEARED.
1134  002766  105077  176376                CLRB    @DQREG          ;SELECT RX BA PRI.
1135  002772  012777  016000  176372        MOV     #RXBUFF,@DQSEC  ;LOAD IT.
1136  003000  105277  176364                INCB    @DQREG          ;SELECT RX WC PRI.
1137  003004  012777  177400  176360        MOV     #-400,@DQSEC    ;LOAD IT FOR 400(8) CHARS.
1138  003012  105277  176352                INCB    @DQREG          ;SEL TX BA PRI.
1139  003016  012777  015374  176346        MOV     #SYNC,@DQSEC    ;LOAD IT.
1140  003024  105277  176340                INCB    @DQREG          ;SEL TX WC PR.
1141  003030  012777  177376  176334        MOV     #-402,@DQSEC    ;SET 400(8) CHARS AND TWO SYNC.
1142  003036  112777  000011  176324        MOVB    #11,@DQREG      ;SEL SYNC REGISTER
1143  003044  013777  015372  176320        MOV     .SYNC,@DQSEC    ;LOAD IT.
1144  003052  105277  176312                INCB    @DQREG          ;GET MISC REGISTER
1145  003056  012777  004000  176306        MOV     #4000,@DQSEC    ;SET FOR EIGHTBITS.
1146  003064  005037  001244                CLR     TEMP1           ;SET DELAY.....
1147  003070  012737  000020  001246        MOV     #20,TEMP2       ;!!!!!!!!!!
1148  003076  005277  176256                INC     @DQRCSR         ;SET RX GO.!
1149  003102  005277  176256                INC     @DQTCSR         ;SET TX GO!!
1150  003106  005777  176254           4$:  TST     @DQERR          ;ANY ERRORS
1151  003112  100007                        BPL     7$              ;BR IF NO ERRORS
```

```
1152  003114  017700  176240                MOV     @DQRCSR,R0
1153  003120  017701  176240                MOV     @DQTCSR,R1
1154  003124  017702  176236                MOV     @DQERR,R2
1155  003130  104007                        HLT     7                ;THE DQ11 ERROR FLAG IS SET.
1156  003132  105777  176222          7$:   TSTB    @DQRCSR          ;IS RX PRI DONE SET?
1157  003136  100407                        BMI     5$               ;BR IF YES
1158  003140  005237  001244                INC     TEMP1            ;DELAY.....
1159  003144  001360                        BNE     4$               ;
1160  003146  005337  001246                DEC     TEMP2            ;......
1161  003152  001355                        BNE     4$               ;
1162  003154  104000                        HLT                      ;RX PRI. DONE FAILED TO SET.
1163  003156  005000                  5$:   CLR     R0               ;ZERO COUNTER.
1164  003160  005037  001252                CLR     TEMP4            ;CLEAR STORAGE
1165  003164  005037  001254                CLR     TEMP5            ;SAME..
1166  003170  012704  015376                MOV     #TXBUFF,R4       ;GET TX BUFFER AREA
1167  003174  012705  016000                MOV     #RXBUFF,R5       ;GET RX BUFFER AREA
1168  003200  112437  001254          6$:   MOVB    (R4)+,TEMP5      ;LOAD FOR ERROR CALL
1169  003204  112537  001252                MOVB    (R5)+,TEMP4      ;.....
1170  003210  023737  001254  001252        CMP     TEMP5,TEMP4      ;DOES DATA CHECK OUT OK?
1171  003216  001401                        BEQ     .+4              ;BR IF GOOD DATA.
1172  003220  104004                        HLT     4                ;DATA COMPARISON ERROR.
1173  003222  105200                        INCB    R0               ;UPDATE COUNTER
1174  003224  001365                        BNE     6$               ;BR IF MORE DATA TO CHECK.
1175  003226  104400                        SCOPE                    ;SCOPE THE TEST.
1176
1177
1178                                        ;RECEIVER STRIP SYNC TEST.
1179                                        ;TEST THAT THE RECEIVER CAN STRIP SYNC.
1180                                        ;CHARACTERS FROM 000-025 WILL BE TRANSFERED
1181                                        ;WITH A TRAIL OF SYNC CHARS. FOLLOWING (026).
1182                                        ;THE TRANSMITTER AND RECEIVER BUFFERS ARE BOTH
1183                                        ;CLEARED BEFORE THE TEST IS EXECUTED.
1184                                        ;A TOTAL OF 400 CHARS. WILL BE TRANSMITTER INTO
1185                                        ;THE RECEIVER. WHEN RX PRI. DONE SETS;
1186                                        ;THE RECEIVER BUFFER IS CHECKED FOR ANY SYNC
1187                                        ;CHARACTERS (026). IF NONE ARE FOUND THEN THE
1188                                        ;RECEIVER DID INDEED STRIP SYNC.
1189
1190
1191                                  ;  TEST 3
1192                                  ;*************************************************************************
1193  003230  012737  000003  001226  TST3:  MOV     #3,TSTNO
1194  003236  012737  003522  001216        MOV     #TST4,NEXT
1195  003244  005000                        CLR     R0               ;CLEAR POINTER
1196  003246  012704  016000                MOV     #RXBUFF,R4       ;SET THE RX BUFFER
1197  003252  105024                  1$:   CLRB    (R4)+            ;BEGIN TO CLEAR THE RX BUFFER
1198  003254  105200                        INCB    R0               ;ALL DONE?
1199  003256  001375                        BNE     1$               ;BR IF NO
1200  003260  005000                        CLR     R0               ;RESET R0 TO ZERO
1201  003262  012704  015376                MOV     #TXBUFF,R4       ;GET TX BUFFER
1202  003266  105024                  8$:   CLRB    (R4)+            ;BEGIN TO CLEAR THE TX BUFFER
1203  003270  105200                        INCB    R0               ;DONE YET?
1204  003272  001375                        BNE     8$               ;BR IF NO
1205
1206  003274  005000                        CLR     R0               ;RESET R0
1207  003276  012704  015376                MOV     #TXBUFF,R4       ;GET TX BUFFER
```

```
1208  003302  110024                  7$:     MOVB    R0,(R4)+        ;START FILLING WITH CHARS.
1209  003304  105200                          INCB    R0              ;UPDATE POINTER
1210  003306  022700  000026                  CMP     #26,R0          ;SYNC YET?
1211  003312  001373                          BNE     7$              ;BR IF NO
1212  003314  012702  000026                  MOV     #26,R2          ;SET FOR SYNC CHAR.
1213  003320  110024                  6$:     MOVB    R0,(R4)+        ;FILL TX BUFFER WITH SYNC CHARS.
1214  003322  105202                          INCB    R2              ;MORE TO GO?
1215  003324  100375                          BPL     6$              ;BR IF YES
1216
1217  003326  104413                          MEMCLR                  ;CLEAR ALL DQ11
1218  003330  105077  176034                  CLRB    @DQREG          ;SEL RX BA PRI.
1219  003334  012777  016000  176030          MOV     #RXBUFF,@DQSEC  ;SET BUFFER.
1220  003342  105277  176022                  INCB    @DQREG          ; RX WC PRI.
1221  003346  012777  177400  176016          MOV     #-400,@DQSEC    ;256. CHARS
1222  003354  105277  176010                  INCB    @DQREG          ;TX BA PRI.
1223  003360  012777  015374  176004          MOV     #SYNC,@DQSEC    ;SET TO XMIT SYNC CHARS.
1224  003366  105277  175776                  INCB    @DQREG          ;TX WC PRI.
1225  003372  012777  177400  175772          MOV     #-400,@DQSEC    ;256. CHARS
1226  003400  112777  000011  175762          MOVB    #11,@DQREG      ;SYNC REGISTER
1227  003406  013777  015372  175756          MOV     .SYNC,@DQSEC    ;LOAD SYNC REGISTER
1228  003414  105277  175750                  INCB    @DQREG          ;MISC. REGISTER.
1229  003420  012777  004010  175744          MOV     #4010,@DQSEC    ;EIGHT BITS AND TEST LOOP
1230  003426  012777  000003  175724          MOV     #00003,@DQRCSR  ;GO AND STRIP SYNC.
1231  003434  005277  175724                  INC     @DQTCSR         ;SET TX GO.
1232  003440  005000                          CLR     R0              ;PREPARE TO DELAY.
1233  003442  005001                          CLR     R1              ; SAME
1234  003444  105777  175710          2$:     TSTB    @DQRCSR         ;RX DONE?
1235  003450  100406                          BMI     9$              ;BR IF YES
1236  003452  062700  000001                  ADD     #1,R0           ;D
1237  003456  001372                          BNE     2$              ; E
1238  003460  105201                          INCB    R1              ;  L
1239  003462  100370                          BPL     2$              ;   A
1240                                                                  ;    Y
1241  003464  104000                          HLT                     ;RX PRI DONE NOT SET.
1242  003466  005077  175666          9$:     CLR     @DQRCSR         ;DISABLE RX
1243  003472  005077  175666                  CLR     @DQTCSR         ;DISABLE TX
1244  003476  005000                          CLR     R0              ;SET COUNTER
1245  003500  012704  016000                  MOV     #RXBUFF,R4      ;GET RX BUFFER
1246  003504  122724  000026          3$:     CMPB    #26,(R4)+       ;ANY SYNC CHARS?
1247  003510  001001                          BNE     .+4             ;BR IF NONE
1248  003512  104000                          HLT                     ;RECEIVER DID NOT STRIP SYNC.
1249  003514  105200                          INCB    R0              ;UPDATE COUNTER
1250  003516  001372                          BNE     3$              ;BR IF MORE TO GO.
1251  003520  104400                          SCOPE                   ;SCOPE THIS TEST.
1252
1253
1254
1255
1256
1257                                    ;DQ11   MEMORY TRANSFER TESTS
1258                                    ;
1259                                    ;IF THE PROCESSOR HAS AT LEAST 8K OF MEMORY
1260                                    ;THIS TEST WILL BE EXECUTED.
1261                                    ;
1262                                    ;THE FIRST PART EXERCISES THE TRANSMITTER ALONE
1263                                    ;TRANSMITTING FROM ADD.20000 TO LAST MEMORY ADD.
```

```
                                        ;UNDER 28K MINUS 400 (SAVE ABL). THE DATA IS
                                        ;VERIFIED ONE CHAR AT A TIME. TWO EIGHT BIT
                                        ; CHARS ARE TRANSFERED AT ONE TIME.
                                        ;
                                        ;AFTER THE TX ALONE THEN THE TRANSMITTER AND RECEIVER
                                        ;ARE EXERCISED TOGETHER IN THE SAME
                                        ;MANNER AS DESCRIBED ABOVE.
                                        ;



                                ;  TEST 4
                                ;*************************************************************************
003522  012737  000004  001226  TST4:   MOV     #4,TSTNO
003530  012737  004460  001216          MOV     #TST5,NEXT
003536  104413                          MEMCLR
003540  013705  000004                  MOV     @#4,R5          ;SAVE THE TIME OUT VECTOR
003544  012737  004434  000004          MOV     #10$,@#4        ;LOAD TRAP VECTOR
003552  005737  020000                  TST     @#20000         ;CHECK FOR 8K OF MEMORY.
003556  000240                          NOP                     ;
003560  012737  003610  000004          MOV     #2$,@#4         ;CPU DOES HAVE AT LEAST 8K.
003566  012700  020000                  MOV     #20000,R0       ;PREPARE TO SIZE MEMORY TO 28K
003572  062700  020000          1$:     ADD     #20000,R0       ;CHECK MEMORY.
003576  005710                          TST     (R0)            ;EXIST?
003600  000240                          NOP                     ;
003602  022700  160000                  CMP     #160000,R0      ;28K HIT YET.
003606  001371                          BNE     1$              ;BR IF NO
003610  012706  001200          2$:     MOV     #STACK,SP       ;ADJUST STACK
003614  012737  003710  001220          MOV     #4$,LOCK        ;SET FOR LOCK (SW09=1)
003622  010537  000004                  MOV     R5,@#4          ;RESET TRAP VECTOR.
003626  162700  005000                  SUB     #5000,R0        ;ALLOW ROOM FOR DDP2 MONITOR.
003632  010037  004456                  MOV     R0,LIMIT.H1     ;SAVE LAST MEMORY ADDRESS
003636  005002                          CLR     R2              ;ZERO DATA CHAR POINTER
003640  012700  020000                  MOV     #20000,R0       ;PREPARE TO FILL MEMORY WITH BINARY COUNT
003644  110220          3$:     MOVB    R2,(R0)+        ;START FILL
003646  005202                  INC     R2              ;UPDATE CHAR.
003650  122702  000026                  CMPB    #26,R2          ;DOES IT EQUAL THE SYNC CHAR?
003654  001001                          BNE     .+4             ;BR IF NO
003656  005202                          INC     R2              ;BUMP ONE HIGHER
003660  020037  004456                  CMP     R0,LIMIT.HI     ;IS ALL OF MEMORY FULL?
003664  001367                          BNE     3$              ;BR IF NO.
003666  112777  000002  175474          MOVB    #2,@DQREG       ;SEL TX BA PRI.
003674  012777  020000  175470          MOV     #20000,@DQSEC   ;SET TX BA TO FIRST ADD IN 8K
003702  012700  020000                  MOV     #20000,R0       ;SET SOFTWARE POINTER.
003706  000406                          BR      5$              ;CONTINUE TEST
003710  112777  000002  175452  4$:     MOVB    #2,@DQREG       ;SEL TX BA PRI.
003716  162777  000002  175446          SUB     #2,@DQSEC       ;GO BACKWARDS FOR SCOPE ROUTINE
003724  112777  000002  175436  5$:     MOVB    #2,@DQREG       ;SEL TX BA PRI.
003732  017737  175434  001252          MOV     @DQSEC,TEMP4    ;SAVE THE TX BA PRI. ADDRESS
003740  104412                          MSTCLR                  ;DO INIT DQ11
003742  112777  000002  175420          MOVB    #2,@DQREG       ;SEL TX BA PRI.
003750  013777  001252  175414          MOV     TEMP4,@DQSEC    ;RELOAD TX BA PRI.
003756  105277  175406                  INCB    @DQREG          ;SEL TX WC PRI.
003762  012777  177776  175402          MOV     #-2,@DQSEC      ;SET FOR A TWO EIGHT BIT XFER
003770  112777  000012  175372          MOVB    #MISC.,@DQREG   ;SEL MISC REGISTER
003776  012777  004012  175366          MOV     #4012,@DQSEC    ;SET 8 BITS TEST LOOP AND AUTO/STEP
004004  005277  175354                  INC     @DQTCSR         ;SET TX GO.
```

```
1320  004010  005777  175352                    TST     @DQERR          ;ANY ERRORS?
1321  004014  100001                            BPL     .+4             ;BR IF NO ERRORS
1322  004016  104000                            HLT                     ;DQ11 ERROR FLAG SET.
1323  004020  112777  000013  175342            MOVB    #13,@DQREG      ;SEL TX MUX REG
1324  004026  017737  175340  001252            MOV     @DQSEC,TEMP4    ;READ TX MUX
1325  004034  011037  001254                    MOV     (R0),TEMP5      ;READ SOFTWARE POINTER
1326  004040  023710  001252                    CMP     TEMP4,(R0)      ;IS THE DATA CORRECT
1327  004044  001401                            BEQ     .+4             ;BR IF GOOD
1328  004046  104005                            HLT     5               ;DATA COMPARISON ERROR.
1329
1330  004050  104401                            SCOP1                   ;LOCK ON CHARACTER (SW09=1)
1331  004052  005720                            TST     (R0)+           ;UPDATE SOFTWARE POINTER.
1332  004054  020037  004456                    CMP     R0,LIMIT.HI     ;ALL DONE?
1333  004060  001321                            BNE     5$              ;BR IF NO
1334
1335
1336                                            ;THE ABOVE WAS FOR THE TX ONLY
1337                                            ;
1338                                            ;THE BELOW ROUTINE EXECISES BOTH THE
1339                                            ;TX AND RX TOGETHER.
1340                                            ;
1341                                            ;NOTE THAT THE RX CA SHOULD BE
1342                                            ;400 (8) LOCATIONS HIGHER THAN THE TX CA.
1343
1344
1345
1346  004062  012737  004110  001220            MOV     #6$,LOCK        ;SET FOR LOCK ON CHAR(SW09=1)
1347  004070  012700  020000                    MOV     #20000,R0       ;SET FIRT ADD IN 8K
1348  004074  112777  000006  175266            MOVB    #6,@DQREG       ;SEL TX BA SEC
1349  004102  010077  175264                    MOV     R0,@DQSEC       ;LOAD TX BA SEC
1350  004106  000413                            BR      7$              ;CONT TEST.
1351  004110  112777  000006  175252  6$:       MOVB    #6,@DQREG       ;SEL TX BA SEC.
1352  004116  162777  000002  175246            SUB     #2,@DQSEC       ;KILL LAST XFER
1353  004124  105077  175240                    CLRB    @DQREG          ;SEL RX BA PRI.
1354  004130  162777  000002  175234            SUB     #2,@DQSEC       ;KILL LAST XFER
1355  004136  112777  000006  175224  7$:       MOVB    #6,@DQREG       ;SEL TX BA SEC
1356  004144  017737  175222  001252            MOV     @DQSEC,TEMP4    ;SAVE IT
1357  004152  104412                            MSTCLR                  ;INIT DQ11
1358  004154  105077  175210                    CLRB    @DQREG          ;SEL RX BA PRI
1359  004160  013777  001252  175204            MOV     TEMP4,@DQSEC    ;LOAD IT
1360  004166  062777  000400  175176            ADD     #400,@DQSEC     ;UPDATE IT
1361  004174  105277  175170                    INCB    @DQREG          ;SEL RX WC PRI
1362  004200  012777  177776  175164            MOV     #-2,@DQSEC      ;SET FOR TWO CHARS.
1363  004206  105277  175156                    INCB    @DQREG          ;SEL TX BA PRI
1364  004212  012777  015374  175152            MOV     #SYNC,@DQSEC    ;TX SYNC ON PRI.
1365  004220  105277  175144                    INCB    @DQREG          ;SEL TX WC PRI.
1366  004224  012777  177776  175140            MOV     #-2,@DQSEC      ;SET FOR TWO SYNC.
1367  004232  112777  000006  175130            MOVB    #6,@DQREG       ;LOAD TX BA SEC.
1368  004240  013777  001252  175124            MOV     TEMP4,@DQSEC    ;LOAD IT
1369  004246  105277  175116                    INCB    @DQREG          ;SEL TX WC SEC
1370  004252  012777  177776  175112            MOV     #-2,@DQSEC      ;SET FOR TWO CHAR XFER
1371  004260  112777  000011  175102            MOVB    #11,@DQREG      ;SEL THE SYNC REG
1372  004266  013777  015372  175076            MOV     .SYNC,@DQSEC    ;LOAD IT
1373  004274  105277  175070                    INCB    @DQREG          ;SEL MISC REG.
1374  004300  012777  004010  175064            MOV     #4010,@DQSEC    ;EIGHT BITS TEST LOOP
1375  004306  005277  175046                    INC     @DQRCSR         ;SET RX GO..
```

```
1376  004312  005277  175046          INC     @DQTCSR         ;SET TX GO..
1377  004316  005037  001244          CLR     TEMP1           ;DELAY COUNTER
1378  004322  012737  000005  001246  MOV     #5,TEMP2        ;"""""
1379  004330  105777  175024    8$:   TSTB    @DQRCSR         ;RX PRI DONE?
1380  004334  100407                  BMI     9$              ;BR IF YES
1381  004336  005237  001244          INC     TEMP1           ;DELAY
1382  004342  001372                  BNE     8$              ;
1383  004344  005337  001246          DEC     TEMP2           ;""""
1384  004350  001367                  BNE     8$              ;
1385  004352  104000                  HLT                     ;RX PRI DONE NOT SET.
1386  004354  005777  175006    9$:   TST     @DQERR          ;ANY ERRORS
1387  004360  100001                  BPL     .+4             ;BR IF NO.
1388  004362  104000                  HLT                     ;DQ11 ERROR FLAG SET.
1389  004364  011037  001254          MOV     (R0),TEMP5      ;SET EXPECTED
1390  004370  105077  174774          CLRB    @DQREG          ;SELECT RX BA PRI.
1391  004374  017701  174772          MOV     @DQSEC,R1       ;GET RX BA
1392  004400  162701  000002          SUB     #2,R1           ;GET LAST XFER
1393  004404  011137  001252          MOV     (R1),TEMP4      ;GET ACTUAL DATA
1394  004410  021037  001252          CMP     (R0),TEMP4      ;IS DATA OF?
1395  004414  001401                  BEQ     .+4             ;BR IF GOOD
1396  004416  104006                  HLT     6               ;DATA COMPARISON ERROR
1397
1398  004420  104401                  SCOP1                   ;LOCK ON DATA (SW09=1)
1399  004422  005720                  TST     (R0)+           ;UPDATE SOFTWARE POINTER
1400  004424  020037  004456          CMP     R0,LIMIT.HI     ;ALL DONE?
1401  004430  001242                  BNE     7$              ;BR IF NO
1402  004432  000410                  BR      11$             ;END TEST
1403  004434  022626          10$:    POP2SP                  ;ADJUST STACK POINTER
1404  004436  010537  000004          MOV     R5,@#4          ;RESET TRAP VECTOR
1405  004442  013737  001216  001214  MOV     NEXT,RETURN     ;DO NEXT TEST
1406  004450  000177  174540          JMP     @RETURN         ;
1407  004454  104400          11$:    SCOPE                   ;SCOPE THIS TEST
1408
1409  004456                  LIMIT.HI:
1410  004456  000000                  0
1411
```

```
1412
1413                                            ;
1414                                            ;TEST OF 'ENTER T' AND 'EXIT T'
1415                                            ;TRANSMITTER TRIGGERED
1416                                            ;
1417                                            ;TEST TO TRANSMITT ONE CHARACTER ENTERING T
1418                                            ;CHECKING THE BCC THEN OVERFLOWING
1419                                            ;CAUSING AN EXIT T THEN MAKING SURE
1420                                            ;THAT THE BCC WENT TO ZERO.
1421                                            ;
1422                                            ;NOTE: IF THE BCC DOES NOT EXIST THESE TESTS WILL NOT BE DONE
1423
1424                                        ;  TEST 5
1425                                        ;*************************************************************
1426  004460  012737  000005  001226    TST5:   MOV     #5,TSTNO
1427  004466  012737  005002  001216            MOV     #TST6,NEXT
1428  004474  032737  002000  001510            BIT     #ABBIT,@DQSTAT
1429  004502  001005                            BNE     .+14
1430  004504  012737  012364  001214            MOV     #.EOP,RETURN
1431  004512  000177  174476                    JMP     @RETURN
1432  004516  104412                            MSTCLR
1433  004520  104412                            MSTCLR                  ;ISSUE A MASTER CLEAR
1434  004522  012737  000351  005000            MOV     #351,WORD       ;SET CHAR
1435  004530  112777  000017  174632            MOVB    #17,@DQREG      ;SELECT POLY REGISTER
1436  004536  012777  000200  174626            MOV     #200,@DQSEC     ;SET POLY FOR LRC 8
1437  004544  012737  000011  015352            MOV     #11,COUNT       ;SET COUNT TO 11
1438  004552  112777  000002  174610            MOVB    #2,@DQREG       ;SET TX BA PRI
1439  004560  012777  005000  174604            MOV     #WORD,@DQSEC    ;LOAD TX BA
1440  004566  112777  000123  174574            MOVB    #123,@DQREG     ;SEL TX CC-WRITE EN ENTER T
1441  004574  012777  177777  174570            MOV     #-1,@DQSEC      ;SEL TX CC TO -1
1442  004602  112777  000067  174560            MOVB    #67,@DQREG      ;SEL TX CC SEC-WRITE EN EXIT T
1443  004610  005077  174556                    CLR     @DQSEC          ;SET TX CC TO ZERO
1444  004614  112777  000012  174546            MOVB    #MISC.,@DQREG   ;SEL MISC REG
1445  004622  012777  004012  174542            MOV     #4012,@DQSEC    ;EIGHT BITS TEST LOOP AUTO SET
1446  004630  005277  174530                    INC     @DQTCSR         ;SET TX GO
1447  004634  027777  174524  174522            CMP     @DQTCSR,@DQTCSR ;WAIST TIME.
1448  004642  027777  174516  174514            CMP     @DQTCSR,@DQTCSR ;WAIST TIME
1449  004650  027777  174510  174506            CMP     @DQTCSR,@DQTCSR ;WAIST TIME
1450  004656  005277  174510                    INC     @DQSEC          ;CLOCK UP
1451  004662  005377  174504                    DEC     @DQSEC          ;CLOCK DOWN
1452  004666  005277  174500          1$:       INC     @DQSEC          ;START THE CHAR UP
1453  004672  005377  174474                    DEC     @DQSEC                  ;       DOWN
1454  004676  005337  015352                    DEC     COUNT           ;DONE YET?
1455  004702  001371                            BNE     1$              ;BR IF NO
1456  004704  112777  000016  174456            MOVB    #16,@DQREG      ;SET TX BCC REG
1457  004712  017705  174454                    MOV     @DQSEC,R5       ;STORE IT
1458  004716  022705  000351                    CMP     #351,R5         ;DID CHAR GET INTO BCC
1459  004722  001401                            BEQ     .+4             ;BR IF YES
1460  004724  104000                            HLT                     ;TX BCC FAILED
1461  004726  112777  000012  174434            MOVB    #MISC.,@DQREG   ;SEL MISC REG
1462  004734  012737  000010  015352            MOV     #10,COUNT       ;SET COUNT TO 10
1463  004742  005277  174424          2$:       INC     @DQSEC          ;START CLOCKING BCC OUT UP
1464  004746  005377  174420                    DEC     @DQSEC                  ;               DOWN
1465  004752  005337  015352                    DEC     COUNT           ;DONE YET
1466  004756  001371                            BNE     2$              ;BR IF NO
1467  004760  112777  000016  174402            MOVB    #16,@DQREG      ;SEL TX BCC
```

```
1468  004766  005777  174400                TST     @DQSEC          ;DID BCC GET SHIFTED OUT?
1469  004772  001401                        BEQ     .+4             ;BR IF YES
1470  004774  104000                        HLT                     ;TX BCC NOT ZERO
1471  004776  104400                        SCOPE                   ;SCOPE TEST
1472  005000  000000              WORD:     0
1473
1474
1475                                        ;
1476                                        ;TEST TO FORCE
1477                                        ;RECEIVER BCC ERROR
1478                                        ;
1479                                        ;THE TRANSMITTER CHARACTER COUNT
1480                                        ;WILL BE SET TO -300
1481                                        ;AND THE RECEIVER CHARACTER COUNT
1482                                        ;WILL BE SET TO -400
1483                                        ;THUS THE RECEIVER WILL RECEIVE
1484                                        ;MORE CHARACTERS THAN THE TRANSMITER
1485                                        ;TRANSMITTED.   *BCC ERROR*
1486                                        ;
1487                                        ;
1488
1489                                  ;  TEST 6
1490                                  ;*************************************************************************
1491  005002  012737  000006  001226  TST6:     MOV     #6,TSTNO
1492  005010  012737  005042  001214            MOV     #2$,RETURN
1493  005016  012737  005130  001216            MOV     #TST7,NEXT
1494  005024  104413                            MEMCLR                  ;CLEAR THE DEVICE
1495  005026  005000                            CLR R0                  ;SET R0 TO ZERO
1496  005030  012704  015376                    MOV     #TXBUFF,R4      ;SET POINTER FOR BUFFER
1497  005034  110024                  1$:       MOVB    R0,(R4)+        ;START FILLING THE BUFFER
1498  005036  105200                            INCB    R0              ;UPDATE THE DATA
1499  005040  001375                            BNE     1$              ;HAS THE BUFFER BEEN FILLED
1500  005042  104412                  2$:       MSTCLR
1501  005044  012737  120001  015350            MOV     #120001,XPOLY   ;SELECT CRC 16  FOR POLYNOMIAL
1502  005052  004537  010570                    JSR     R5,SYNBCC       ;GO PRIM THE DQ11
1503  005056  177400                            -400                    ;THIS IS THE CHARACTER COUNT FOR THE RECEIVER
1504  005060  177500                            -300                    ;THIS IS THE CHARACTER COUNT FOR THE TRANSMITTER
1505  005062  017705  174300                    MOV     @DQERR,R5       ;SAVE THE DQ ERROR REGISTER
1506  005066  005705                            TST     R5              ;DID AN ERROR OCCUR??
1507  005070  100401                            BMI     .+4             ;BR IF THE ERROR DID OCCUR
1508  005072  104001                            HLT     1               ;HALT THE DQ ERROR BIT IS NOT SET
1509  005074  032777  000100  174264            BIT     #BIT6,@DQERR    ;MAKE SURE IT WAS A Rx BCC THAT CAUSED THE ERROR
1510  005102  001001                            BNE     .+4             ;BR IF THE RX BCC BIT IS SET
1511  005104  104001                            HLT     1               ;RX BCC ERROR BIT NOT SET
1512  005106  042777  000100  174252            BIC     #BIT6,@DQERR    ;CLEAR RX BCC BIT.                      ;;++E
1513  005114  032777  000100  174244            BIT     #BIT6,@DQERR    ;MAKE SURE RX BCC BIT IS CLEAR.         ;;++E
1514  005122  001401                            BEQ     3$              ;IF CLEAR, BR.                          ;;++E
1515  005124  104010                            HLT     10                                                      ;;++E
1516  005126  104400                  3$:       SCOPE                   ;SCOPE THIS TEST
1517
1518
1519                                        ;
1520                                        ;TEST OF TRANSMITTER BCC
1521                                        ;WITH POLYNOMIAL EQUAL TO '77777
1522                                        ;
1523                                        ;A FOUR HUNDRED BINARY COUNT
```

```
1524                                            ;DATA PATTERN IS RUN THROUGH
1525                                            ;THE BCC WITH A SHIFT BY SHIFT
1526                                            ;CHECK OF THE HARDWARE BY THE SOFTWARE.
1527                                            ;AT THE END THE TRANSMITTER IS ALSO
1528                                            ;CHECKED TO SEE IF THE BCC WAS SHIFTED
1529                                            ;OUT AND THAT THE BCC WENT TO ZERO.
1530                                            ;
1531                                            ;NOTE: THERE IS A TWO SHIFT DELAY
1532                                                    ;BEFORE THE TX BCC STARTS.
1533                                            ;
1534                                        ;  TEST 7
1535                                        ;*****************************************************************************
1536  005130  012737  000007  001226    TST7:   MOV     #7,TSTNO
1537  005136  012737  005176  001214            MOV     #2$,RETURN
1538  005144  012737  005636  001216            MOV     #TST10,NEXT
1539  005152  104413                           MEMCLR                  ;CLEAR ALL THE DQ11
1540  005154  005000                           CLR     R0              ;SET POINTER TO ZERO
1541  005156  012704  015376                   MOV     #TXBUFF,R4      ;GET TX BUFFER
1542  005162  110024                    1$:    MOVB    R0,(R4)+        ;START FILLING TX BUFFER
1543  005164  105200                           INCB    R0              ;WITH A BINARY
1544  005166  001375                           BNE     1$              ;COUNT PATTERN
1545  005170  012737  177777  015350           MOV     #177777,XPOLY   ;SET POLYNOMIAL TO 177777
1546  005176  104412                    2$:    MSTCLR                  ;ISSUE MASTER CLEAR
1547  005200  104412                           MSTCLR
1548  005202  005037  015344                   CLR     CALBCC          ;SET CALCULATED BCC TO ZERO
1549  005206  012737  000016  001254           MOV     #16,TEMP5       ;SET TYPE OUT ERROR REG TO 16
1550  005214  005037  015354                   CLR     DATA            ;SET DATA OF BCC SIMULATOR TO ZERO
1551  005220  112777  000022  174142           MOVB    #22,@DQREG      ;WRITE EN TX BA PRI
1552  005226  012777  015376  174136           MOV     #TXBUFF,@DQSEC  ;SET TX BUFFER
1553  005234  112777  000123  174126           MOVB    #123,@DQREG     ;ENTER T WRITE EN ,TX CC PRI
1554  005242  012777  177400  174122           MOV     #-400,@DQSEC    ;SET FOR 400 CHARS
1555  005250  112777  000067  174112           MOVB    #67,@DQREG      ;EXIT 'T',WRITE EN,TX CC SEC
1556  005256  005077  174110                   CLR     @DQSEC          ;SET FOR ZERO CHARS ON SEC
1557  005262  112777  000017  174100           MOVB    #17,@DQREG      ;SEL POLYNOMIAL REGISTER
1558  005270  013777  015350  174074           MOV     XPOLY,@DQSEC    ;LOAD IT
1559  005276  112777  000012  174064           MOVB    #MISC.,@DQREG   ;SEL MISC REGISTER
1560  005304  012777  004012  174060           MOV     #4012,@DQSEC    ;EIGHT BITS,TEST LOOP,AUTO STEP
1561  005312  005277  174046                   INC     @DQTCSR         ;SET TX GO
1562  005316  027777  174042  174040           CMP     @DQTCSR,@DQTCSR ;WAIST TIME.
1563  005324  027777  174034  174032           CMP     @DQTCSR,@DQTCSR ;WAIST TIME
1564  005332  027777  174026  174024           CMP     @DQTCSR,@DQTCSR ;WAIST TIME
1565  005340  005277  174026                   INC     @DQSEC          ;CLOCK UP---
1566  005344  005377  174022                   DEC     @DQSEC          ;CLOCK DOWN---
1567  005350  005277  174016                   INC     @DQSEC          ;CLOCK UP---
1568  005354  005377  174012                   DEC     @DQSEC          ;CLOCK DOWN---
1569  005360  005037  015352            3$:    CLR     COUNT           ;SET COUNT TO 0
1570  005364  013737  015354  005406           MOV     DATA,6$         ;SET DATA FOR SUBROUTINE
1571  005372  013737  015344  005410    4$:    MOV     CALBCC,7$       ;SET CALCULATED BCC FOR SUB ROUTINE
1572  005400  004537  012064                   JSR     R5,SIMBCC       ;GO TO BCC SIMULATOR ROUTINE
1573  005404  000001                    5$:    1                       ;THIS IS THE NUMBER OF SHIFTS FOR ROUTINE TO DO
1574  005406  000001                    6$:    .BLKW   1               ;THIS IS WHERE THE CHAR IS PLACED
1575  005410  000001                    7$:    .BLKW   1               ;THIS IS THE PREVIOUS BCC CALCULATED
1576  005412  112777  000012  173750           MOVB    #MISC.,@DQREG   ;RESELECT THE MISC REG
1577  005420  005277  173746                   INC     @DQSEC          ;CLOCK UP---
1578  005424  005377  173742                   DEC     @DQSEC          ;CLOCK DOWN---
1579  005430  112777  000016  173732           MOVB    #16,@DQREG      ;SEL THE TX BCC REGISTER
```

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1580  005436  017737  173730  001252          MOV     @DQSEC,TEMP4    ;SAVE IT IN TEMP4
1581  005444  023737  015344  001252          CMP     CALBCC,TEMP4    ;ARE THE CALCULATED AND RECEIVED RESULTS THE SAME??
1582  005452  001401                          BEQ     .+4             ;BR IF GOOD (SAME)
1583  005454  104003                          HLT     3               ;BCC(S) ARE DIFFERNT..
1584  005456  000241                          CLC                     ;CLEAR THE CARRY BIT OF PSW
1585  005460  006037  005406                  ROR     6$              ;UPDATE MY DATA LOCATION
1586  005464  005237  015352                  INC     COUNT           ;UPDATE THE COUNT OF BITS PER CHAR
1587  005470  023727  015352  000010          CMP     COUNT,#8.       ;IS THIS CHARACTER DONE YET??
1588  005476  001335                          BNE     4$              ;BR IF CHAR NOT DONE
1589  005500  105237  015354                  INCB    DATA            ;GET NEW CHAR
1590  005504  001325                          BNE     3$              ;HAVE ALL CHARACTERS BEEN DONE
1591                                          ;
1592  005506  005037  015352                  CLR     COUNT           ;INIT COUNT
1593  005512  112777  000012  173650  8$:     MOVB    #MISC.,@DQREG   ;RESELECT THE MISC REG
1594  005520  000241                          CLC                     ;CLEAR CARRY
1595  005522  006037  015344                  ROR     CALBCC          ;SHIFT OUT CALCULATED BCC
1596  005526  005277  173640                  INC     @DQSEC          ;CLOCK UP---
1597  005532  005377  173634                  DEC     @DQSEC          ;CLOCK DOWN---
1598  005536  112777  000016  173624          MOVB    #16,@DQREG      ;SEL TX BCC REGISTER
1599  005544  017737  173622  001252          MOV     @DQSEC,TEMP4    ;SAVE IT IN TEMP4
1600  005552  023737  015344  001252          CMP     CALBCC,TEMP4    ;ARE THEY THE SAME??
1601  005560  001401                          BEQ     .+4             ;BR IF SAME(GOOD)
1602  005562  104003                          HLT     3               ;BCC DIFFERENT
1603  005564  005237  015352                  INC     COUNT           ;UPDATE COUNT
1604  005570  022737  000020  015352          CMP     #16.,COUNT      ;HAS ALL THE BCC BEEN SHIFED OUT
1605  005576  001345                          BNE     8$              ;BR IF MORE TO DO
1606  005600  112777  000012  173562          MOVB    #MISC.,@DQREG   ;SELECT THE MISC REGISTER
1607  005606  005277  173560                  INC     @DQSEC          ;GIVE ONE LAST CLOCK UP--
1608  005612  005377  173554                  DEC     @DQSEC          ;AND CLOCK DOWN--
1609  005616  112777  000016  173544          MOVB    #16,@DQREG      ;SEL THE TX BCC REGISTER
1610  005624  005777  173542                  TST     @DQSEC          ;DID THE TX BCC GO TO ZERO
1611  005630  001401                          BEQ     .+4             ;BR IF GOOD
1612  005632  104000                          HLT                     ;TX BCC NOT ZERO
1613  005634  104400                          SCOPE                   ;SCOPE TEST
1614
1615
1616
1617                                          ;
1618                                          ;TEST OF RECEIVER BCC
1619                                          ;WITH POLYNOMIAL EQUAL TO 177777
1620                                          ;
1621                                          ;A FOUR HUNDRED BINARY COUNT
1622                                          ;DATA PATTERN IS RUN THROUGH
1623                                          ;THE BCC WITH A SHIFT BY SHIFT
1624                                          ;CHECK OF THE HARDWARE COMPARE
1625                                          ;WITH THE SOFTWARE.
1626                                          ;NOTE   THERE IS ONE CHARACTER TIME DELAY
1627                                                  ;FOR THE BCC TO START.
1628                                                  ;ALSO THE IS ONE PAD CHAR
1629                                                  ;NEEDED AT THE END OF THE DATA.
1630                                          ;
1631                                  ;  TEST 10
1632                                  ;*****************************************************************************
1633  005636  012737  000010  001226  TST10:  MOV     #10,TSTNO
1634  005644  012737  005676  001214          MOV     #2$,RETURN
1635  005652  012737  006662  001216          MOV     #TST11,NEXT
```

```
1636  005660  104413                    1$:   MEMCLR                    ;CLEAR THE DEVICE
1637  005662  012737  177777  015350          MOV   #177777,XPOLY       ;SELXPOLY TO 177777
1638  005670  012737  000015  001254          MOV   #15,TEMP5           ;SET TYPE OUT REG TO 15
1639  005676  104412                    2$:   MSTCLR                    ;ISSUE A MASTER CLEAR
1640  005700  104412                          MSTCLR
1641  005702  005037  015344                  CLR   CALBCC              ;SET CALBCC TO ZERO
1642  005706  005037  015354                  CLR   DATA                ;SET DATA TO ZERO
1643  005712  112777  000020  173450          MOVB  #20,@DQREG          ;WRITE EN,RX BA PRI
1644  005720  012777  016000  173444          MOV   #RXBUFF,@DQSEC      ;LOAD THE RX BA
1645  005726  112777  000121  173434          MOVB  #121,@DQREG         ;ENTER 'T',WRITE EN,RX CC PRI
1646  005734  012777  177400  173430          MOV   #-400,@DQSEC        ;SET FOR FOUR HUNDRED CHARS
1647  005742  112777  000024  173420          MOVB  #24,@DQREG          ;SEL THE RX BA SEC
1648  005750  012777  016000  173414          MOV   #RXBUFF,@DQSEC      ;SET FOR THE PAD CHAR.
1649  005756  112777  000065  173404          MOVB  #65,@DQREG          ;EXIT 'T',WRITE EN,RX CC SEC
1650  005764  012777  177777  173400          MOV   #-1,@DQSEC          ;SEL RX CC SEC FOR ONE PAD CHAR.
1651  005772  112777  000017  173370          MOVB  #17,@DQREG          ;SEL THE POLYNO REGISTER
1652  006000  013777  015350  173364          MOV   XPOLY,@DQSEC        ;LOAD IT WITH THE POLY
1653  006006  112777  000012  173354          MOVB  #MISC.,@DQREG       ;SEL THE MISC REGISTER
1654  006014  012777  004012  173350          MOV   #4012,@DQSEC        ;EIGHT BITS TEST LOOP AND AUTO STEP
1655  006022  012777  010001  173330          MOV   #10001,@DQRCSR      ;SET RX ACTIVE AND GO!!
1656  006030  012737  000010  015352  3$:     MOV   #8.,COUNT           ;SET FOR ONE CHAR TIME DELAY
1657  006036  013737  015354  015340          MOV   DATA,TMPDAT         ;SAVE THE DATA
1658  006044  005137  015340                  COM   TMPDAT              ;COMPLIMENT IT FOR BIT WINDOW USE.
1659  006050  005037  001250          4$:     CLR   TEMP3               ;INIT LOC
1660  006054  006037  015340                  ROR   TMPDAT              ;SHIFT OUT ONE BIT OF DATA
1661  006060  106037  001250                  RORB  TEMP3               ;BRING IT IN FROM CARRY
1662  006064  042777  000200  173300          BIC   #BIT7,@DQSEC        ;CLEAR THE BIT WINDOW
1663  006072  053777  001250  173272          BIS   TEMP3,@DQSEC        ;PLACE DATA ON BIT WINDOW
1664  006100  005277  173266                  INC   @DQSEC              ;CLOCK UP---
1665  006104  005377  173262                  DEC   @DQSEC              ;CLOCK DN---
1666  006110  005337  015352                  DEC   COUNT               ;CHAR DONE??
1667  006114  001355                          BNE   4$                  ;BR IF NOT DONE
1668  006116  105237  015354                  INCB  DATA                ;UPDATE DATA
1669  006122  005037  015352          5$:     CLR   COUNT               ;INIT COUNT
1670  006126  013737  015354  006166          MOV   DATA,8$             ;MOV DATA TO SUB ROUTINE USE AREA
1671  006134  005337  006166                  DEC   8$                  ;SET SUBROUTINE TO ONE LESS THAT RX GETS
1672  006140  013737  015354  015340          MOV   DATA,TMPDAT         ;SAVE DATA
1673  006146  005137  015340                  COM   TMPDAT              ;COMPLIMENT DATA FOR BIT WINDOW USE
1674  006152  013737  015344  006170  6$:     MOV   CALBCC,9$           ;MOV CALCULATED BCC TO SUB ROUTINE USE
1675  006160  004537  012064                  JSR   R5,SIMBCC           ;GO AND CALCULATE BCC (SOFTWARE)
1676  006164  000001                    7$:   1                         ;THIS IS NUMBER OF SHIFTS TO BE DONE
1677  006166  000001                    8$:   .BLKW  1                  ;THIS IS WHERE THE DATA IS PLACED
1678  006170  000001                    9$:   .BLKW  1                  ;THIS IS WHERE THE PREVIOUS BCC IS PLACED
1679  006172  112777  000012  173170          MOVB  #MISC.,@DQREG       ;RESELECT THE MISC REGISTER
1680  006200  005037  001250                  CLR   TEMP3               ;INIT LOC
1681  006204  006037  015340                  ROR   TMPDAT              ;SHIFT OUT DATA BIT
1682  006210  106037  001250                  RORB  TEMP3               ;CATCH IT IN TEMP3
1683  006214  042777  000200  173150          BIC   #BIT7,@DQSEC        ;CLEAR THE BIT WINDOW
1684  006222  053777  001250  173142          BIS   TEMP3,@DQSEC        ;LOAD THE DATA
1685  006230  005277  173136                  INC   @DQSEC              ;CLOCK UP---
1686  006234  005377  173132                  DEC   @DQSEC              ;CLOCK DN---
1687  006240  112777  000015  173122          MOVB  #15,@DQREG          ;SEL RX BCC REGISTER
1688  006246  017737  173120  001252          MOV   @DQSEC,TEMP4        ;SAVE THE BCC
1689  006254  023737  015344  001252          CMP   CALBCC,TEMP4        ;IS IT CORRECT??
1690  006262  001401                          BEQ   .                   ;BR IF GOOD
1691  006264  104003                          HLT   3                   ;BCC NOT WHAT EXPECTED
```

```
1692  006266  000241                          CLC             ;CLEAR THE CARRY BIT
1693  006270  006037  006166                  ROR     8$      ;SHIFT THE DATA
1694  006274  005237  015352                  INC     COUNT   ;UPDATE THE COUNT
1695  006300  022737  000010  015352          CMP     #8.,COUNT       ;IS THE CHARACTER DONE??
1696  006306  001321                          BNE     6$      ;BR IF CHAR NOT DONE
1697  006310  105237  015354                  INCB    DATA    ;UPDATA DATA
1698  006314  001302                          BNE     5$      ;BR IF NOT ALL CHARS DONE.
1699  006316  012737  000003  015370  10$:    MOV     #3,LOC1         ;POINTER****
1700  006324  013737  015344  006350          MOV     CALBCC,21$      ;SAVE CALBCC
1701  006332  013737  015344  015366          MOV     CALBCC,STORE1   ;
1702  006340  004537  012064                  JSR     R5,SIMBCC       ;GO FINISH THE BCC
1703  006344  000010                          8.                      ;SHIFTS REQUIRED
1704  006346  000377                          377                     ;DATA CHARACTER
1705  006350  000001                  21$:    .BLKW   1               ;PREVIOS BCC
1706  006352  013737  015344  015356          MOV     CALBCC,SAVBCC   ;SAVE THE BCC
1707  006360  013737  015366  015344          MOV     STORE1,CALBCC   ;RESTORE THE BCC
1708  006366  012737  000377  015354          MOV     #377,DATA       ;DATA =377
1709  006374  013737  015356  015340          MOV     SAVBCC,TMPDAT   ;PUSH IN THE LOW BYTE OF THE BCC
1710  006402  005137  015340                  COM     TMPDAT          ;INTO THE RX
1711  006406  000421                          BR      12$             ;
1712  006410  013737  015356  015354  1'$:    MOV     SAVBCC,DATA     ;MOVE THE CALBCC TO DATA FOR SUBROUTINE
1713  006416  113737  015357  015340          MOVB    SAVBCC+1,TMPDAT ;MOVE THE HIGH BYTE OF CALBCC TO PLACED INTO THE RECEIVE
1714  006424  005137  015340                  COM     TMPDAT          ;PREPARE IT FOR THE BIT WINDOW
1715  006430  000410                          BR      12$             ;GO TO MAIN PART OF TEST
1716  006432  113737  015357  015354  16$:    MOVB    SAVBCC+1,DATA   ;MOVE THE HIGH BYTE OF THE CALBCC TO DATA
1717  006440  012737  000377  015340          MOV     #377,TMPDAT     ;PAD CHAR FOR RX
1718  006446  005137  015340                  COM     TMPDAT          ;PREPARE IT FOR THE BIT WINDOW
1719  006452  005037  015352          12$:    CLR     COUNT           ;INIT COUNT (THIS IS FOR NUMBER OF BITS PER CHAR)
1720  006456  113737  015354  006500          MOVB    DATA,13$        ;LOAD THE CHAR FOR SUBROUTINE
1721  006464  013737  015344  006502  15$:    MOV     CALBCC,14$      ;LOAD THE CALBCC FOR THE SUBROUTINE
1722  006472  004537  012064                  JSR     R5,SIMBCC       ;GO TO THE SUBROUTINE
1723  006476  000001                          1                       ;THIS IS THE NUMBER OF SHIFTS TO BE DONE
1724  006500  000001                  13$:    .BLKW   1               ;THIS IS THE CHAR FOR THE SUBROUTINE
1725  006502  000001                  14$:    .BLKW   1               ;THIS IS THE PREVIOUS BCC
1726  006504  112777  000012  172656          MOVB    #MISC.,@DQREG   ;SEL THE MISC REGISTER
1727  006512  005037  001250                  CLR     TEMP3           ;INIT LOC       ;
1728  006516  006037  015340                  ROR     TMPDAT          ;SHIFT OUT A BIT OF DATA
1729  006522  106037  001250                  RORB    TEMP3           ;BRING IT FROM CARRY INTO TEMP3
1730  006526  042777  000200  172636          BIC     #BIT7,@DQSEC    ;CLEAR THE BIT WINDOW
1731  006534  053777  001250  172630          BIS     TEMP3,@DQSEC    ;PLACE DATA ON THE BIT WINDOW
1732  006542  005277  172624                  INC     @DQSEC          ;CLOCK UP---
1733  006546  005377  172620                  DEC     @DQSEC          ;CLOCK DN---
1734  006552  112777  000015  172610          MOVB    #15,@DQREG      ;SEL THE RX BCC REGISTER
1735  006560  017737  172606  001252          MOV     @DQSEC,TEMP4    ;SAVE IT IN TEMP4
1736  006566  023737  015344  001252          CMP     CALBCC,TEMP4    ;IS THE BCC CORRECT??
1737  006574  001401                          BEQ     .+4             ;BR IF GOOD
1738  006576  104003                          HLT     3               ;BCC ERROR IN RX
1739  006600  000241                          CLC                     ;CLEAR THE CARRY BIT
1740  006602  006037  006500                  ROR     13$             ;SHIFT THE CHARACTER TO THE RIGHT
1741  006606  005237  015352                  INC     COUNT           ;UPDATE THE COUNT
1742  006612  022737  000010  015352          CMP     #8.,COUNT       ;IS THIS CHARACTER DONE
1743  006620  001321                          BNE     15$             ;BR IF NOT DONE
1744  006622  005337  015370                  DEC     LOC1            ;ALTER THE RETURN POINTER
1745  006626  022737  000002  015370          CMP     #2,LOC1         ;WHERE SHOULD I GO??
1746  006634  001665                          BEQ     1'$             ;IF LOC1-2 GOTO 11$
1747  006636  022737  000001  015370          CMP     #1,LOC1 ;
```

```
1748  006644  001672                          BEQ     16$                ;IF LOC1=1 GOTO 16$
1749  006646  017705  172514                  MOV     @DQERR,R5          ;SAVE THE ERROR REGISTER
1750  006652  005705                          TST     R5                 ;DID AN ERROR OCCUR??
1751  006654  100001                          BPL     .+4                ;BR IF NO ERROR
1752  006656  104001                          HLT     1                  ;DQ11 ERROR FLAG SET
1753  006660  104400                          SCOPE                      ;SCOPE THIS TEST
1754
1755
1756                                          ;TEST OF TRANSMITTER AND RECEIVER
1757                                          ;BCC WITH A POLYNOMIAL OF
1758                                          ;CRC 16: X16+X15+X2+1
1759                                          ;NOTE: IN THIS TEST IT IS UP TO
1760                                          ;      THE HARDWARE TO DISCOVER
1761                                          ;      AN ERROR IF ONE OCCURS.
1762
1763                                  ;  TEST 11
1764                                  ;*************************************************************************
1765  006662  012737  000011  001226  TST11:  MOV     #11,TSTNO
1766  006670  012737  006726  001216          MOV     #TST12,NEXT
1767  006676  104412                          MSTCLR                     ;CLEAR DQ11 WITH A MASTER CLEAR
1768  006700  012737  120001  015350          MOV     #120001,XPOLY      ;LOAD SELECTED POLYNOMIAL INTO XPOLY.
1769  006706  004737  010202                  JSR     PC,STBCC           ;TRANSFER CHARACTERS.
1770  006712  017705  172450                  MOV     @DQERR,R5          ;SAVE THE ERROR REGISTER
1771  006716  005705                          TST     R5                 ;DID AN ERROR OCCUR??
1772  006720  100001                          BPL     .+4                ;BR IF NO ERROR
1773  006722  104001                          HLT     1                  ;AN ERROR OCCURED
1774  006724  104400                          SCOPE
1775
1776
1777
1778
1779                                          ;
1780                                          ;TEST OF TRANSMITTER AND RECEIVER
1781                                          ;BCC WITH A POLYNOMIAL OF
1782                                          ;CRC 12: X12+X11+X3+X2+X+1
1783                                          ;NOTE:  IN THIS TEST IT IS UP TO
1784                                          ;       THE HARDWARE TO DISCOVER
1785                                          ;       AN ERROR IF ONE OCCURS
1786
1787                                  ;  TEST 12
1788                                  ;*************************************************************************
1789  006726  012737  000012  001226  TST12:  MOV     #12,TSTNO
1790  006734  012737  006772  001216          MOV     #TST13,NEXT
1791  006742  104412                          MSTCLR                     ;CLEAR DQ11 WITH A MASTER CLEAR
1792  006744  012737  007401  015350          MOV     #7401,XPOLY        ;LOAD SELECTED POLYNOMIAL INTO XPOLY.
1793  006752  004737  010202                  JSR     PC,STBCC           ;TRANSFER CHARACTERS.
1794  006756  017705  172404                  MOV     @DQERR,R5          ;SAVE THE ERROR REGISTER
1795  006762  005705                          TST     R5                 ;DID AN ERROR OCCUR??
1796  006764  100001                          BPL     .+4                ;BR IF NO ERROR
1797  006766  104001                          HLT     1                  ;AN ERROR OCCURED
1798  006770  104400                          SCOPE
1799
1800
1801
1802
1803                                          ;
```

```
1804                                            ;TEST OF TRANSMITTER AND RECEIVER
1805                                            ;BCC WITH A POLYNOMIAL OF
1806                                            ;CRC/CCITT: X16+X12+X2+X+1
1807                                            ;NOTE:  IN THIS TEST IT IS UP TO
1808                                            ;       THE HARDWARE TO DISCOVER
1809                                            ;       AN ERROR IF ONE OCCURES
1810
1811                                    ;  TEST 13
1812                                    ;*****************************************************************************
1813  006772  012737  000013  001226  TST13:  MOV     #13,TSTNO
1814  007000  012737  007036  001216          MOV     #TST14,NEXT
1815  007006  104412                          MSTCLR                  ;CLEAR DQ11 WITH A MASTER CLEAR
1816  007010  012737  102010  015350          MOV     #102010,XPOLY   ;LOAD SELECTED POLYNOMIAL INTO XPOLY.
1817  007016  004737  010202                  JSR     PC,STBCC        ;TRANSFER CHARACTERS.
1818  007022  017705  172340                  MOV     @DQERR,R5       ;SAVE THE ERROR REGISTER
1819  007026  005705                          TST     R5              ;DID AN ERROR OCCUR??
1820  007030  100001                          BPL     .+4             ;BR IF NO ERROR
1821  007032  104001                          HLT     1               ;AN ERROR OCCURED
1822  007034  104400                          SCOPE
1823
1824
1825
1826
1827                                            ;
1828                                            ;TEST OF TRANSMITTER AND RECEIVER
1829                                            ;BCC WITH A POLYNOMIAL OF
1830                                            ;LRC 8: X8+1
1831                                            ;NOTE:  IN THIS TEST IT IS UP TO
1832                                            ;       THE HARDWARE TO DISCOVER
1833                                            ;       AN ERROR IF ONE OCCURES.
1834
1835                                    ;  TEST 14
1836                                    ;*****************************************************************************
1837  007036  012737  000014  001226  TST14:  MOV     #14,TSTNO
1838  007044  012737  007102  001216          MOV     #TST15,NEXT
1839  007052  104412                          MSTCLR                  ;CLEAR DQ11 WITH A MASTER CLEAR
1840  007054  012737  000200  015350          MOV     #200,XPOLY      ;LOAD SELECTED POLYNOMIAL INTO XPOLY.
1841  007062  004737  010202                  JSR     PC,STBCC        ;TRANSFER CHARACTERS.
1842  007066  017705  172274                  MOV     @DQERR,R5       ;SAVE THE ERROR REGISTER
1843  007072  005705                          TST     R5              ;DID AN ERROR OCCUR??
1844  007074  100001                          BPL     .+4             ;BR IF NO ERROR
1845  007076  104001                          HLT     1               ;AN ERROR OCCURED
1846  007100  104400                          SCOPE
1847
1848
1849
1850
1851                                            ;
1852                                            ;TEST OF TRANSMITTER AND RECEIVER
1853                                            ;BCC WITH A POLYNOMIAL OF
1854                                            ;LRC 16: X16+1
1855                                            ;NOTE:  IN THIS TEST IT IS UP TO
1856                                            ;       THE HARDWARE TO DISCOVER
1857                                            ;       AN ERROR IF ONE OCCURES
1858
1859                                    ;  TEST 15
```

```
1860                                    ;*************************************************************************
1861  007102  012737  000015  001226    TST15:  MOV     #15,TSTNO
1862  007110  012737  007146  001216            MOV     #TST16,NEXT
1863  007116  104412                            MSTCLR                  ;CLEAR DQ11 WITH A MASTER CLEAR
1864  007120  012737  100000  015350            MOV     #100000,XPOLY   ;LOAD SELECTED POLYNOMIAL INTO XPOLY.
1865  007126  004737  010202                    JSR     PC,STBCC        ;TRANSFER CHARACTERS.
1866  007132  017705  172230                    MOV     @DQERR,R5       ;SAVE THE ERROR REGISTER
1867  007136  005705                            TST     R5              ;DID AN ERROR OCCUR??
1868  007140  100001                            BPL     .+4             ;BR IF NO ERROR
1869  007142  104001                            HLT     1               ;AN ERROR OCCURED
1870  007144  104400                            SCOPE
1871
1872
1873
1874
1875                                            ;
1876                                            ;TEST OF RECEIVER AND TRANSMITTER
1877                                            ;BCC USING CRC 16 FOR POLYNOMIAL.
1878                                            ;
1879                                            ;THIS TEST USES IDLE MODE TO
1880                                            ;GET INTO TRANSPARENCY
1881                                            ;AND IF AN ERROR SHOULD OCCUR
1882                                            ;IT MUST BE REPORTED BY THE HARDWARE.
1883                                            ;
1884
1885                                    ;  TEST 16
1886                                    ;*************************************************************************
1887  007146  012737  000016  001226    TST16:  MOV     #16,TSTNO
1888  007154  012737  007206  001214            MOV     #2$,RETURN
1889  007162  012737  007242  001216            MOV     #TST17,NEXT
1890  007170  104413                            MEMCLR                  ;CLEAR THE DEVICE
1891  007172  005000                            CLR RO                  ;SET RO TO ZERO
1892  007174  012704  015376                    MOV     #TXBUFF,R4      ;SET POINTER FOR BUFFER
1893  007200  110024                    1$:     MOVB    RO,(R4)+        ;START FILLING THE BUFFER
1894  007202  105200                            INCB    RO              ;UPDATE THE DATA
1895  007204  001375                            BNE     1$              ;HAS THE BUFFER BEEN FILLED
1896  007206  104412                    2$:     MSTCLR
1897  007210  012737  120001  015350            MOV     #120001,XPOLY   ;SELECT CRC 16  FOR POLYNOMIAL
1898  007216  004537  010570                    JSR     R5,SYNBCC       ;GO PRIM THE DQ11
1899  007222  177400                            -400                    ;THIS IS THE CHARACTER COUNT FOR THE RECEIVER
1900  007224  177400                            -400                    ;THIS IS THE CHARACTER COUNT FOR THE TRANSMITTER
1901  007226  017705  172134                    MOV     @DQERR,R5       ;SAVE THE DQ ERROR REGISTER
1902  007232  005705                            TST     R5              ;DID AN ERROR OCCUR??
1903  007234  100001                            BPL     .+4             ;BR IF THE ERROR DID NOT OCCUR
1904  007236  104001                            HLT     1               ;HALT THE DQ ERROR BIT IS SET
1905  007240  104400                            SCOPE                   ;SCOPE THIS TEST
1906
1907
1908
1909                                            ;
1910                                            ;TEST OF TRANSMITTER AND RECEIVER
1911                                            ;BCC WITH A POLYNOMIAL OF 177777
1912                                            ;
1913                                            ;THIS TEST USES IDLE MODE TO
1914                                            ;GET INTO TRANSPARENCY. IF AN
1915                                            ;ERROR SHOULD HAPPEN, THE HARDWARE
```

```
1916                                            ;MUST FLAG IT.
1917                                            ;
1918                                    ;  TEST 17
1919                                    ;*****************************************************************************
1920  007242  012737  000017  001226  TST17:  MOV     #17,TSTNO
1921  007250  012737  007302  001214           MOV     #2$,RETURN
1922  007256  012737  007336  001216           MOV     #TST20,NEXT
1923  007264  104413                           MEMCLR                  ;CLEAR THE DEVICE
1924  007266  005000                           CLR R0                  ;SET R0 TO ZERO
1925  007270  012704  015376                   MOV     #TXBUFF,R4      ;SET POINTER FOR BUFFER
1926  007274  110024                   1$:     MOVB    R0,(R4)+        ;START FILLING THE BUFFER
1927  007276  105200                           INCB    R0              ;UPDATE THE DATA
1928  007300  001375                           BNE     1$              ;HAS THE BUFFER BEEN FILLED
1929  007302  104412                   2$:     MSTCLR                  ;ISSUE MASTER CLEAR
1930  007304  012737  177777  015350           MOV     #177777,XPOLY   ;SELECT 177777  FOR POLYNOMIAL
1931  007312  004537  010570                   JSR     R5,SYNBCC       ;GO PRIM THE DQ11
1932  007316  177400                           -400                    ;THIS IS THE CHARACTER COUNT FOR THE RECEIVER
1933  007320  177400                           -400                    ;THIS IS THE CHARACTER COUNT FOR THE TRANSMITTER
1934  007322  017705  172040                   MOV     @DQERR,R5       ;SAVE THE DQ ERROR REGISTER
1935  007326  005705                           TST     R5              ;DID AN ERROR OCCUR??
1936  007330  100001                           BPL     .+4             ;BR IF THE ERROR DID NOT OCCUR
1937  007332  104001                           HLT     1               ;HALT THE DQ ERROR BIT IS SET
1938  007334  104400                           SCOPE                   ;SCOPE THIS TEST
1939
1940                                            ;
1941                                            ;TEST OF TRANSMITTER AND RECEIVER
1942                                            ;BCC WITH ALL POLYNOMIALS
1943                                            ;BETWEEN 000000 AND 177777
1944                                            ;SENDING ONE CHARACTER (351)
1945                                            ;AND CALCULATING WHAT THE BCC
1946                                            ;SHOULD BE AND COMPARING IT
1947                                            ;WITH THE TRANSMITTER BCC AND RECEIVER BCC
1948                                            ;
1949                                            ;NOTE:  SW 09=1 WILL FREEZE THE POLYNOMIAL
1950                                                    ;WHEN SW 09 IS ASSERTED.
1951
1952                                    ;  TEST 20
1953                                    ;*****************************************************************************
1954  007336  012737  000020  001226  TST20:  MOV     #20,TSTNO
1955  007344  012737  000003  001222           MOV     #3,ICOUNT
1956  007352  012737  007472  001216           MOV     #TST21,NEXT
1957  007360  012737  007372  001220           MOV     #1$,LOCK
1958  007366  005037  015350                   CLR     XPOLY           ;INIT SET XPOLY TO ZERO
1959  007372  104412                   1$:     MSTCLR
1960  007374  004737  011110                   JSR     PC,TYBCC        ;GO AND PRIM THE DQ11
1961  007400  004537  012064                   JSR     R5,SIMBCC       ;GO AND CALCULATE WHAT THE BCC SHOULD BE
1962  007404  000010                           8.                      ;THIS IS FOR EIGHT BITS PER CHAR (NUMBER OF SHIFTS)
1963  007406  000351                           351                     ;THIS IS THE DATA CHARACTER
1964  007410  000000                           0                       ;THIS IS THE PREVIOUS BCC
1965  007412  112777  000015  171750           MOVB    #15,@DQREG      ;SEL THE RX BCC REGISTER
1966  007420  012705  000015                   MOV     #15,R5          ;SAVE THE REGISTER
1967  007424  017701  171742                   MOV     @DQSEC,R1       ;SAVE THE BCC
1968  007430  023701  015344                   CMP     CALBCC,R1       ;IS THE BCC RIGHT??
1969  007434  001401                           BEQ     .+4             ;BR IF YES
1970  007436  104002                           HLT     2               ;BCC ERROR
1971  007440  012705  000016                   MOV     #16,R5          ;SEL THE TX BCC REGISTER
```

```
1972  007444  013701  015362                  MOV     SEC16,R1        ;THIS IS WHERE THE TX BCC WAS STORED
1973  007450  023701  015344                  CMP     CALBCC,R1       ;IS IT RIGHT??
1974  007454  001401                          BEQ     .+4             ;BR IF GOOD
1975  007456  104002                          HLT     2               ;TX BCC ERROR
1976  007460  104401                          SCOP1                   ;DOES THE USER HAVE SW09=1??
1977  007462  005237  015350                  INC     XPOLY           ;UPDATE THE POLYNO
1978  007466  001341                          BNE     1$              ;BE IF NOT ALL POLYNO HAVE BEEN DONE
1979  007470  104400                          SCOPE                   ;SCOPE THIS TEST
1980
1981
1982                                          ;
1983                                          ;TEST OF BIT 06 OF MISC REGISTER
1984                                          ;POLYNOMIAL 16-24
1985                                          ;
1986                                          ;TEST WILL SEND ONE CHARACTER AT
1987                                          ;A TIME CHECKING THAT THE BCC
1988                                          ;OF RECEIVER AND TRANSMITTER
1989                                          ;ARE CORRECT.
1990                                          ;CHARACTER SENT: 000-377
1991                                          ;
1992
1993                                  ;  TEST 21
1994                                  ;*************************************************************************
1995  007472  012737  000021  001226  TST21:  MOV     #21,TSTNO
1996  007500  012737  012364  001216          MOV     #.EOP,NEXT
1997                                          ;PART 1         READ/WRITE TEST OF POLY 16-24
1998                                          ;TEST OF ALL READ WRITE BITS IN POLY 16-24
1999                                          ;BY RUNNING A BINARY COUNT PATTERN TROUGH
2000                                          ;THE REGISTER.
2001
2002
2003  007506  012737  007520  001220          MOV     #1$,LOCK        ;SET FOR LOCK ON TEST(SW09=1)
2004  007514  005037  001254                  CLR     TEMP5           ;ZERO POINTER
2005  007520  104412                  1$:     MSTCLR                  ;INIT DQ11
2006  007522  112777  000012  171640          MOVB    #MISC.,@DQREG   ;SEL MISC REG
2007  007530  012777  000100  171634          MOV     #BIT6,@DQSEC    ;SEL POLY 16-24
2008  007536  112777  000017  171624          MOVB    #17,@DQREG      ;SEL POLY REGISTER
2009  007544  053777  001254  171620          BIS     TEMP5,@DQSEC    ;LOAD WITH CHAR.
2010  007552  017737  171614  001252          MOV     @DQSEC,TEMP4    ;READ CHAR BACK.
2011  007560  023737  001254  001252          CMP     TEMP5,TEMP4     ;IS IT CORRECT?
2012  007566  001401                          BEQ     .+4             ;BR IF YES.
2013  007570  104006                          HLT     6               ;POLY READ/WRITE ERROR.
2014  007572  104401                          SCOP1                   ;LOCK ON CHAR (SW09=1)
2015  007574  105237  001254                  INCB    TEMP5           ;UPDATE CHAR.
2016  007600  001347                          BNE     1$              ;BR IF MORE TO GO
2017
2018                                          ;PART 2         RX AND TX BCC TESTS
2019
2020  007602  005037  015344                  CLR     CALBCC          ;ZERO EXPECTED BCC
2021  007606  012737  007614  001220          MOV     #2$,LOCK        ;SET FOR SW09=1
2022  007614  104412                  2$:     MSTCLR                  ;INIT DQ11
2023  007616  012737  000200  015350          MOV     #200,XPOLY      ;SEL 'LRC 24''
2024  007624  004737  011456                  JSR     PC,TXBCC        ;GOTO SUBROUTINE
2025  007630  012705  000015                  MOV     #15,R5          ;SEL BCC REG
2026  007634  112777  000015  171526          MOVB    #'5,@DQREG      ;''''
2027  007642  017701  171524                  MOV     @DQSEC,R1       ;READ BCC REG.
```

```
2028  007646  023701  015344                  CMP     CALBCC,R1       ;IS BCC CORRECT?
2029  007652  001401                          BEQ     .+4             ;BR IF GOOD.
2030  007654  104002                          HLT     2               ;BCC ERROR.
2031  007656  012705  000016                  MOV     #16,R5          ;SEL BCC REG.
2032  007662  013701  015362                  MOV     SEC16,R1        ;GET SAVED BCC
2033  007666  023701  015344                  CMP     CALBCC,R1       ;DID IT COMPARE?
2034  007672  001401                          BEQ     .+4             ;BR IF GOOD.
2035  007674  104002                          HLT     2               ;BCC ERROR
2036  007676  013704  015344                  MOV     CALBCC,R4       ;SAVE GOOD BCC
2037  007702  005037  015344                  CLR     CALBCC          ;ZERO SOFTWARE BCC
2038  007706  112777  000012  171454          MOVB    #MISC.,@DQREG   ;SEL MISC REGISTER
2039  007714  042777  000100  171450          BIC     #BIT6,@DQSEC    ;SEL POLY 0-15
2040  007722  012705  000015                  MOV     #15,R5          ;SET FOR ERROR
2041  007726  110577  171436                  MOVB    R5,@DQREG       ;SEL BCC REG
2042  007732  017701  171434                  MOV     @DQSEC,R1       ;READ BCC
2043  007736  005701                          TST     R1              ;IS IT 0
2044  007740  001401                          BEQ     .+4             ;BR IF YES.
2045  007742  104002                          HLT     2               ;BCC NOT 0
2046  007744  012705  000016                  MOV     #16,R5
2047  007750  013701  015364                  MOV     SEC16X,R1
2048  007754  005701                          TST     R1
2049  007756  001401                          BEQ     .+4
2050  007760  104002                          HLT     2
2051  007762  010437  015344                  MOV     R4,CALBCC
2052  007766  112777  000012  171374          MOVB    #MISC.,@DQREG
2053  007774  005277  171372                  INC     @DQSEC
2054  010000  005377  171366                  DEC     @DQSEC
2055  010004  012705  000016                  MOV     #16,R5
2056  010010  110577  171354                  MOVB    R5,@DQREG
2057  010014  017701  171352                  MOV     @DQSEC,R1
2058  010020  000301                          SWAB    R1
2059  010022  023701  015344                  CMP     CALBCC,R1
2060  010026  001401                          BEQ     .+4
2061  010030  104002                          HLT     2
2062  010032  012737  000007  015352          MOV     #7,COUNT
2063  010040  112777  000012  171322          MOVB    #MISC.,@DQREG
2064  010046  005277  171320          3$:     INC     @DQSEC
2065  010052  005377  171314                  DEC     @DQSEC
2066  010056  005337  015352                  DEC     COUNT
2067  010062  001371                          BNE     3$
2068  010064  012705  000015                  MOV     #15,R5
2069  010070  110577  171274                  MOVB    R5,@DQREG
2070  010074  017701  171272                  MOV     @DQSEC,R1
2071  010100  000301                          SWAB    R1
2072  010102  023701  015344                  CMP     CALBCC,R1
2073  010106  001401                          BEQ     .+4
2074  010110  104002                          HLT     2
2075  010112  104401                          SCOP1
2076  010114  105237  015344                  INCB    CALBCC
2077  010120  001235                          BNE     2$
2078  010122  104413                          MEMCLR
2079  010124  104413                          MEMCLR
2080  010126  104400                          SCOPE
2081                                          ;
2082                                          ;USERS BCC RECEIVER TRANSMITTER TEST
2083                                          ;THIS TEST ALLOWS THE USER TO
```

```
2084                                        ;USE ANY POSSIBLE POLYNOMIAL
2085                                        ;OF HIS CHOICE.
2086                                        ;THE TEST USES THAT POLYNOMIAL
2087                                        ;ON A FOUR HUNDRED, EIGHT BIT,BINARY COUNT
2088                                        ;DATA PATTERN
2089                                        ;NOTE: THE BCC OF THE TRANSMITTER AND RECEIVER
2090                                        ;ARE NOT CHECKED FOR CORRECT CONTENT
2091                                        ;ONLY THAT THE HARDWARE DID NOT
2092                                        ;FLAG AN ERROR.
2093
2094  010130  012737  010130  001216  USEBCC: MOV     #USEBCC,NEXT
2095  010136  012737  010130  001214           MOV     #USEBCC,RETURN
2096  010144  104402                          TYPE
2097  010146  016470                          MPOLY
2098  010150  000000                          HALT
2099  010152  104414                          CKSWR                           ;CHECK FOR <^G>
2100  010154  017737  171020  015350           MOV     @SWR,XPOLY
2101  010162  004737  010202          2$:     JSR     PC,STBCC
2102  010166  017705  171174                  MOV     @DQERR,R5
2103  010172  005705                          TST     R5
2104  010174  100001                          BPL     .+4
2105  010176  104001                          HLT     1
2106  010200  000770                          BR      2$
2107
2108
2109
```

```
2110  010202  011637  015360          STBCC:  MOV     (SP),SAVEPC     ;SAVE PC OF ENTERING ROUTINE
2111  010206  104413                         MEMCLR
2112  010210  005000                         CLR     R0
2113  010212  012704  015376                 MOV     #TXBUFF,R4
2114  010216  110024                  1$:    MOVB    R0,(R4)+
2115  010220  105200                         INCB    R0
2116  010222  001375                         BNE     1$
2117  010224  105077  171140                 CLRB    @DQREG          ;SELECT THE RX BA PRI.
2118  010230  012777  016000  171134         MOV     #RXBUFF,@DQSEC  ;LOAD THE RX BA
2119  010236  112777  000121  171124         MOVB    #121,@DQREG     ;*ENTER T,WRITE ENABLE,RX CC,PRI.
2120  010244  012777  177400  171120         MOV     #-400,@DQSEC    ;SET RX CC FOR A TRANSFER OF 400 CHARS.
2121  010252  112777  000022  171110         MOVB    #22,@DQREG      ;WRITE ENABLE, TX BA PRI.
2122  010260  012777  015374  171104         MOV     #SYNC,@DQSEC    ;LOAD THE TX BA PRI.
2123  010266  112777  000023  171074         MOVB    #23,@DQREG      ;ENTER T,WRITE ENABLE,TX CC PRI.
2124  010274  012777  177776  171070         MOV     #-2,@DQSEC      ;SET TX CC FOR A TRANSFER OF 2 CHARS.
2125  010302  112777  000024  171060         MOVB    #24,@DQREG      ;WRITE ENABLE,RX BA SEC.
2126  010310  005077  171056                 CLR     @DQSEC          ;CLEAR THE RX BA SEC
2127  010314  112777  000065  171046         MOVB    #65,@DQREG      ;EXIT T,WRITE ENABLE,RX CC SEC.
2128  010322  012777  177777  171042         MOV#-1,@DQSEC           ;SET THE RX CC SEC FOR ONE PAD CHAR.
2129  010330  112777  000026  171032         MOVB    #26,@DQREG      ;WRITE ENABLE,TX BA SEC.
2130  010336  012777  015376  171026         MOV     #TXBUFF,@DQSEC
2131  010344  112777  000127  171016         MOVB    #127,@DQREG     ;EXIT T,WRITE ENABLE,TX CC SEC.
2132  010352  012777  177400  171012         MOV     #-400,@DQSEC
2133  010360  112777  000011  171002         MOVB    #11,@DQREG
2134  010366  013777  015372  170776         MOV     .SYNC,@DQSEC
2135  010374  112777  000017  170766         MOVB    #17,@DQREG
2136  010402  013777  015350  170762         MOV     XPOLY,@DQSEC
2137  010410  112777  000012  170752         MOVB    #MISC.,@DQREG
2138  010416  012777  004010  170746         MOV     #4010,@DQSEC
2139  010424  005037  001244                 CLR     TEMP1
2140  010430  005037  001246                 CLR     TEMP2
2141  010434  012777  010504  170712         MOV     #TXISR1,@DQTVEC
2142  010442  005077  170710                 CLR     @DQTLVL
2143  010446  012777  000001  170704         MOV     #1,@DQRCSR
2144  010454  012777  000041  170702         MOV     #41,@DQTCSR
2145  010462  005037  177776                 CLR     PS
2146  010466  105237  001244          2$:    INCB    TEMP1
2147  010472  001375                         BNE     2$
2148  010474  105237  001246                 INCB    TEMP2
2149  010500  001372                         BNE     2$
2150  010502  104000                         HLT
2151  010504  022626              4.7 TXISR1: CMP     (SP)+,(SP)+
2152  010506  042777  000040  170650  8.2         BIC     #BIT5,@DQTCSR
2153  010514  112777  000063  170646  7.6         MOVB    #63,@DQREG
2154  010522  005077  170644          6.1         CLR     @DQSEC
2155  010526  000240                  1.5         NOP
2156  010530  005037  001244          3.7         CLR     TEMP1
2157  010534  005037  001246          3.7         CLR     TEMP2
2158  010540  032777  000100  170612  7.7  1$:    BIT     #BIT6,@DQRCSR
2159  010546  001007                  2.6         BNE     ENDBCC
2160  010550  105237  001244          3.7         INCB    TEMP1
2161  010554  001371                  2.6         BNE     1$
2162  010556  105237  001246          3.7         INCB    TEMP2
2163  010562  001366                  2.6         BNE     1$
2164  010564  104000                  9.3         HLT                     ;RX SECONDARY DONE NOT SET.
2165  010566  000207              3.5 ENDBCC: RTS     PC
```

```
2166
2167
2168
2169  010570  010537  015360          SYNBCC: MOV     R5,SAVEPC       ;SAVE PC OF ENTERING ROUTINE
2170  010574  104412                          MSTCLR                  ;CLEAR THE DQ11
2171  010576  105077  170566                  CLRB    @DQREG          ;SELECT THE RX BA PRI.
2172  010602  012777  016000  170562          MOV     #RXBUFF,@DQSEC  ;LOAD THE RX BA
2173  010610  112777  000121  170552          MOVB    #121,@DQREG     ;*ENTER T,WRITE ENABLE,RX CC,PRI.
2174  010616  012577  170550                  MOV     (R5)+,@DQSEC    ;SET RX CC
2175  010622  112777  000022  170540          MOVB    #22,@DQREG      ;WRITE ENABLE, TX BA PRI.
2176  010630  012777  015376  170534          MOV     #TXBUFF,@DQSEC  ;LOAD THE TX BA PRI.
2177  010636  112777  000123  170524          MOVB    #123,@DQREG     ;ENTER T,WRITE ENABLE,TX CC PRI.
2178  010644  012577  170522                  MOV     (R5)+,@DQSEC    ;SET TX CC
2179  010650  112777  000024  170512          MOVB    #24,@DQREG      ;WRITE ENABLE,RX BA SEC.
2180  010656  012777  016000  170506          MOV     #RXBUFF,@DQSEC  ;LOAD THE RX BA SEC.
2181  010664  112777  000065  170476          MOVB    #65,@DQREG      ;EXIT T,WRITE ENABLE,RX CC SEC.
2182  010672  012777  177777  170472          MOV     #-1,@DQSEC      ;SET FOR ONE PAD CHARACTER.
2183  010700  112777  000026  170462          MOVB    #26,@DQREG      ;WRITE ENABLE,TX BA SEC.
2184  010706  005077  170460                  CLR     @DQSEC          ;CLEAR THE TX CC SEC
2185  010712  112777  000067  170450          MOVB    #67,@DQREG      ;EXIT T,WRITE ENABLE,TX CC SEC.
2186  010720  005077  170446                  CLR     @DQSEC          ;CLEAR THE TX CC SEC
2187  010724  112777  000011  170436          MOVB    #11,@DQREG
2188  010732  013777  015372  170432          MOV     .SYNC,@DQSEC
2189  010740  112777  000017  170422          MOVB    #17,@DQREG
2190  010746  013777  015350  170416          MOV     XPOLY,@DQSEC
2191  010754  112777  000012  170406          MOVB    #MISC.,@DQREG
2192  010762  012777  004010  170402          MOV     #4010,@DQSEC
2193  010770  005037  001244                  CLR     TEMP1
2194  010774  005037  001246                  CLR     TEMP2
2195  011000  052777  000003  170352          BIS     #3,@DQRCSR
2196  011006  052777  000002  170350          BIS     #2,@DQTCSR
2197  011014  032777  020000  170350  2$:     BIT     #BIT13,@DQSEC
2198  011022  001006                          BNE     3$
2199  011024  005237  001244                  INC     TEMP1
2200  011030  001371                          BNE     2$
2201  011032  005237  001246                  INC     TEMP2
2202  011036  001366                          BNE     2$
2203  011040  012777  000001  170316  3$:     MOV     #BIT0,@DQTCSR
2204  011046  005037  001244                  CLR     TEMP1
2205  011052  012737  000005  001246          MOV     #5,TEMP2
2206  011060  032777  000100  170272  4$:     BIT     #BIT6,@DQRCSR
2207  011066  001007                          BNE     ENDSYN
2208  011070  005237  001244                  INC     TEMP1
2209  011074  001371                          BNE     4$
2210  011076  005337  001246                  DEC     TEMP2
2211  011102  001366                          BNE     4$
2212  011104  104000                          HLT                     ;RECEIVER DONE SECONDARY NOT SET.
2213  011106  000205              ENDSYN:     RTS     R5
2214
2215
2216
2217  011110  011637  015360          TYBCC:  MOV     (SP),SAVEPC     ;SAVE PC OF ENTERING ROUTINE
2218  011114  104412                          MSTCLR          ;CLEAR THE DQ11
2219  011116  000240                          NOP
2220  011120  104412                          MSTCLR
2221  011122  012737  000351  015376          MOV     #351,TXBUFF
```

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2222  011130  012737  000011  015352          MOV     #9.,COUNT
2223  011136  105077  170226          1$:     CLRB    @DQREG          ;SELECT THE RX BA PRI.
2224  011142  012777  016000  170222          MOV     #RXBUFF,@DQSEC  ;LOAD THE RX BA
2225  011150  112777  000121  170212          MOVB    #121,@DQREG     ;*ENTER T,WRITE ENABLE,RX CC,PRI.
2226  011156  012777  177600  170206          MOV     #-200,@DQSEC    ;SET RX CC FOR A TRANSFER OF 1 CHARACTER.
2227  011164  112777  000022  170176          MOVB    #22,@DQREG      ;WRITE ENABLE, TX BA PRI.
2228  011172  012777  015376  170172          MOV     #TXBUFF,@DQSEC  ;LOAD THE TX BA PRI.
2229  011200  112777  000123  170162          MOVB    #123,@DQREG     ;ENTER T,WRITE ENABLE,TX CC PRI.
2230  011206  012777  177600  170156          MOV     #-200,@DQSEC    ;SET TX CC FOR A TRANSFER OF 1 CHARACTER.
2231  011214  112777  000024  170146          MOVB    #24,@DQREG      ;WRITE ENABLE,RX BA SEC.
2232  011222  005077  170144                  CLR     @DQSEC          ;CLEAR THE RX BA SEC
2233  011226  112777  000065  170134          MOVB    #65,@DQREG      ;EXIT T,WRITE ENABLE,RX CC SEC.
2234  011234  005077  170132                  CLR     @DQSEC          ;CLEAR THE RX CC SEC.
2235  011240  112777  000026  170122          MOVB    #26,@DQREG      ;WRITE ENABLE,TX BA SEC.
2236  011246  005077  170120                  CLR     @DQSEC          ;CLEAR THE TX CC SEC
2237  011252  112777  000067  170110          MOVB    #67,@DQREG      ;EXIT T,WRITE ENABLE,TX CC SEC.
2238  011260  005077  170106                  CLR     @DQSEC          ;CLEAR THE TX CC SEC
2239  011264  112777  000017  170076          MOVB    #17,@DQREG
2240  011272  013777  015350  170072          MOV     XPOLY,@DQSEC
2241  011300  112777  000012  170062          MOVB    #MISC.,@DQREG
2242  011306  012777  004012  170056          MOV     #4012,@DQSEC
2243  011314  052777  000001  170042          BIS     #BIT0,@DQTCSR           ;SET TRANSMITTER GO
2244  011322  027777  170036  170034          CMP     @DQTCSR,@DQTCSR ;WAIST TIME.
2245  011330  027777  170030  170026          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2246  011336  027777  170022  170020          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
2247  011344  005277  170022                  INC     @DQSEC          ;PRIM THE
2248  011350  005377  170016                  DEC     @DQSEC                  ;  TRANSMITTER.
2249  011354  042777  000200  170010          BIC     #BIT7,@DQSEC    ;CLEAR THE BIT WINDOW.
2250  011362  052777  010001  167770          BIS     #10001,@DQRCSR
2251  011370  005277  167776          2$:     INC     @DQSEC
2252  011374  005377  167772                  DEC     @DQSEC
2253  011400  005337  015352                  DEC     COUNT
2254  011404  001371                          BNE     2$
2255  011406  112777  000016  167754          MOVB    #16,@DQREG
2256  011414  017737  167752  015362          MOV     @DQSEC,SEC16
2257  011422  112777  000012  167740          MOVB    #MISC.,@DQREG
2258  011430  012737  000007  015352          MOV     #7.,COUNT
2259  011436  005277  167730          3$:     INC     @DQSEC
2260  011442  005377  167724                  DEC     @DQSEC
2261  011446  005337  015352                  DEC     COUNT
2262  011452  001371                          BNE     3$
2263  011454  000207                  ENDTY:  RTS     PC
2264
2265
2266
2267
2268
2269  011456  011637  015360          TXBCC:  MOV     (SP),SAVEPC     ;SAVE PC OF ENTERING ROUTINE
2270  011462  104412                          MSTCLR                  ;CLEAR THE DQ11
2271  011464  013737  015344  015376          MOV     CALBCC,TXBUFF
2272  011472  012737  000011  015352          MOV     #9.,COUNT
2273  011500  105077  167664          1$:     CLRB    @DQREG          ;SELECT THE RX BA PRI.
2274  011504  012777  016000  167660          MOV     #RXBUFF,@DQSEC  ;LOAD THE RX BA
2275  011512  112777  000121  167650          MOVB    #121,@DQREG     ;*ENTER T,WRITE ENABLE,RX CC,PRI.
2276  011520  012777  177777  167644          MOV     #-1,@DQSEC      ;SET RX CC FOR A TRANSFER OF 1 CHARACTER.
2277  011526  112777  000022  167634          MOVB    #22.@DQREG      ;WRITE ENABLE, TX BA PRI.
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```
 2278  011534  012777  015376  167630          MOV     #TXBUFF,@DQSEC  ;LOAD THE TX BA PRI.
 2279  011542  112777  000123  167620          MOVB    #123,@DQREG     ;ENTER T,WRITE ENABLE,TX CC PRI.
 2280  011550  012777  177777  167614          MOV     #-1,@DQSEC      ;SET TX CC FOR A TRANSFER OF 1 CHARACTER.
 2281  011556  112777  000024  167604          MOVB    #24,@DQREG      ;WRITE ENABLE,RX BA SEC.
 2282  011564  005077  167602                  CLR     @DQSEC          ;CLEAR THE RX BA SEC
 2283  011570  112777  000065  167572          MOVB    #65,@DQREG      ;EXIT T,WRITE ENABLE,RX CC SEC.
 2284  011576  005077  167570                  CLR     @DQSEC          ;CLEAR THE RX CC SEC.
 2285  011602  112777  000026  167560          MOVB    #26,@DQREG      ;WRITE ENABLE,TX BA SEC.
 2286  011610  005077  167556                  CLR     @DQSEC          ;CLEAR THE TX CC SEC
 2287  011614  112777  000067  167546          MOVB    #67,@DQREG      ;EXIT T,WRITE ENABLE,TX CC SEC.
 2288  011622  005077  167544                  CLR     @DQSEC          ;CLEAR THE TX CC SEC
 2289  011626  112777  000012  167534          MOVB    #MISC.,@DQREG
 2290  011634  012777  004112  167530          MOV     #4112,@DQSEC
 2291  011642  112777  000017  167520          MOVB    #17,@DQREG
 2292  011650  013777  015350  167514          MOV     XPOLY,@DQSEC
 2293  011656  112777  000012  167504          MOVB    #MISC.,@DQREG
 2294  011664  052777  000001  167472          BIS     #BIT0,@DQTCSR           ;SET TRANSMITTER GO
 2295  011672  027777  167466  167464          CMP     @DQTCSR,@DQTCSR ;WAIST TIME.
 2296  011700  027777  167460  167456          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
 2297  011706  027777  167452  167450          CMP     @DQTCSR,@DQTCSR ;WAIST TIME
 2298  011714  005277  167452                  INC     @DQSEC          ;PRIM THE
 2299  011720  005377  167446                  DEC     @DQSEC                  ;  TRANSMITTER.
 2300  011724  042777  000200  167440          BIC     #BIT7,@DQSEC    ;CLEAR THE BIT WINDOW.
 2301  011732  052777  010001  167420          BIS     #10001,@DQRCSR
 2302  011740  005277  167426          2$:     INC     @DQSEC
 2303  011744  005377  167422                  DEC     @DQSEC
 2304  011750  005337  015352                  DEC     COUNT
 2305  011754  001371                          BNE     2$
 2306  011756  042777  000100  167406          BIC     #BIT6,@DQSEC
 2307  011764  112777  000016  167376          MOVB    #16,@DQREG
 2308  011772  017737  167374  015364          MOV     @DQSEC,SEC16X
 2309  012000  112777  000012  167362          MOVB    #MISC.,@DQREG
 2310  012006  052777  000100  167356          BIS     #BIT6,@DQSEC
 2311  012014  112777  000016  167346          MOVB    #16,@DQREG
 2312  012022  017737  167344  015362          MOV     @DQSEC,SEC16
 2313  012030  112777  000012  167332          MOVB    #MISC.,@DQREG
 2314  012036  012737  000007  015352          MOV     #7.,COUNT
 2315  012044  005277  167322          3$:     INC     @DQSEC
 2316  012050  005377  167316                  DEC     @DQSEC
 2317  012054  005337  015352                  DEC     COUNT
 2318  012060  001371                          BNE     3$
 2319  012062  000207                  ENDTX:  RTS     PC
```

```
2320                                                    ;
2321                                                    ;BLOCK CHECK CHARACTER GENERATOR SIMULATOR.
2322                                                    ;
2323  012064  012537  001244          SIMBCC: MOV     (R5)+,TEMP1
2324  012070  012537  001246                  MOV     (R5)+,TEMP2
2325  012074  012537  001250                  MOV     (R5)+,TEMP3
2326  012100  005037  015346          1$:     CLR     BCCFBK
2327  012104  013700  001250                  MOV     TEMP3,R0
2328  012110  006037  001246                  ROR     TEMP2
2329  012114  005500                          ADC     R0
2330  012116  032700  000001                  BIT     #BIT0,R0
2331  012122  001402                          BEQ     2$
2332  012124  005137  015346                  COM     BCCFBK
2333  012130  013700  015350          2$:     MOV     XPOLY,R0
2334  012134  005100                          COM     R0
2335  012136  040037  015346                  BIC     R0,BCCFBK
2336  012142  000241                          CLC
2337  012144  006037  001250                  ROR     TEMP3
2338  012150  013700  015346                  MOV     BCCFBK,R0
2339  012154  013701  001250                  MOV     TEMP3,R1
2340  012160  010102                          MOV     R1,R2
2341  012162  040100                          BIC     R1,R0
2342  012164  043702  015346                  BIC     BCCFBK,R2
2343  012170  050200                          BIS     R2,R0
2344  012172  043737  015350  001250          BIC     XPOLY,TEMP3
2345  012200  050037  001250                  BIS     R0,TEMP3
2346  012204  005337  001244                  DEC     TEMP1
2347  012210  001333                          BNE     1$
2348  012212  013737  001250  015344          MOV     TEMP3,CALBCC
2349  012220  000205                          RTS     R5
2350
2351  012222                          .MEMCLR:
2352  012222  005077  167132                  CLR     @DQRCSR
2353  012226  005077  167132                  CLR     @DQTCSR
2354  012232  005077  167130                  CLR     @DQERR
2355  012236  012705  000020                  MOV     #16.,R5
2356  012242  152777  000020  167120  1$:     BISB    #BIT4,@DQREG
2357  012250  142777  000140  167112          BICB    #140,@DQREG
2358  012256  005077  167110                  CLR     @DQSEC
2359  012262  105277  167102                  INCB    @DQREG
2360  012266  005305                          DEC     R5
2361  012270  001364                          BNE     1$
2362  012272  105077  167072                  CLRB    @DQREG
2363  012276  105077  167060                  CLRB    @DQRCSH
2364  012302  012705  000020                  MOV     #16.,R5
2365  012306  112777  000010  167054  2$:     MOVB    #10,@DQREG
2366  012314  005077  167052                  CLR     @DQSEC
2367  012320  112777  000014  167042          MOVB    #14,@DQREG
2368  012326  005077  167040                  CLR     @DQSEC
2369  012332  105277  167024                  INCB    @DQRCSH
2370  012336  005305                          DEC     R5
2371  012340  001362                          BNE     2$
2372  012342  105077  167014                  CLRB    @DQRCSH
2373  012346                          .MSTCLR:
2374  012346  112777  000012  167014          MOVB    #^!SC,@DQREG
2375  012354  012777  000040  167010          MOV     #BIT5,@DQSEC
```

```
2376  012362  000002                          RTI
2377
2378
2379
2380
2381                                          ;END OF PASS
2382                                          ;TYPE NAME OF TEST
2383                                          ;UPDATE PASS COUNT
2384                                          ;CHECK FOR EXIT TO ACT-11
2385                                          ;RESTART TEST
2386
2387  012364  005037  001234        .EOP:   CLR     LSTERR                  ;CLEAR LAST ERROR PC
2388  012370  005037  001312                CLR     ERRFLG                  ;CLEAR ERROR FLAG
2389  012374  005237  001230                INC     PASCNT                  ;UPDATE PASS COUNT
2390  012400  104402                        TYPE
2391  012402  014614                        MEPASS
2392  012404  104402                        TYPE
2393  012406  014775                        MCSRX
2394  012410  104411                        CNVRT
2395  012412  012522                        XCSR
2396  012414  104402                        TYPE
2397  012416  015003                        MVECX
2398  012420  104411                        CNVRT
2399  012422  012530                        XVEC
2400  012424  104402                        TYPE
2401  012426  015011                        MPASSX
2402  012430  104411                        CNVRT
2403  012432  012536                        XPASS
2404  012434  104402                        TYPE
2405  012436  015022                        MERRX
2406  012440  104411                        CNVRT
2407  012442  012544                        XERR
2408  012444  013777  001230  166530        MOV     PASCNT,@LIGHTS          ;DISPLAY PASS COUNT
2409  012452  005337  001276                DEC     SAVNUM
2410  012456  001013                        BNE     RESTRT
2411  012460  013737  001504  001276        MOV     DONUM,SAVNUM
2412  012466  013701  000042                MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
2413  012472  001405                        BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
2414  012474  000005                        RESET
2415  012476                        LOGICAL:
2416  012476  004711                        JSR     PC,(R1)
2417  012500  000240                        NOP
2418  012502  000240                        NOP
2419  012504  000240                        NOP
2420  012506  104414                RESTRT: CKSWR
2421  012510  012737  002254  001214        MOV     #TST1,RETURN
2422  012516  000137  002254                JMP     TST1
2423  012522  000001                XCSR:   1
2424  012524     006     002                .BYTE   6,2
2425  012526  001360                        DORCSR
2426  012530  000001                XVEC:   1
2427  012532     003     002                .BYTE   3,2
2428  012534  001350                        DORVEC
2429  012536  000001                XPASS:  1
2430  012540     006     002                .BYTE   6,2
2431  012542  001230                        PASCNT
```

```
                                        END OF PASS ROUTINE

012544  000001                  XERR:   1
012546     006     002                  .BYTE   6,2
012550  001232                          ERRCNT

                                        ;SCOPE LOOP AND INTERATION HANDLER

012552  104414                  .SCOPE: CKSWR
012554  032777  040000  166416          BIT     #BIT14,@SWR
012562  001407                  TTST:   BEQ     1$
012564  000432                          BR      3$
012566  105777  166412                  TSTB    @TKCSR
012572  100027                          BPL     3$
012574  017700  166406                  MOV     @TKDBR,R0
012600  000412                          BR      2$
012602  032777  004000  166370  1$:     BIT     #SW11,@SWR
012610  001006                          BNE     2$
012612  005237  001224                  INC     LPCNT
012616  023737  001224  001222          CMP     LPCNT,ICOUNT
012624  001012                          BNE     3$
012626  105037  001312          2$:     CLRB    ERRFLG
012632  005037  001224                  CLR     LPCNT
012636  012737  000011  001222          MOV     #9.,ICOUNT
012644  013737  001216  001214          MOV     NEXT,RETURN
012652  013716  001214          3$:     MOV     RETURN,(SP)
012656  000002                          RTI
012660  001407                  BRW:    1407
012662  000432                  BRX:    432

                                        ;CHECK FOR FREEZE ON CURRENT DATA

012664  104414                  .SCOP1: CKSWR
012666  032777  001000  166304          BIT     #SW09,@SWR
012674  001402                          BEQ     1$
012676  013716  001220                  MOV     LOCK,(SP)
012702  000002                  1$:     RTI

                                        ;TELETYPE OUTPUT ROUTINE

012704  010546                  .TYPE:  MOV     R5,-(SP)
012706  017605  000002                  MOV     @2(SP),R5
012712  062766  000002  000002          ADD     #2,2(SP)
012720  005737  014374          1$:     TST     @#RDSW
012724  001004                          BNE     300$
012726  032777  010000  166244          BIT     #SW12,@SWR
012734  001024                          BNE     3$
012736  105715                  300$:   TSTB    (R5)
012740  100014                          BPL     2$
012742  105777  166242                  TSTB    @TPCSR
012746  100375                          BPL     .-4
012750  012777  000015  166234          MOV     #15,@TPDBR
012756  105777  166226                  TSTB    @TPCSR
012762  100375                          BPL     .-4
012764  012777  000012  166220          MOV     #12,@TPDBR
012772  105777  166212          2$:     TSTB    @TPCSR
012776  100375                          BPL     2$
013000  112577  166206                  MOVB    (R5)+,@TPDBR
```

```
2488  013004  001345                        BNE     1$
2489  013006  012605                3$:     MOV     (SP)+,R5
2490  013010  000002                        RTI
2491
2492                                        ;ASCII STRING INPUT ROUTINE
2493
2494  013012  010346                .INSTR: MOV     R3,-(SP)
2495  013014  010446                        MOV     R4,-(SP)
2496  013016  017637  000004 013034        MOV     @4(SP),.MSG
2497  013024  062766  000002 000004        ADD     #2,4(SP)
2498  013032  104402                .INST1: TYPE
2499  013034  000000                .MSG:   0
2500  013036  012704  015166                MOV     #INBUF,R4
2501  013042  012703  000007                MOV     #7,R3
2502  013046  105777  166132        1$:     TSTB    @TKCSR
2503  013052  100375                        BPL     1$
2504  013054  117714  166126                MOVB    @TKDBR,(R4)
2505  013060  142714  000200                BICB    #200,(R4)
2506  013064  121427  000025                CMPB    (R4),#25                ;IS IT <^G>
2507  013070  001003                        BNE     200$
2508  013072  104402  014554                TYPE,MCRLF
2509  013076  000755                        BR      .INST1
2510  013100  122427  000015        200$:   CMPB    (R4)+,#15
2511  013104  001423                        BEQ     INSTR2
2512  013106  117777  166074 166076        MOVB    @TKDBR,@TPDBR
2513  013114  105777  166070        2$:     TSTB    @TPCSR
2514  013120  100375                        BPL     2$
2515  013122  005303                        DEC     R3
2516  013124  001350                        BNE     1$
2517  013126  000402                        BR      .INSTG
2518  013130  010346                .INSTE: MOV     R3,-(SP)
2519  013132  010446                        MOV     R4,-(SP)
2520  013134  104402                .INSTG: TYPE
2521  013136  014550                        MQM
2522  013140  005737  014374                TST     @#RDSW
2523  013144  001402                        BEQ     400$
2524  013146  104402  014554                TYPE,MCRLF
2525  013152  000727                400$:   BR      .INST1
2526  013154  012604                INSTR2: MOV     (SP)+,R4
2527  013156  012603                        MOV     (SP)+,R3
2528  013160  000002                        RTI
2529
2530                                        ;CONVERT ASCII STRING TO OCTAL
2531
2532  013162  010546                .PARAM: MOV     R5,-(SP)
2533  013164  010446                        MOV     R4,-(SP)
2534  013166  016605  000004                MOV     4(SP),R5
2535  013172  012537  013366                MOV     (R5)+,LOLIM
2536  013176  012537  013370                MOV     (R5)+,HILIM
2537  013202  012537  013372                MOV     (R5)+,DEVADR
2538  013206  112537  013374                MOVB    (R5)+,LOBITS
2539  013212  112537  013375                MOVB    (R5)+,ADRCNT
2540  013216  010566  000004                MOV     R5,4(SP)
2541  013222  005005                PARAM1: CLR     R5
2542  013224  012704  015166                MOV     #^MBUF,R4
2543  013230  122714  000015                CMPB    #15,(R4)
```

```
2544  013234  001420                    BEQ     PARERR
2545  013236  121427  000060    1$:     CMPB    (R4),#60
2546  013242  002415                    BLT     PARERR
2547  013244  121427  000067            CMPB    (R4),#67
2548  013250  003012                    BGT     PARERR
2549  013252  142714  000060            BICB    #60,(R4)
2550  013256  152405                    BISB    (R4)+,R5
2551  013260  122714  000015            CMPB    #15,(R4)
2552  013264  001414                    BEQ     LIMITS
2553  013266  006305                    ASL     R5
2554  013270  006305                    ASL     R5
2555  013272  006305                    ASL     R5
2556  013274  000760                    BR      1$
2557  013276  122714  000015    PARERR: CMPB    #15,(R4)        ;IS FIRST CHARACTER A <CR>
2558  013302  001003                    BNE     120$
2559  013304  005737  014374            TST     @#RDSW          ;IS CKSWR ROUTINE BEING USED
2560  013310  001023                    BNE     PARTI
2561  013312  104404              120$: INSTER
2562  013314  000742                    BR      PARAM1
2563
2564                                    ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
2565
2566  013316  020537  013370    LIMITS: CMP     R5,HILIM
2567  013322  101365                    BHI     PARERR
2568  013324  020537  013366            CMP     R5,LOLIM
2569  013330  103762                    BLO     PARERR
2570  013332  133705  013374            BITB    LOBITS,R5
2571  013336  001357                    BNE     PARERR
2572
2573                                    ;STORE NUMBER AT SPECIFIED ADDRESS
2574
2575  013340  013704  013372            MOV     DEVADR,R4
2576  013344  010524              1$:   MOV     R5,(R4)+
2577  013346  062705  000002            ADD     #2,R5
2578  013352  105337  013375            DECB    ADRCNT
2579  013356  001372                    BNE     1$
2580  013360  012604              PARTI: MOV     (SP)+,R4
2581  013362  012605                    MOV     (SP)+,R5
2582  013364  000002                    RTI
2583  013366  000000              LOLIM: 0
2584  013370  000000              HILIM: 0
2585  013372  000000              DEVADR: 0
2586  013374  000000              LOBITS: 0
2587          013375              ADRCNT=LOBITS+1
2588
2589                                    ;SAVE PC OF TEST THAT FAILED AND R0-R5
2590
2591  013376  016637  000004  001274 .SAV05: MOV     4(SP),SAVPC
2592
2593                                    ;SAVE R0-R5
2594
2595  013404  010537  001270    SV05:   MOV     R5,SAVR5
2596  013410  010437  001266            MOV     R4,SAVR4
2597  013414  010337  001264            MOV     R3,SAVR3
2598  013420  010237  001262            MOV     R2,SAVR2
2599  013424  010137  001260            MOV     R1,SAVR1
```

```
2600  013430  010037  001256              MOV     R0,SAVR0
2601  013434  000002                      RTI
2602
2603                                      ;RESTORE R0-R5
2604
2605  013436  013700  001256      .RES05: MOV     SAVR0,R0
2606  013442  013701  001260              MOV     SAVR1,R1
2607  013446  013702  001262              MOV     SAVR2,R2
2608  013452  013703  001264              MOV     SAVR3,R3
2609  013456  013704  001266              MOV     SAVR4,R4
2610  013462  013705  001270              MOV     SAVR5,R5
2611  013466  000002                      RTI
2612
2613                                      ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
2614
2615  013470  104402              .CONVR: TYPE
2616  013472  014554                      MCRLF
2617  013474  010046              .CNVRT: MOV     R0,-(SP)
2618  013476  010146                      MOV     R1,-(SP)
2619  013500  010346                      MOV     R3,-(SP)
2620  013502  010446                      MOV     R4,-(SP)
2621  013504  010546                      MOV     R5,-(SP)
2622  013506  017601  000012              MOV     @12(SP),R1
2623  013512  013737  015230  001250      MOV     TEMP,TEMP3
2624  013520  062766  000002  000012      ADD     #2,12(SP)
2625  013526  012137  013710              MOV     (R1)+,WRDCNT
2626  013532  112137  013712      1$:     MOVB    (R1)+,CHRCNT
2627  013536  112137  013713              MOVB    (R1)+,SPACNT
2628  013542  013137  013714              MOV     @(R1)+,BINWRD
2629  013546  013704  013714      2$:     MOV     BINWRD,R4
2630  013552  113705  013712              MOVB    CHRCNT,R5
2631  013556  012700  015230              MOV     #TEMP,R0
2632  013562  010403              3$:     MOV     R4,R3
2633  013564  042703  177770              BIC     #177770,R3
2634  013570  062703  000060              ADD     #060,R3
2635  013574  110320                      MOVB    R3,(R0)+
2636  013576  000241                      CLC
2637  013600  006004                      ROR     R4
2638  013602  000241                      CLC
2639  013604  006004                      ROR     R4
2640  013606  000241                      CLC
2641  013610  006004                      ROR     R4
2642  013612  005305                      DEC     R5
2643  013614  001362                      BNE     3$
2644  013616  012703  015272              MOV     #MDATA,R3
2645  013622  114023              4$:     MOVB    -(R0),(R3)+
2646  013624  105337  013712              DECB    CHRCNT
2647  013630  001374                      BNE     4$
2648  013632  105737  013713              TSTB    SPACNT
2649  013636  001405                      BEQ     6$
2650  013640  112723  000040      5$:     MOVB    #040,(R3)+
2651  013644  105337  013713              DECB    SPACNT
2652  013650  001373                      BNE     5$
2653  013652  105013              6$:     CLRB    (R3)
2654  013654  104402                      TYPE
2655  013656  015272                      MDATA
```

```
2656  013660  005337  013710                    DEC     WRDCNT
2657  013664  001322                            BNE     1$
2658  013666  013737  001250  015230            MOV     TEMP3,TEMP
2659  013674  012605                            MOV     (SP)+,R5
2660  013676  012604                            MOV     (SP)+,R4
2661  013700  012603                            MOV     (SP)+,R3
2662  013702  012601                            MOV     (SP)+,R1
2663  013704  012600                            MOV     (SP)+,R0
2664  013706  000002                            RTI
2665  013710  000000                    WRDCNT: 0
2666  013712  000000                    CHRCNT: 0
2667          013713                    SPACNT=CHRCNT+1
2668  013714  000000                    BINWRD: 0
2669                                            ;TRAP DISPATCH SERVICE
2670                                            ;ARGUMENT OF TRAP IS EXTRACTED
2671                                            ;AND USED AS OFFSET TO OBTAIN POINTER
2672                                            ;TO SELECTED SUBROUTINE
2673
2674  013716  011646                    .TRPSR: MOV     (SP),-(SP)              ;GET PC OF RETURN
2675  013720  162716  000002                    SUB     #2,(SP)                 ;=PC OF TRAP
2676  013724  017616  000000                    MOV     @(SP),(SP)              ;GET TRP
2677  013730  006316                    TRPOK:  ASL     (SP)                    ;MULTIPLY TRAP ARG BY 2
2678  013732  042716  177001                    BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
2679  013736  062716  001314                    ADD     #.TRPTAB,(SP)           ;POINTER TO SUBROUTINE ADDRESS
2680  013742  017616  000000                    MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
2681  013746  000136                            JMP     @(SP)+                  ;GO TO SUBROUTINE
2682
2683                                            ;ERROR HANDLER
2684
2685  013750  104414                    .HLT:   CKSWR
2686  013752  032777  010000  165220            BIT     #SW12,@SWR
2687  013760  001406                            BEQ     XBX
2688  013762  105777  165222                    TSTB    @TPCSR
2689  013766  100003                            BPL     XBX
2690  013770  112777  000207  165214            MOVB    #207,@TPDBR
2691  013776  032777  020000  165174    XBX:    BIT     #SW13,@SWR
2692  014004  001074                            BNE     HALTS
2693  014006  021637  001234                    CMP     (SP),LSTERR
2694  014012  001404                            BEQ     1$
2695  014014  011637  001234                    MOV     (SP),LSTERR
2696  014020  105037  001312                    CLRB    ERRFLG
2697  014024  104406                    1$:     SAV05
2698  014026  011605                            MOV     (SP),R5
2699  014030  162705  000002                    SUB     #2,R5
2700  014034  011504                            MOV     (R5),R4
2701  014036  006304                            ASL     R4
2702  014040  061504                            ADD     (R5),R4
2703  014042  006304                            ASL     R4
2704  014044  042704  177001                    BIC     #177001,R4
2705  014050  062704  016402                    ADD     #.ERRTAB,R4
2706  014054  012437  014146                    MOV     (R4)+,ERRMSG
2707  014060  012437  014160                    MOV     (R4)+,DATAHD
2708  014064  011437  014172                    MOV     (R4),DATABP
2709  014070  105737  001312                    TSTB    ERRFLG
2710  014074  001403                            BEQ     TYPMSG
2711  014076  005737  014172                    TST     DATABP
```

```
2712  014102  001027                          BNE     TYPDAT
2713  014104  104402                  TYPMSC: TYPE
2714  014106  015033                          MTSTN
2715  014110  104411                          CNVRT
2716  014112  014272                          XTSTN
2717  014114  104402                          TYPE
2718  014116  015121                          MERRPC
2719  014120  104411                          CNVRT
2720  014122  014264                          ERTABO
2721  014124  104402                          TYPE
2722  014126  014554                          MCRLF
2723  014130  112737  177777  001312          MOVB    #-1,ERRFLG
2724  014136  005737  014146                  TST     ERRMSG
2725  014142  001402                          BEQ     WRKO.FM
2726  014144  104402                          TYPE
2727  014146  000000                  ERRMSG: 0
2728  014150                          WRKO.FM:
2729  014150  005737  014160                  TST     DATAHD
2730  014154  001402                          BEQ     TYPDAT
2731  014156  104402                          TYPE
2732  014160  000000                  DATAHD: 0
2733  014162  005737  014172          TYPDAT: TST     DATABP
2734  014166  001402                          BEQ     RESREG
2735  014170  104410                          CONVRT
2736  014172  000000                  DATABP: 0
2737  014174  104407                  RESREG: RES05
2738  014176  005777  164776          HALTS:  TST     @SWR
2739  014202  100005                          BPL     EXITER
2740  014204  010046                          PUSHR0
2741  014206  016600  000002                  MOV     2(SP),R0
2742  014212  000000                          HALT
2743  014214  012600                          POPR0
2744  014216  104414                  EXITER: CKSWR
2745  014220  005237  001232                  INC     ERRCNT
2746  014224  032777  000400  164746          BIT     #SW08,@SWR
2747  014232  001007                          BNE     1$
2748  014234  032777  002000  164736          BIT     #SW10,@SWR
2749  014242  001407                          BEQ     2$
2750  014244  013737  001216  001214          MOV     NEXT,RETURN
2751  014252  012706  001200          1$:     MOV     #STACK,SP
2752  014256  000177  164732                  JMP     @RETURN
2753  014262  000002                  2$:     RTI
2754  014264  000001                  ERTABO: 1
2755  014266     006     002                  .BYTE   6,2
2756  014270  001274                          SAVPC
2757  014272  000001                  XTSTN:  1
2758  014274     003     002                  .BYTE   3,2
2759  014276  001226                          TSTNO
2760                                          ;ENTER HERE ON POWER FAILURE
2761
2762
2763  014300                          .PFAIL:
2764  014300  012737  014312  000024          MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
2765  014306  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
2766  014310  000777                          BR      .
2767
```

```
2768                                        ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
2769
2770  014312                        RESTAR:
2771  014312  012737  014300  000024        MOV     #.PFAIL,24              ;SET UP FOR POWER FAILURE
2772  014320  012706  001200              MOV     #STACK,SP
2773  014324  005037  015230              CLR     TEMP
2774  014330  005237  015230              INC     TEMP
2775  014334  001375                      BNE     .-4
2776  014336  104402                      TYPE
2777  014340  014556                      MPFAIL
2778  014342  104411                      CNVRT
2779  014344  014366                      PFTAB
2780  014346  005037  001312              CLR     ERRFLG
2781  014352  005037  001234              CLR     LSTERR
2782  014356  104412                      MSTCLR
2783  014360  104413                      MEMCLR
2784  014362  000177  164626              JMP     @RETURN
2785  014366  000001                PFTAB:  1
2786  014370     003     002          .BYTE   3,2
2787  014372  001226                      TSTNO
2788
2789
2790                                        ;CHECK SWITCH REGISTER ROUTINE. CHECKS FOR ^G TO ALLOW CHANGING
2791                                        ;OF LOC.176.
2792                                        ;LOCATIONS USED:
2793  014374  000000                RDSW:   .WORD   0
2794
2795
2796  014376  005737  000042        .CKSWR: TST     @#42
2797  014402  001042                      BNE     OUT
2798  014404  022737  000176  001200      CMP     #SWREG,SWR      ;SOFTWARE SWITCH REGISTER PRESENT
2799  014412  001036                      BNE     OUT             ;NO, GET OUT
2800  014414  105777  164564              TSTB    @TKCSR          ;YES,WAIT FOR
2801  014420  100033                      BPL     OUT             ;READY, GET CHARACTER
2802  014422  017737  164560  013034      MOV     @TKDBR,.MSG     ;AND STRIP OFF
2803  014430  042737  177600  013034      BIC     #177600,.MSG    ;THE GARBAGE
2804  014436  122737  000007  013034      CMPB    #7,.MSG         ;IS IT A <^G>
2805  014444  001021                      BNE     OUT
2806  014446  104402  014524              TYPE,$CNTG
2807  014452  005137  014374        .CNTLU: COM     @#RDSW
2808  014456  104402  014530              TYPE,$MSWR
2809  014462  104411  014516              CNVRT,SWREGC
2810  014466  104403  014537              INSTR,$MNEW
2811  014472  104405                      PARAM
2812  014474  000000                      0
2813  014476  177777                      177777
2814  014500  000176                      SWREG
2815  014502     000     001          .BYTE           0,1
2816  014504  104402  014554              TYPE,MCRLF
2817  014510  005037  014374        OUT:    CLR     @#RDSW
2818  014514  000002                      RTI
2819  014516  000001                SWREGC: 1
2820  014520     006     002          .BYTE   6,2
2821  014522  000176                      SWREG
2822  014524  057377  000107        $CNTG:  .ASCIZ  <377>/^G/
2823  014530  051777  051127  020075  $MSWR:  .ASCIZ  <377>/SWR- /
```

```
2824  014536  000
2825  014537  040  047040  053505  SMNEW:  .ASCIZ  /  NEW= /
2826  014544  020075  000
2827  014550  .EVEN
2828  014550  020040  000077  MQM:    .ASCIZ  /  ?/
2829  014554  000377  MCRLF:  .ASCIZ  <377>
2830  014556  050377  051127  043040  MPFAIL: .ASCIZ  <377>/PWR FAILED. RESTART AT TEST /
2831  014564  044501  042514  027104
2832  014572  051040  051505  040524
2833  014600  052122  040440  020124
2834  014606  042524  052123  000040
2835  014614  042777  042116  050040  MEPASS: .ASCIZ  <377>/END PASS CZDQE  /
2836  014622  051501  020123  055103
2837  014630  050504  020105  000040
2838  014636  051377  000  MR:     .ASCIZ  <377>/R/
2839  014641  377  051120  043517  MERR2:  .ASCIZ  <377>/PROGRAM INDICATES NO DEVICES PRESENT./
2840  014646  040522  020115  047111
2841  014654  044504  040503  042524
2842  014662  020123  047516  042040
2843  014670  053105  041511  051505
2844  014676  050040  042522  042523
2845  014704  052116  000056
2846  014710  044777  051516  043125  MERR3:  .ASCIZ  <377>/INSUFFICIENT DATA!/
2847  014716  044506  044503  047105
2848  014724  020124  040504  040524
2849  014732  000041
2850  014734  052377  051505  020124  MTSTPC: .ASCIZ  <377>/TEST PC-/
2851  014742  041520  000055
2852  014746  046377  041517  020113  MLOCK:  .ASCIZ  <377>/LOCK ON SELECTED TEST/
2853  014754  047117  051440  046105
2854  014762  041505  042524  020104
2855  014770  042524  052123  000
2856  014775  103  051123  020072  MCSRX:  .ASCIZ  /CSR: /
2857  015002  000
2858  015003  126  041505  020072  MVECX:  .ASCIZ  /VEC: /
2859  015010  000
2860  015011  120  051501  042523  MPASSX: .ASCIZ  /PASSES: /
2861  015016  035123  000040
2862  015022  051105  047522  051522  MERRX:  .ASCIZ  /ERRORS: /
2863  015030  020072  000
2864  015033  377  052377  051505  MTSTN:  .ASCIZ  <377><377> /TEST NO: /
2865  015040  020124  047516  020072
2866  015046  000
2867  015047  377  042523  020124  MNEW:   .ASCIZ  <377>/SET SWITCH REG TO DQ11'S DESIRED ACTIVE./
2868  015054  053523  052111  044103
2869  015062  051040  043505  052040
2870  015070  020117  050504  030461
2871  015076  051447  042040  051505
2872  015104  051111  042105  040440
2873  015112  052103  053111  027105
2874  015120  000
2875  015121  120  035103  000040  MERRPC: .ASCIZ  /PC: /
2876  015126  046777  050101  047440  XHEAD:  .ASCIZ  <377>/MAP OF DQ11 STATUS/<377>
2877  015134  020106  050504  030461
2878  015142  051440  040524  052524
2879  015150  177523  000
```

```
2880            015154                  .EVEN
2881  015154   000002                   XSTATC: 2
2882  015156      006       003                .BYTE   6,3
2883  015160   001244                          TEMP1
2884  015162      006       002                .BYTE   6,2
2885  015164   001246                          TEMP2
2886                                    .EVEN
2887
2888                                            ;BUFFERS FOR INPUT-OUTPUT
2889
2890  015166   000000                   INBUF:  0
2891            015230                  . .+40
2892  015230   000000                   TEMP:   0
2893            015272                  . .+40
2894  015272   000000                   MDATA:  0
2895            015334                  .-.+40
2896
2897
2898  015334   000010                   CHRLNG: 10
2899  015336   000351                   DATAIN: 351
2900  015340   000000                   TMPDAT: 0
2901  015342   000000                   BCCPRV: 0
2902  015344   000000                   CALBCC: 0
2903  015346   000000                   BCCFBK: 0
2904  015350   000000                   XPOLY:  0
2905  015352   000000                   COUNT:  0
2906  015354   000000                   DATA:   0
2907  015356   000000                   SAVBCC: 0
2908  015360   000000                   SAVEPC: 0
2909  015362   000000                   SEC16:  0
2910  015364   000000                   SEC16X: 0
2911  015366   000000                   STORE1: 0
2912  015370   000000                   LOC1:   0
2913  015372      026       026        .SYNC:  .BYTE   26,26
2914  015374      026       026        SYNC:   .BYTE   26,26
2915  015376   000000                   TXBUFF: 0
2916            016000                          .=.+400
2917  016000   000000                   RXBUFF: 0
2918            016402                          .=.+400
2919  016402   000000                   .ERRTA: 0
2920  016404   000000                           0          ;HALT 0
2921  016406   000000                           0
2922  016410   000000                           0
2923  016412   017026                           DH0        ;HALT 1
2924  016414   017402                           DT0
2925  016416   000000                           C
2926  016420   017052                           DH1        ;HALT 2
2927  016422   017414                           DT1
2928  016424   016635                           EM0
2929  016426   017122                           DH2        ;HALT 3
2930  016430   017436                           DT2
2931  016432   016730                           EM2
2932  016434   017234                           DH4        ;HALT 4
2933  016436   017506                           DT4
2934  016440   016664                           EM1
2935  016442   017201                           DH3        ;HALT 5
```

```
2936  016444  017470                          DT3
2937  016446  016664                          EM1
2938  016450  017310                          DH5     ;HALT 6
2939  016452  017520                          DT5
2940  016454  016745                          EM3
2941  016456  017352                          DH6     ;HALT   7
2942  016460  017542                          DT6
2943  016462  016772                          EM4                                                    ;;++E
2944  016464  000000                          0       ;HALT 10
2945  016466  000000                          0
2946  016470  050377  042514  051501  MPOLY:  .ASCII  <377>/PLEASE SET SWITCH REGISTER TO POLYNOMIAL YOU DESIRE /
      016555     377  047524  041040          .ASCIZ  <377>/TO BE PLACED INTO POLYNOMIAL REGISTER OF DQ11./
      016635     377  040503  041514  EM0:    .ASCIZ  <377>/CALCULATED BCC ERROR./
      016664  046777  046505  051117  EM1:    .ASCIZ  <377>/MEMORY TRANSFER TEST  *DATA ERROR*/
      016730  041777  041101  042514  EM2:    .ASCIZ  <377>/CABLE TEST /
      016745     377  050504  030461  EM3:    .ASCIZ  <377>/DQ11 ERROR FLAG SET/
      016772  051377  041130  041503  EM4:    .ASCIZ  <377>/RXBCC ERROR BIT6 NOT CLEAR/              ;;++E
      017026  050377  046117  047131  DH0:    .ASCIZ <377>/POLYNOMIAL   DQERR/
      017052  050377  046117  047131  DH1:    .ASCIZ <377>/POLYNO   EXPECTED   RECEIVED   SEC REG/
      017122  050377  046117  047131  DH2:    .ASCIZ  <377>/POLYNO  CHAR  SHIFTS  EXPECTED  RECEIVED  REG/
      017201     377  042101  051104  DH3:    .ASCIZ  <377>/ADDRESS  EXPECTED  FOUND /
      017234  042377  052101  020101  DH4:    .ASCII  <377>/DATA COMPARISON ERROR /
      017263     377  054105  042520          .ASCIZ  <377>/EXPECTED   RECEIVED/
      017310  052377  020130  042101  DH5:    .ASCIZ  <377>/TX ADD  RX ADD  EXPECTED  FOUND /
      017352  042377  051121  051503  DH6:    .ASCIZ  <377>/DQRCSR  DQTCSR  DQERR /
                                      .EVEN
      017402  000002                  DT0:    2
2947  017404     006       007        .BYTE   6,7
2948  017406  015350                          XPOLY
2949  017410     006       001        .BYTE   6,1
2950  017412  001270                          SAVR5
2951  017414  000004                  DT1:    4
2952  017416     006       003        .BYTE   6,3
2953  017420  015350                          XPOLY
2954  017422     006       005        .BYTE   6,5
2955  017424  015344                          CALBCC
2956  017426     006       005        .BYTE   6,5
2957  017430  001260                          SAVR1
2958  017432     002       001        .BYTE   2,1
2959  017434  001270                          SAVR5
2960  017436  000006                  DT2:    6
2961  017440     006       002        .BYTE   6,2
2962  017442  015350                          XPOLY
2963  017444     003       003        .BYTE   3,3
2964  017446  015354                          DATA
2965  017450     002       006        .BYTE   2,6
2966  017452  015352                          COUNT
2967  017454     006       004        .BYTE   6,4
2968  017456  015344                          CALBCC
2969  017460     006       004        .BYTE   6,4
2970  017462  001252                          TEMP4
2971  017464     002       002        .BYTE   2,2
2972  017466  001254                          TEMP5
2973  017470  000003                  DT3:    3
2974  017472     006       003                .BYTE   6,3
2975  017474  001256                          SAVR0
```

```
017476     006     004            .BYTE   6,4
017500  001254                    TEMP5
017502     006     002            .BYTE   6,2
017504  001252                    TEMP4
017506  000002           DT4:     2
017510     006     004   .BYTE    6,4
017512  001254                    TEMP5
017514     006     002   .BYTE    6,2
017516  001252                    TEMP4
017520  000004           DT5:     4
017522     006     002            .BYTE   6,2
017524  001256                    SAVR0
017526     006     002            .BYTE   6,2
017530  001260                    SAVR1
017532     006     004            .BYTE   6,4
017534  001254                    TEMP5
017536     006     002            .BYTE   6,2
017540  001252                    TEMP4
017542  000003           DT6:     3
017544     006     002            .BYTE   6,2
017546  001256                    SAVR0
017550     006     002            .BYTE   6,2
017552  001260                    SAVR1
017554     006     002            .BYTE   6,2
017556  001262                    SAVR2
        000001           .END
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
ABBIT = 002000            610#    724     1428
ACTBIT= 004000            611#    732
ADRCNT= 013375           2539*   2578*   2587#
BABIT = 010000            612#    728
BBBIT = 020000            613#    719
BCCFBK  015346           2326*   2332*   2335*   2338    2342    2903#
BCCPRV  015342           2901#
BINWRD  013714           2628*   2629    2668#
BIT0  = 000001            605#    1043    2203    2243    2294    2330
BIT1  = 000002            604#
BIT10 = 002000            595#
BIT11 = 004000            594#
BIT12 = 010000            593#
BIT13 = 020000            592#    2197
BIT14 = 040000            591#    2439
BIT15 = 100000            590#
BIT2  = 000004            603#    1014
BIT3  = 000010            602#
BIT4  = 000020            601#    2356
BIT5  = 000040            600#    2152    2375
BIT6  = 000100            599#    1509    1512    1513    2007    2039    2158    2206    2306    2310
BIT7  = 000200            598#    1662    1683    1730    2249    2300
BIT8  = 000400            597#
BIT9  = 001000            596#
BRW     012660           1020    2457#
BRX     012662           1021    2458#
CALBCC  015344           1548*   1571    1581    1595*   1600    1641*   1674    1689    1700    1701    1706    1707*   1721
                         1736    1968    1973    2020*   2028    2033    2036    2037*   2051*   2059    2072    2076*   2271
                         2348*   2902#   2955    2968
CHARDT= 000010             630#
CHAR1   001236             801#
CHAR2   001240             802#
CHAR3   001242             803#
CHRCNT  013712           2626*   2630    2646*   2666#   2667
CHRLNG  015334           2898#
CKDN    002710           1115    1117#
CKSWR = 104414            862#    988     998     1013    2099    2420    2438    2462    2685    2744
CKSYN1  002662           1112#
CNTLU = 104415            864#    970
CNVRT = 104411            856#    2394    2398    2402    2406    2715    2719    2778    2809
CONVRT= 104410            854#    978     2735
COUNT   015352           1437*   1454*   1462*   1465*   1569*   1586*   1587    1592*   1603*   1604    1656*   1666*   1669*
                         1694*   1695    1719*   1741*   1742    2062*   2066*   2222*   2253*   2258*   2261*   2272*   2304*
                         2314*   2317*   2905#   2966
CREAM   001300             818#    942*    1052*   1056*   1065    1066*   1067    1068*
CSRMAP  000220             699#    973
DATA    015354           1550*   1570    1589*   1642*   1657    1668*   1670    1672    1697*   1708*   1712*   1716*   1720
                         2906#   2964
DATABP  014172           2708*   2711    2733    2736#
DATAHD  014160           2707*   2729    2732#
DATAIN  015336           2899#
DEVADR  013372           2537*   2575    2585#
DH0     017026           2923    2946#
DH1     017052           2926    2946#
DH2     017122           2929    2946#
DH3     017201           2935    2946#
```

```
DH4     017234            2932    2946#
DH5     017310            2938    2946#
DH6     017352            2941    2946#
DISPRE  000174             690#    958
DLIGHT= 177570             575#    949
DQACTV  001500             670     744*    750*    751*    755     921#    995*    996     1046    1048
DQCR00  001400             889#
DQCR01  001404             891#
DQCR02  001410             893#
DQCR03  001414             895#
DQCR04  001420             897#
DQCR05  001424             899#
DQCR06  001430             901#
DQCR07  001434             903#
DQCR10  001440             905#
DQCR11  001444             907#
DQCR12  001450             909#
DQCR13  001454             911#
DQCR14  001460             913#
DQCR15  001464             915#
DQCR16  001470             917#
DQCR17  001474             919#
DQCSR   001506             924#    1065*   1069
DQERR   001366             879#    1082*   1083*   1084    1150    1154    1320    1386    1505    1509    1512*   1513    1749
                          1770     1794    1818    1842    1866    1901    1934    2102    2354*
DQNUM   001504             703*    740*    745     747     923#    937     2411
DQRCSH  001362             877#    1078*   1079*   2363*   2369*   2372*
DQRCSR  001360             876#    1069*   1078    1080    1148*   1152    1156    1230*   1234    1242*   1375*   1379    1655*
                          2143*    2158    2195*   2206    2250*   2301*   2352*   2425
DQREG   001370             880#    1084*   1085*   1086    1134*   1136*   1138*   1140*   1142*   1144*   1218*   1220*   1222*
                          1224*    1226*   1228*   1304*   1308*   1310*   1313*   1315*   1317*   1323*   1348*   1351*   1353*
                          1355*    1358*   1361*   1363*   1365*   1367*   1369*   1371*   1373*   1390*   1435*   1438*   1440*
                          1442*    1444*   1456*   1461*   1467*   1551*   1553*   1555*   1557*   1559*   1576*   1579*   1593*
                          1598*    1606*   1609*   1643*   1645*   1647*   1649*   1651*   1653*   1679*   1687*   1726*   1734*
                          1965*    2006*   2008*   2026*   2038*   2041*   2052*   2056*   2063*   2069*   2117*   2119*   2121*
                          2123*    2125*   2127*   2129*   2131*   2133*   2135*   2137*   2153*   2171*   2173*   2175*   2177*
                          2179*    2181*   2183*   2185*   2187*   2189*   2191*   2223*   2225*   2227*   2229*   2231*   2233*
                          2235*    2237*   2239*   2241*   2255*   2257*   2273*   2275*   2277*   2279*   2281*   2283*   2285*
                          2287*    2289*   2291*   2293*   2307*   2309*   2311*   2313*   2356*   2357*   2359*   2362*   2365*
                          2367*    2374*
DQRLVL  001352             873#    1072*   1073*   1074
DQRVEC  001350             872#    1070*   1071*   1072    2428
DQSEC   001372             881#    1086*   1087*   1088    1135*   1137*   1139*   1141*   1143*   1145*   1219*   1221*   1223*
                          1225*    1227*   1229*   1305*   1309*   1311    1314*   1316*   1318*   1324    1349*   1352*   1354*
                          1356     1359*   1360*   1362*   1364*   1366*   1368*   1370*   1372*   1374*   1391    1436*   1439*
                          1441*    1443*   1445*   1450*   1451*   1452*   1453*   1457    1463*   1464*   1468    1552*   1554*
                          1556*    1558*   1560*   1565*   1566*   1567*   1568*   1577*   1578*   1580    1596*   1597*   1599
                          1607*    1608*   1610    1644*   1646*   1648*   1650*   1652*   1654*   1662*   1663*   1664*   1665*
                          1683*    1684*   1685*   1686*   1688    1730*   1731*   1732*   1733*   1735    1967    2007*   2009*
                          2010     2027    2039*   2042    2053*   2054*   2057    2064*   2065*   2070    2118*   2120*   2122*
                          2124*    2126*   2128*   2130*   2132*   2134*   2136*   2138*   2154*   2172*   2174*   2176*   2178*
                          2180*    2182*   2184*   2186*   2188*   2190*   2192*   2197    2224*   2226*   2228*   2230*   2232*
                          2234*    2236*   2238*   2240*   2242*   2247*   2248*   2249*   2251*   2252*   2256    2259*   2260*
                          2274*    2276*   2278*   2280*   2282*   2284*   2286*   2288*   2290*   2292*   2298*   2299*   2300*
                          2302*    2303*   2306*   2308    2310*   2312    2315*   2316*   2358*   2366*   2368*   2375*
DQSECH  001374             882#    1088*   1089*
```

```
DQSTAT  001510            925#  1067*  1070   1112   1119   1428
DQST00  001402            890#
DQST01  001406            892#
DQST02  001412            894#
DQST03  001416            896#
DQST04  001422            898#
DQST05  001426            900#
DQST06  001432            902#
DQST07  001436            904#
DQST10  001442            906#
DQST11  001446            908#
DQST12  001452            910#
DQST13  001456            912#
DQST14  001462            914#
DQST15  001466            916#
DQST16  001472            918#
DQST17  001476            920#
DQTCSR  001364            878#  1080*  1081*  1082   1149*  1153   1231*  1243*  1319*  1376*  1446*  1447   1448
                         1449   1561*  1562   1563   1564   2144*  2152*  2196*  2203*  2243*  2244   2245   2246
                         2294*  2295   2296   2297   2353*
DQTLVL  001356            875#  1076*  1077*  2142*
DQTVEC  001354            874#  1074*  1075*  1076   2141*
DSWR  = 177570            574#   948
DT0     017402           2924   2946#
DT1     017414           2927   2951#
DT2     017436           2930   2960#
DT3     017470           2936   2973#
DT4     017506           2933   2980#
DT5     017520           2939   2985#
DT6     017542           2942   2994#
EM0     016635           2928   2946#
EM1     016664           2934   2937   2946#
EM2     016730           2931   2946#
EM3     016745           2940   2946#
EM4     016772           2943   2946#
ENDBCC  010566           2159   2165#
ENDSYN  011106           2207   2213#
ENDTX   012062           2319#
ENDTY   011454           2263#
ERRCNT  001232            796#   943*  2434   2745*
ERRFLG  001312            827#   940*  2388*  2451*  2696*  2709   2723*  2780*
ERRMSG  014146           2706*  2724   2727#
ERTABO  014264           2720   2754#
EXITER  014216           2739   2744#
HALTS   014176           2692   2738#
HILIM   013370           2536*  2566   2584#
ICOUNT  001222            792#  1955*  2449   2453*
INBUF   015166           2500   2542   2890#
INIFLG  001310            825#   964    967*
INSTER= 104404            846#  2561
INSTR = 104403            844#  1024   2810
INSTR2  013154           2511   2526#
JUMBIT= 040000            614#   731   1119
LIGHTS  001202            781#   949*   958*  2408*
LIMITS  013316           2552   2566#
LIMIT.  004456           1294*  1302   1332   1400   1409#
```

```
LOBITS  013374  2538*  2570  2586#  2587
LOCK    001220   791#  1291* 1346*  1957* 2003* 2021* 2465
LOC1    015370  1699*  1744* 1745   1747  2912#
LOGICA  012476   652   2415#
LOKFLG  001313   828#
LOLIM   013366  2535*  2568  2583#
LPCNT   001224   793#  2448* 2449   2452*
LSTERR  001234   797#   944* 2387*  2693  2695* 2781*
MCRLF   014554  2508   2524  2616   2722  2816  2829#
MCSRX   014775  2393   2856#
MDATA   015272  2644   2655  2894#
MEMCLR= 104413   860#  1128  1217   1278  1494  1539  1636  1890  1923  2078  2079  2111  2783
MEPASS  014614  2391   2835#
MERRPC  015121  2718   2875#
MERRX   015022  2405   2862#
MERR2   014641   762   1060  2839#
MERR3   014710   992   2846#
MISC. = 000012   632#  1317  1444   1461  1559  1576  1593  1606  1653  1679  1726  2006  2038
                2052   2063  2137   2191  2241  2257  2289  2293  2309  2313  2374
MLOCK   014746  1016   2852#
MNEW    015047   985   2867#
MPASSX  015011  2401   2860#
MPFAIL  014556  2777   2830#
MPOLY   016470  2097   2946#
MQM     014550  2521   2828#
MR      014636  1034   2838#
MSTCLR= 104412   858#  1312  1357   1432  1433  1500  1546  1547  1639  1640  1767  1791  1815
                1839   1863  1896   1929  1959  2005  2022  2170  2218  2220  2270  2782
MTITLE  001000   771#   966
MTSTN   015033  2714   2864#
MTSTPC  014734  1025   2850#
MVECX   015003  2397   2858#
NEXT    001216   790#  1040* 1110*  1121  1194* 1277* 1405  1427* 1493* 1538* 1635* 1766* 1790*
                1814*  1838* 1862*  1889* 1922* 1956* 1996* 2094* 2454  2750
ODDBIT- 001000   615#   733
OUT     014510  2797   2799  2801   2805  2817#
PARAM = 104405   848#  1026  2811
PARAM1  013222  2541#  2562
PARERR  013276  2544   2546  2548   2557# 2567  2569  2571
PARTI   013360  2560   2580#
PASCNT  001230   795#   939* 2389*  2408  2431
PFTAB   014366  2779   2785#
POLY. = 000017   637#
POPR0 = 012600   584#  2743
POP1SP= 005726   582#
POP2SP= 022626   586#  1403
PS    = 177776   576#   673*  934*  1009* 2145*
PUSHR0= 010046   583#  2740
PUSH1S= 005746   581#
PUSH2S= 024646   585#
RDSW    014374  2473   2522  2559   2793# 2807* 2817*
RESREG  014174  2734   2737#
RESTAR  014312  2764   2770#
RESTRT  012506  2410   2413  2420#
RESO5 = 104407   852#  2737
RETURN  001214   789#   946* 1029   1033* 1035  1039* 1121* 1122  1405* 1406  1430* 1431  1492*
```

```
                    1537*  1634*  1888*  1921*  2095*  2421*  2454*  2455   2750*  2752   2784
RUN      001304      820#  1043*  1046   1051*  1057*  1064*
RUNCNT   001306      821#  1044*  1053*  1055*
RUNFLG   001302      819#   941*  1041   1045*
RXBA.P=  000000      621#
RXBA.S=  000004      625#
RXBUFF   016000     1130   1135   1167   1196   1219   1245   1644   1648   2118   2172   2180   2224   2274
                    2917#
RXWC.P=  000001      622#
RXWC.S=  000005      626#
RX.BCC=  000015      635#
SAVACT   001502      755*   922#   989
SAVBCC   015356     1706*  1709   1712   1713   1716   2907#
SAVEPC   015360     2110*  2169*  2217*  2269*  2908#
SAVNUM   001276      748*   817#   937*  2409*  2411*
SAVPC    001274      816#  2591*  2756
SAVR0    001256      809#  2600*  2605   2975   2987   2996
SAVR1    001260      810#  2599*  2606   2957   2989   2998
SAVR2    001262      811#  2598*  2607   3000
SAVR3    001264      812#  2597*  2608
SAVR4    001266      813#  2596*  2609
SAVR5    001270      814#  2595*  2610   2950   2959
SAVSP    001272      815#
SAV05 =  104406      850#  2697
SCOPE =  104400      838#  1175   1251   1407   1471   1516   1613   1753   1774   1798   1822   1846   1870
                    1905   1938   1979   2080
SCOP1 =  104401      840#  1330   1398   1976   2014   2075
SEC16    015362     1972   2032   2256*  2312*  2909#
SEC16X   015364     2047   2308*  2910#
SEQ.  =  000014      634#
SIMBCC   012064     1572   1675   1702   1722   1961   2323#
SPACNT=  013713     2627*  2648   2651*  2667#
STACK =  001200      577#   935   1010   1290   2751   2772
STBCC    010202     1769   1793   1817   1841   1865   2101   2110#
STFLG    001311      826#   938*
STORE1   015366     1701*  1707   2911#
SV05     013404     2595#
SWR      001200      780#   948*   953    957*   968    971    982    989    995   1014   1022   2100   2439
                    2446   2463   2475   2686   2691   2738   2746   2748   2798
SWREG    000176      691#   957    968   2798   2814   2821
SWREGC   014516     2809   2819#
SW00  -  000001      557#   982
SW01  =  000002      556#  1022
SW02  =  000004      555#
SW03  =  000010      554#
SW04  -  000020      553#
SW05  =  000040      552#
SW06  =  000100      551#
SW08  =  000400      550#  2746
SW09  =  001000      549#  2463
SW10  =  002000      548#  2748
SW11  =  004000      547#  2446
SW12  =  010000      546#  2475   2686
SW13  =  020000      545#  2691
SW14  -  040000      544#
SW15     100000      543#
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
SYNBCC  010570          1502    1898    1931    2169#
SYNBIT= 100000           616#    713    1112
SYNC    015374          1114*   1116*   1139    1223    1364    2122    2914#
SYNC. = 000011           631#
TEMP    015230          2623    2631    2658*   2773*   2774*   2892#
TEMP1   001244           670*    671*    804#    975*    976     980*   1146*   1158*   1377*   1381*   2139*   2146*   2156*
                        2160*   2193*   2199*   2204*   2208*   2323*   2346*   2883
TEMP2   001246           805#    976*   1147*   1160*   1378*   1383*   2140*   2148*   2157*   2162*   2194*   2201*   2205*
                        2210*   2324*   2328*   2885
TEMP3   001250           806#   1659*   1661*   1663    1680*   1682*   1684    1727*   1729*   1731    2325*   2327    2337*
                        2339    2344*   2345*   2348    2623*   2658
TEMP4   001252           807#   1164*   1169*   1170    1311*   1314    1324*   1326    1356*   1359    1368    1393*   1394
                        1580*   1581    1599*   1600    1688*   1689    1735*   1736    2010*   2011    2970    2979    2984
                        2993
TEMP5   001254           808#   1165*   1168*   1170    1325*   1389*   1549*   1638*   2004*   2009    2011    2015*   2972
                        2977    2982    2991
TKCSR   001204           782#   2442    2502    2800
TKDBR   001206           783#   2444    2504    2512    2802
TLAST = 007472          1028    2381#
TMPDAT  015340          1657*   1658*   1660*   1672*   1673*   1681*   1709*   1710*   1713*   1714*   1717*   1718*   1728*
                        2900#
TPCSR   001210           784#   2479    2482    2485    2513    2688
TPDBR   001212           785#   2481*   2484*   2487*   2512*   2690*
TRPOK   013730          2677#
TSTNO   001226           794#    945*   1038*   1109*   1193*   1276*   1426*   1491*   1536*   1633*   1765*   1789*   1813*
                        1837*   1861*   1887*   1920*   1954*   1995*   2759    2787
TST1    002254          1027    1033    1038#   2421    2422
TST10   005636          1538    1633#
TST11   006662          1635    1765#
TST12   006726          1766    1789#
TST13   006772          1790    1813#
TST14   007036          1814    1837#
TST15   007102          1838    1861#
TST16   007146          1862    1887#
TST17   007242          1889    1920#
TST2    002646          1039    1040    1109#
TST20   007336          1922    1954#
TST21   007472          1956    1995#   2381
TST22 = ****** U        1996
TST3    003230          1110    1193#
TST4    003522          1194    1276#
TST5    004460          1277    1426#
TST6    005002          1427    1491#
TST7    005130          1493    1536#
TTST    012562          1017*   1018*   1020*   1021*   2440#
TXBA.P= 000002           623#
TXBA.S= 000006           627#
TXBCC   011456          2024    2269#
TXBUFF  015376          1124    1166    1201    1207    1496    1541    1552    1892    1925    2113    2130    2176    2221*
                        2228    2271*   2278    2915#
TXISR1  010504          2141    2151#
TXWC.P= 000003           624#
TXWC.S= 000007           628#
TX.BCC= 000016           636#
TX.MUX- 000013           633#
TYBCC   011110          1960    2217#
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
TYPDAT  014162          2712    2730    2733#
TYPE    104402           761     842#    966     974     984     991    1016    1034    1059    2096    2390    2392    2396
                        2400    2404    2498    2508    2520    2524    2615    2654    2713    2717    2721    2726    2731
                        2776    2806    2808    2816
TYPMSG  014104          2710    2713#
USEBCC  010130          2094#   2095
VECMAP  000056           663#    760
WORD    005000          1434*   1439    1472#
WRDCNT  013710          2625*   2656*   2665#
WRKO.F  014150          2725    2728#
XBX     013776          2687    2689    2691#
XCSR    012522          2395    2423#
XERR    012544          2407    2432#
XHEAD   015126           974    2876#
XPASS   012536          2403    2429#
XPOLY   015350          1501*   1545*   1558    1637*   1652    1768*   1792*   1816*   1840*   1864*   1897*   1930*   1958*
                        1977*   2023*   2100*   2136    2190    2240    2292    2333    2344    2904#   2948    2953    2962
XSTATQ  015154           979    2881#
XTSTN   014272          2716    2757#
XVEC    012530          2399    2426#
$CNTG   014524          2806    2822#
$E      000023             1#   1040    1041#   1110    1111#   1194    1195#   1277    1278#   1427    1428#   1493    1494#
                        1538    1539#   1635    1636#   1766    1767#   1790    1791#   1814    1815#   1838    1839#   1862
                        1863#   1889    1890#   1922    1923#   1956    1958#   1996    1997#
$MNEW   014537          2810    2825#
$MSWR   014530          2808    2823#
$N      000021             1#   1036    1041#   1107    1111#   1191    1195#   1274    1278#   1424    1428#   1489    1494#
                        1534    1539#   1631    1636#   1763    1767#   1787    1791#   1811    1815#   1835    1839#   1859
                        1863#   1885    1890#   1918    1923#   1952    1958#   1993    1997#   2381#
$Y      000016             1#    829#    838     840#    842#    844#    846#    848#    850#    852#    854#    856#    858#
                         860#    862#    864#    866#
.       017560           641#    642     644#    651#    653#    661#    677     689#    695#    698#    702     718     723
                         727     730     765     770#    777#    818#    888#    889#    890#    891#    892#    893#    894#
                         895#    896#    897#    898#    899#    900#    901#    902#    903#    904#    905#    906#    907#
                         908#    909#    910#    911#    912#    913#    914#    915#    916#    917#    918#    919#    920#
                         921#    922#    923#    924#    925#    972     977     981     994    1062    1120    1171    1247
                        1300    1321    1327    1387    1395    1429    1459    1469    1507    1510    1574#   1575#   1582
                        1601    1611    1677#   1678#   1690    1705#   1724#   1725#   1737    1751    1772    1796    1820
                        1844    1868    1903    1936    1969    1974    2012    2029    2034    2044    2049    2060    2073
                        2104    2480    2483    2766    2775    2827#   2880#   2891#   2893#   2895#   2916#   2918#
.BEGIN  002116          1009#
.CKSWR  014376           863    2796#
.CNTLU  014452           865    2807#
.CNVRT  013474           857    2617#
.CONVR  013470           855    2615#
.EOP    012364          1430    1996    2387#
.ERRTA  016402          2705    2919#
.HLT    013750           647    2685#
.INSTE  013130           847    2518#
.INSTG  013134          2517    2520#
.INSTR  013012           845    2494#
.INST1  013032          2498#   2509    2525
.MEMCL  012222           861    2351#
.MSG    013034          2496*   2499#   2802*   2803*   2804
.MSTCL  012346           859    2373#
.PARAM  013162           849    2532#
```

```
.PFAIL  014300            645     936    2763#   2771
.RES05  013436            853    2605#
.SAV05  013376            851    2591#
.SCOPE  012552            839    2438#
.SCOP1  012664            841    2462#
.START  001512            696     934#    946
.SYNC   015372           1143    1227    1372    2134    2188    2913#
.TRPSR  013716            649    2674#
.TRPTA  001314            837#   2679
.TYPE   012704            843    2470#

. ABS.  017560      000

 ERRORS DETECTED:  0

 DSKZ:CZDQEE,DSKZ:CZDQEE.SEQ=DSKZ:CZDQXX.MAC,DSKZ:CZDQEE.P11
 RUN-TIME: 6 10 1 SECONDS
 RUN-TIME RATIO: 59/18=3.2
 CORE USED:  18K  (35 PAGES)

 DOCUMENT PAGES:  66
```