DQ11

CHAR LENGTH INTERRUPT TEST
CZDQHD0

AH-8637D-MC

FICHE 1 OF 1

JAN 1979
digital
MADE IN USA

IDENTIFICATION

PRODUCT CODE: AC-8635D-MC

PRODUCT NAME: CZDQHDO CHAR L & INTR

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. 17757C)
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 DO'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 CAN'T BE SINGLED OUT.

4.1.3 SWITCH REGISTER PRIORITYS

ERROR SWITCHES

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

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

SCOPE SWITCHES

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

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

4.2 STARTING ADDRESS

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

NOTE: IF ADDRESS 000042 IS NON-ZERO
THE PROGRAM ASSUMES IT IS UNDER
ACT11 OR DDP CONTROL AND WILL ACT ACCORDINGLY
AFTER *ALL* AVAILABLE DQ11'S ARE TESTED
THE PROGRAM WILL RETURN TO ''DDP?'' 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-8635D-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 OR EVEN PARITY?

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

8.5.9 FINDING THE VECTOR.

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

9. PROGRAM DESCRIPTION

CONTAINED WITHIN LISTING

10. LISTING

FOLLOWING

```
522
523                             ;CZDQHD0/<377>/CHAR L & INTR
524                             ;COPYRIGHT 1975, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
525
526                             ;REVISED 16-DEC-76 BY R. BLACK
527                             ;       A)SUPPORTS SOFTWARE SWITCH REGISTER
528                             ;       B)SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER
529                             ;         BY <^G>.
530                                     ;STARTING PROCEDURE
531                                     ;LOAD PROGRAM
532                                     ;LOAD ADDRESS 000200
533                                     ;PRESS START
534                                     ;PROGRAM WILL TYPE ''CZDQHD0/<377>/CHAR L & INTR ''
535                                     ;PROGRAM WILL TYPE 'R'' TO INDICATE THAT TESTING HAS STARTED
536                                     ;AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
537                                     ;AND THEN RESUME TESTING
538
539
540                             ;SWITCH REGISTER OPTIONS
541
542         100000              SW15=100000             ;-1,HALT ON ERROR
543         040000              SW14-40000              ;-1,LOOP ON CURRENT TEST
544         020000              SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
545         010000              SW12=10000              ;-1,DELETE TYPEOUT/BELL ON ERROR.
546         004000              SW11=4000               ; 1,INHIBIT ITERATIONS
547         002000              SW10=2000               ; 1,ESCAPE TO NEXT TEST ON ERROR
548         001000              SW09=1000               ;=1,LOOP WITH CURRENT DATA
549         000400              SW08=400                ;=1,LOOP ON ERROR
550         000100              SW06=100
551         000040              SW05-40
552         000020              SW04=20
553         000010              SW03-10
554         000004              SW02=4                  ;LOCK ON TEST SELECT
555         000002              SW01-2                  ;RESTART PROGRAM AT SELECTED TEST
556         000001              SW00-1                  ;RESELECT DQ11 DESIRED ACTIVE
557                                                     ;NOTE: THIS MUST NOT EXCEED ORIGINAL COUNT
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                        ;REGISTER DEFINITIONS

000000                  R0=%0           ;GENERAL REGISTER
000001                  R1=%1           ;GENERAL REGISTER
000002                  R2=%2           ;GENERAL REGISTER
000003                  R3=%3           ;GENERAL REGISTER
000004                  R4=%4           ;GENERAL REGISTER
000005                  R5=%5           ;GENERAL REGISTER
000006                  SP=%6           ;PROCESSOR STACK POINTER
000007                  PC=%7           ;PROGRAM COUNTER

                        ;LOCATION EQUIVALENCIES

177570                  DSWR=   177570  ;HARDWARE SWITCH REGISTER LOC.
177570                  DLIGHTS=177570  ;HARDWARE DISPLAY REGISTER LOC.
177776                  PS=177776       ;PROCESSOR STATUS WORD
001200                  STACK=1200      ;START OF PROCESSOR STACK

                        ;INSTRUCTION DEFINITIONS

005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
010046                  PUSHR0=10046    ;SAVE R0 ON STACK
012600                  POPR0=12600     ;RESTORE R0 FROM STACK
024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE
022626                  POP2SP=22626    ;INCREMENT STACK TWICE
                        .EQUIV  EMT,HLT ;BASIC DEFINITION OF ERROR CALL


100000                  BIT15=100000
040000                  BIT14=40000
020000                  BIT13=20000
010000                  BIT12=10000
004000                  BIT11=4000
002000                  BIT10=2000
001000                  BIT9=1000
000400                  BIT8=400
000200                  BIT7=200
000100                  BIT6=100
000040                  BIT5=40
000020                  BIT4=20
000010                  BIT3=10
000004                  BIT2=4
000002                  BIT1=2
000001                  BIT0=1


                        ;DQ11 OPTIONAL DEFINITIONS

002000                  ABBIT=2000
004000                  ACTBIT=4000
010000                  BABIT=10000
020000                  BBBIT=20000
040000                  JUMBIT=40000
```

```
614          001000                  ODDBIT=1000
615          100000                  SYNBIT=100000
616
617
618                                  ;DQ11 SECONDARY REGISTER DEFINATIONS
619
620          000000                  RXBA.P=0        ;RECEIVER BUS ADDRESS PRIMARY.
621          000001                  RXWC.P=1        ;RECEIVER WORD COUNT PRIMARY.
622          000002                  TXBA.P=2        ;TRANSMITTER BUS ADDRESS PRIMARY.
623          000003                  TXWC.P=3        ;TRANSMITTER BUS ADDRESS PRIMARY.
624          000004                  RXBA.S=4        ;RECEIVER BUS ADDRESS SECONDARY.
625          000005                  RXWC.S=5        ;RECEIVER WORD COUNT SECONDARY.
626          000006                  TXBA.S=6        ;TRANSMITTER BUS ADDRESS SECONDARY.
627          000007                  TXWC.S=7        ;TRANSMITTER WORD COUNT SECONDARY.
628
629          000010                  CHARDT=10       ;CHARACTER DETECT REGISTER.
630          000011                  SYNC.=11        ;SYNC REGISTER.
631          000012                  MISC.=12        ;MISCELLANEOUS REGISTER.
632          000013                  TX.MUX=13       ;TRANSMITTER MUX REGISTER.
633          000014                  SEQ.=14         ;SEQUENCE REGISTER.
634          000015                  RX.BCC=15       ;RECEIVER BCC REGISTER.
635          000016                  TX.BCC=16       ;TRANSMITTER BCC REGISTER.
636          000017                  POLY.=17        ;POLYNOMIAL REGISTER.
637
638
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                                        ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
000000                          .=0
                                        ;STANDARD INTERRUPT VECTORS

000024                          .=24
000024  016222                          .PFAIL                  ;POWER FAIL HANDLER
000026  000340                          340                     ;SERVICE AT LEVEL 7
000030  015672                          .HLT                    ;ERROR HAND'ER
000032  000340                          340                     ;SERVICE AT LEVEL 7
000034  015640                          .TRPSRV                 ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                          340                     ;SERVICE AT LEVEL 7
000046                          .-46
000046  014420                          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
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```
695  000200  000137  001512                 JMP     .START          ;GO TO START OF PROGRAM
696
697          000220                 .=220
698  000220  012702  001400         CSRMAP: MOV     #1400,R2        ;CLEAR ALL STATUS TABLE
699  000224  005022                         CLR     (R2)+           ;DO CLEAR
700  000226  022702  001512                 CMP     #1512,R2        ;ALL TABLE DONE
701  000232  001374                         BNE     .-6             ;BR IF MORE TO GO
702  000234  005037  001504                 CLR     DQNUM           ;SET NUMBER OF DQ11S TO 0
703  000240  012702  001400                 MOV     #1400,R2        ;SET TABLE POINTER
704  000244  012701  160000                 MOV     #160000,R1      ;GET FIRST FLOATING ADDRESS
705  000250  012737  000614  000004         MOV     #5$,@#4         ;SET FOR TIME OUT TRAP--NO DEVICE--
706  000256  112761  000012  000005  1$:    MOVB    #12,5(R1)       ;TRY AND SEL MISC REGISTER
707  000264  005061  000006                 CLR     6(R1)           ;TRY AND CLEAR MISC REG
708  000270  012711  010000                 MOV     #10000,(R1)     ;TRY AND SET RX ACTIVE
709  000274  022761  030000  000006         CMP     #30000,6(R1)    ;LOOK FOR SYNC 1 AND SYNC 2
710  000302  001071                         BNE     2$              ;THIS IS NOT A DQ11 IF I BRANCH
711  000304  010122                         MOV     R1,(R2)+        ;NOW THIS IS A DQ11 --STORE CSR
712  000306  052712  100000                 BIS     #SYNBIT,(R2)    ;SET FOR TWO SYNC CHARS
713  000312  005011                         CLR     (R1)            ;CLEAR DQ ACTIVE BIT
714  000314  112761  000010  000005         MOVB    #10,5(R1)       ;SEL CHAR DET REGISTER
715  000322  012761  177777  000006         MOV     #-1,6(R1)       ;WRITE INTO CHAR DET REG
716  000330  005761  000006                 TST     6(R1)           ;WAS THE REGISTER WRITTEN?
717  000334  001402                         BEQ     .+6             ;APPERENTLY NO BB OPTION.
718  000336  052712  020000                 BIS     #BBBIT,(R2)     ;SET FOR BB OPTION
719  000342  112761  000017  000005         MOVB    #17,5(R1)       ;SEL POLYNO. REGISTER
720  000350  012761  177777  000006         MOV     #-1,6(R1)       ;WRITE POLYNO.REGISTER
721  000356  005761  000006                 TST     6(R1)           ;WAS REG WRITTEN??
722  000362  001402                         BEQ     .+6             ;BR IF NO AB OPTION
723  000364  052712  002000                 BIS     #ABBIT,(R2)     ;SET FOR AB OPTION
724  000370  012761  001400  000002         MOV     #1400,2(R1)     ;TRY TO SET .DTR. .RS.
725  000376  032761  001400  000002         BIT     #1400,2(R1)     ;DID ANY OF THEM SET
726  000404  001402                         BEQ     .+6             ;BR IF NO BA OPTION
727  000406  052712  010000                 BIS     #BABIT,(R2)     ;SET FOR BA OPTION
728  000412  032761  030000  000002         BIT     #30000,2(R1)    ;DID .CS. .CO. SET
729  000420  001402                         BEQ     .+6             ;BR IF NO JUMPER
730  000422  052712  040000                 BIS     #JUMBIT,(R2)    ;SET FOR JUMPER
731  000426  052712  004000                 BIS     #ACTBIT,(R2)    ;SET FOR ACTIVE ON FIRST NON-SYNC
732  000432  052712  001000                 BIS     #ODDBIT,(R2)    ;SET FOR ODD VRC.......
733  000436  005722                         TST     (R2)+           ;POP POINTER
734  000440  005011                         CLR     (R1)            ;CLEAR RCSR
735  000442  005061  000002                 CLR     2(R1)           ;CLEAR TCSR
736  000446  005061  000002                 CLR     2(R1)           ;CLEAR AGAIN
737  000452  005061  000004                 CLR     4(R1)           ;CLEAR ERROR REG
738  000456  005061  000006                 CLR     6(R1)           ;CLEAR SEC REG
739  000462  005237  001504                 INC     DQNUM           ;UPDATE NUMBER OF DQ11S
740  000466  062701  000010         2$:     ADD     #10,R1          ;UPDATE CSR POINTER BY 10 (8)
741  000472  022701  164000                 CMP     #164000,R1      ;HAVE ALL FLOATING ADDRESSES BEEN CHECKED??
742  000476  001267                         BNE     1$              ;BR IF NOT ALL DONE
743  000500  005037  001500                 CLR     DQACTV          ;ZERO ACTIVE DQ11S
744  000504  005737  001504                 TST     DQNUM           ;WERE ANY DQ11S FOUND
745  000510  001434                         BEQ     4$              ;HEY BUDDY. NO DQ11S FOUND IN SYSTEM
746  000512  013701  001504                 MOV     DQNUM,R1        ;SAVE NUMBER OF DQ11S
747  000516  010137  001276                 MOV     R1,SAVNUM       ;SAVE NUMBER FOR ACT11
748  000522  000241         3$:     CLC                             ;CLEAR CARRY
749  000524  006137  001500                 ROL     DQACTV          ;       ACTIVE ADDRESS
750  000530  005237  001500                 INC     DQACTV          ;SET BIT 0
```

```
751  000534  005301                        DEC     R1              ;DEC NUMBER OF DQ11S
752  000536  001371                        BNE     3$              ;BR IF MORE TO GO
753  000540  012737  000006  000004        MOV     #6,@#4          ;RESET TIME OUT VECTOR
754  000546  013737  001500  001502        MOV     DQACTV,SAVACT   ;SAVE ACTIVE
755  000554  012737  000340  000022        MOV     #340,@#22       ;SET IOT TRAP PRIO: TO 7
756  000562  012702  001400                MOV     #1400,R2        ;SET TABLE POINTER
757  000566  012700  000300                MOV     #300,R0         ;SET VECTOR START
758  000572  012701  000302                MOV     #302,R1         ;SET VECTOR+2 START
759  000576  000137  000056                JMP     VECMAP          ;GO FIND THE VECTORS
760  000602  104402                4$:     TYPE                    ;TYPE MESSAGE
761  000604  016563                        MERR2                   ;I DIDN'T FIND ANY DQ11S. DON'T USE AUTO SIZE.
762  000606  005000                        CLR     R0              ;
763  000610  000000                        HALT                    ;HOW CAN I TEST NO DQ11S
764  000612  000776                        BR      .-2             ;DON'T LET OPR HIT CONT. SW
765  000614  012716  000466        5$:     MOV     #2$,(SP)        ;ENTERED BY TIME OUT TRAP
766  000620  000002                        RTI                     ;GO HOME.
767
768
769          001000                .=1000
770  001000  005377  055103  050504 MTITLE: .ASCIZ  <377><12>/CZDQHD0/<377>/CHAR L & INTR /<377>
771  001006  042110  177460  044103
772  001014  051101  046040  023040
773  001022  044440  052116  020122
774  001030  000377
775
776          001200                .=1200
777                                ;INDIRECT POINTERS
778
779  001200  177570                SWR:    177570                  ;SWITCH REGISTER POINTER
780  001202  177570                LIGHTS: 177570                  ;DISPLAY REGISTER POINTER
781  001204  177560                TKCSR:  177560                  ;TELETYPE KEYBOARD CONTROL REGISTER
782  001206  177562                TKDBR:  177562                  ;TELETYPE KEYBOARD DATA BUFFER
783  001210  177564                TPCSR:  177564                  ;TELEPRINTER CONTROL REGISTER
784  001212  177566                TPDBR:  177566                  ;TELEPRINTER DATA BUFFER
785
786                                ;PROGRAM CONTROL PARAMETERS
787
788  001214  000000                RETURN: 0                       ;SCOPE ADDRESS FOR LOOP ON TEST
789  001216  000000                NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
790  001220  000000                LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT DATA
791  001222  000003                ICOUNT: 3                       ;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE EXECUTED
792  001224  000000                LPCNT:  0                       ;NUMBER OF ITEREATIONS COMPLETED
793  001226  000000                TSTNO:  0                       ;NUMBER OF TEST IN PROGRESS
794  001230  000000                PASCNT: 0                       ;NUMBER OF PASSES COMPLETED
795  001232  000000                ERRCNT: 0                       ;TOTAL NUMBER OF ERRORS
796  001234  000000                LSTERR: 0                       ;PC OF LAST ERROR CALL
797
798                                ;PROGRAM VARIABLES
799
800  001236  000000                CHAR1:  0
801  001240  000000                CHAR2:  0
802  001242  000000                CHAR3:  0
803  001244  000000                TEMP1:  0                       ;TEMPORARY STORAGE
804  001246  000000                TEMP2:  0                       ;TEMPORARY STORAGE
805  001250  000000                TEMP3:  0                       ;TEMPORARY STORAGE
806  001252  000000                TEMP4:  0                       ;TEMPORARY STORAGE
```

```
  807  001254  000000                TEMP5:  0                       ;TEMPORARY STORAGE
  808  001256  000000                SAVR0:  0                       ;R0 STORAGE
  809  001260  000000                SAVR1:  0                       ;R1 STORAGE
  810  001262  000000                SAVR2:  0                       ;R2 STORAGE
  811  001264  000000                SAVR3:  0                       ;R3 STORAGE
  812  001266  000000                SAVR4:  0                       ;R4 STORAGE
  813  001270  000000                SAVR5:  0                       ;R5 STORAGE
  814  001272  000000                SAVSP:  0                       ;STACK POINTER STORAGE
  815  001274  000000                SAVPC:  0                       ;PROGRAM COUNTER STORAGE
  816  001276  000000                SAVNUM: 0
  817  001300  000001                CREAM:  .BLKW   1
  818  001302  000000                RUNFLG: 0
  819  001304  000000                RUN:    0
  820  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  014474                          .SCOPE
        104401                  SCOP1=TRAP+1            ;CALL TO LOOP ON CURRENT DATA HANDLER
001316  014606                          .SCOP1
        104402                  TYPE=TRAP+2             ;CALL TO TELETYPE OUTPUT ROUTINE
001320  014626                          .TYPE
        104403                  INSTR=TRAP+3            ;CALL TO ASCII STRING INPUT ROUTINE
001322  014734                          .INSTR
        104404                  INSTER=TRAP+4           ;CALL TO INPUT ERROR HANDLER
001324  015052                          .INSTER
        104405                  PARAM=TRAP+5            ;CALL TO NUMERICAL DATA INPUT ROUTINE
001326  015104                          .PARAM
        104406                  SAV05=TRAP+6            ;CALL TO REGISTER SAVE ROUTINE
001330  015320                          .SAV05
        104407                  RES05=TRAP+7            ;CALL TO REGISTER RESTORE ROUTINE
001332  015360                          .RES05
        104410                  CONVRT=TRAP+10          ;CALL TO DATA OUTPUT ROUTINE
001334  015412                          .CONVRT
        104411                  CNVRT=TRAP+11           ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001336  015416                          .CNVRT
        104412                  MSTCLR=TRAP+12          ;CALL TO ISSUE MASTER CLEAR
001340  013032                          .MSTCLR
        104413                  MEMCLR=TRAP+13          ;CALL TO CLEAR ALL SCRATCH PAD MEMORIES
001342  012706                          .MEMCLR
        104414                  CKSWR=TRAP+14           ;CALL TO ALLOW SWREG TO BE LOADED FROM TTY
001344  016320                          .CKSWR
        104415                  CNTLU=TRAP+15           ;CALL TO ALLOW LOADING OF SWREG FROM TTY
001346  016374                          .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
```

```
001364  000000                  DQTCSR: 0               ;POINTER TO DQ11 TRANSMITTER CONTROl REGISTER
001366  000000                  DQERR:  0               ;POINTER TO DQ11 ERROR REGISTER
001370  000000                  DQREG:  0               ;POINTER TO HIGH BYTE OF ERROR REGISTER
001372  000000                  DQSEC:  0               ;POINTER TO DQ11 SECONDARY REGISTER
001374  000000                  DQSECH: 0               ;POINTER TO HIGH BYTE OF DQ11 SECONDARY REGISTER


                                        ;DQ11 STATUS TABLE AND ADDRESS ASSIGNMENTS

        001400                  . 1400
001400  000001                  DQCR00: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 00
001402  000001                  DQST00: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 00
001404  000001                  DQCR01: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 01
001406  000001                  DQST01: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 01
001410  000001                  DQCR02: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 02
001412  000001                  DQST02: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 02
001414  000001                  DQCR03: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 03
001416  000001                  DQST03: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 03
001420  000001                  DQCR04: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 04
001422  000001                  DQST04: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 04
001424  000001                  DQCR05: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 05
001426  000001                  DQST05: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 05
001430  000001                  DQCR06: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 06
001432  000001                  DQST06: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 06
001434  000001                  DQCR07: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 07
001436  000001                  DQST07: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 07
001440  000001                  DQCR10: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 10
001442  000001                  DQST10: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 10
001444  000001                  DQCR11: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 11
001446  000001                  DQST11: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 11
001450  000001                  DQCR12: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 12
001452  000001                  DQST12: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 12
001454  000001                  DQCR13: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 13
001456  000001                  DQST13: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 13
001460  000001                  DQCR14: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 14
001462  000001                  DQST14: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 14
001464  000001                  DQCR15: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 15
001466  000001                  DQST15: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 15
001470  000001                  DQCR16: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 16
001472  000001                  DQST16: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 16
001474  000001                  DQCR17: .BLKW   1       ;CONTROL STATUS REGISTER FOR DEVICE NO: 17
001476  000001                  DQST17: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS FOR DEVICE NO: 17
001500  000001                  DQACTV: .BLKW   1       ;HOLD ACTIVE BITS FOR TESTING
001502  000001                  SAVACT: .BLKW   1       ;SAVE NUMBER OF ACTIVE DQ11S
001504  000001                  DQNUM:  .BLKW   1       ;OCTAL NUMBER OF TOTAL NUMBER OD DQ11S
001506  000001                  DQCSR:  .BLKW   1       ;CSR OF DQ11 UNDER TEST
001510  000001                  DQSTAT: .BLKW   1       ;VECTOR AND CONFIGURATION STATUS OF DQ11 UNDER TEST


                                        ;PROGRAM INITIALIZATION
                                        ;LOCK OUT INTERRUPTS
                                        ;SET UP PROCESSOR STACK
                                        ;SET UP POWER FAIL VECTOR
                                        ;CLEAR PROGRAM CONTROL FLAGS AND COUNTS
                                        ;TYPE TITLE MESSAGE
```

```
   933  001512  012737  000340  177776  .START: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
   934  001520  012706  001200                  MOV     #STACK,SP               ;SET UP STACK
   935  001524  012737  016222  000024          MOV     #.PFAIL,@#24            ;SET UP POWER FAIL VECTOR
   936  001532  013737  001504  001276          MOV     DQNUM,SAVNUM
   937  001540  105037  001311                  CLRB    STFLG                   ;CLEAR START FLAG
   938  001544  005037  001230                  CLR     PASCNT                  ;CLEAR PASS COUNT
   939  001550  105037  001312                  CLRB    ERRFLG                  ;CLEAR ERROR FLAG
   940  001554  005037  001302                  CLR     RUNFLG
   941  001560  012737  001400  001300          MOV     #1400,CREAM
   942  001566  005037  001232                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
   943  001572  005037  001234                  CLR     LSTERR                  ;CLEAR LAST ERROR POINTER
   944  001576  012737  000001  001226          MOV     #1,TSTNO                ;SET UP FOR TEST 1
   945  001604  012737  001512  001214          MOV     #.START,RETURN          ;SET UP FOR POWER FAIL BEFORE
   946                                                                          ;TESTING STARTS
   947  001612  012737  177570  001200          MOV     #DSWR,SWR               ;MOV HARDWARE SWR TO SWR
   948  001620  012737  177570  001202          MOV     #DLIGHTS,LIGHTS         ;MOV DISPLAY LIGHTS TO LIGHTS
   949  001626  013746  000006                  MOV     @#6,-(SP)               ;SAVE VECTORS
   950  001632  013746  000004                  MOV     @#4,-(SP)
   951  001636  012737  001656  000004          MOV     #64$,@#4                        ;SET UP FOR TIMEOUT
   952  001644  022777  177777  177326          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
   953  001652  001402                          BEQ     65$
   954  001654  000407                          BR      66$
   955  001656  022626                  64$:    CMP     (SP)+,(SP)+             ;ADJUST STACK
   956  001660  012737  000176  001200  65$:    MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
   957  001666  012737  000174  001202          MOV     #DISPREG,LIGHTS         ;POINT TO SOFT DISPLAY REG
   958  001674  012637  000004          66$:    MOV     (SP)+,@#4               ;RESTORE VECTORS
   959  001700  012637  000006                  MOV     (SP)+,@#6
   960  001704  005737  000042                  TST     @#42                    ;UNDER MONITOR
   961  001710  001014                          BNE     67$
   962                                  ;;******THE NEXT 4 LINES OF CODE MOVED TO SOLVE PR#2757 (JUNE 78)******
   963  001712  105737  001310                  TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED?
   964  001716  001035                          BNE     12$                     ;IF YES, BR
   965  001720  104402  001000                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
   966  001724  105137  001310                  COMB    INIFLG          ;IF NOT SET FLAG AND INIT
   967  001730  022737  000176  001200          CMP     #SWREG,SWR              ;IS SWREG USED
   968  001736  001001                          BNE     67$
   969  001740  104415                          CNTLU
   970  001742  105777  177232          67$:    TSTB    @SWR
   971  001746  100402                          BMI     .+6
   972  001750  004737  000220                  JSR     PC,CSRMAP
   973  001754  104402  017050                  TYPE    ,XHEAD
   974  001760  012737  001400  001244          MOV     #1400,TEMP1
   975  001766  017737  177252  001246          MOV     @TEMP1,TEMP2
   976  001774  001406                          BEQ     .+16
   977  001776  104410                          CONVRT
   978  002000  017076                          XSTATQ
   979  002002  062737  000002  001244          ADD     #2,TEMP1
   980  002010  000766                          BR      .-22
   981  002012  032777  000001  177760  12$:    BIT     #SW00,@SWR
   982  002020  001424                          BEQ     1$
   983  002022  104402                          TYPE
   984  002024  016771                          MNEW
   985  002026  005000                          CLR     R0
   986  002030  000000                          HALT
   987  002032  104414                          CKSWR
   988  002034  027737  177740  001502          CMP     @SWR,SA,ACT
```

```
  989  002042  101404                          BLOS    11$
  990  002044  104402                          TYPE
  991  002046  016€32                          MERR3
  992  002050  000000                          HALT
  993  002052  000776                          BR      .-2
  994  002054  017737  177120  00'500  11$:    MOV     @SWR,DQACTV
  995  002062  013700  001500                  MOV     DQACTV,R0
  996  002066  000000                          HALT
  997  002070  104414                          CKSWR
  998  002072  012700  000300           1$:    MOV     #300,R0
  999  002076  012701  000302                  MOV     #302,R1
 1000  002102  010120                   2$:    MOV     R1,(R0)+
 1001  002104  005021                          CLR     (R1)+
 1002  002106  022021                          CMP     (R0)+,(R1)+
 1003  002110  022700  001000                  CMP     #1000,R0
 1004  002114  001372                          BNE     2$
 1005
 1006                                          ;TEST START AND RESTART
 1007
 1008  002116  012737  000340  177776  .BEGIN: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
 1009  002124  012706  001200                  MOV     #STACK,SP               ;SET UP STACK
 1010  002130  005737  000042                  TST     @#42                    ;IS PROGRAM UNDER MONITOR CONTROL
 1011  002134  001040                          BNE     3$
 1012  002136  104414                          CKSWR                           ;CHECK FOR <^G>
 1013  002140  032777  000004  177032          BIT     #BIT2,@SWR              ;CHECK FOR LOCK ON TEST
 1014  002146  001411                          BEQ     1$
 1015  002150  104402  016670                  TYPE    ,MLOCK
 1016  002154  012737  000240  014504          MOV     #NOP,TTST
 1017  002162  012737  000240  014506          MOV     #NOP,TTST+2             ;SET UP TO LOCK
 1018  002170  000406                          BR      2$
 1019  002172  013737  014602  014504  1$:     MOV     BRW,TTST
 1020  002200  013737  014604  014506          MOV     BRX,TTST+2              ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
 1021  002206  032777  000002  176764  2$:     BIT     #SW01,@SWR              ;IF SW01=1, GET STARTING PC
 1022  002214  001410                          BEQ     3$
 1023  002216  104403                          INSTR
 1024  002220  016656                          MTSTPC
 1025  002222  104405                          PARAM
 1026  002224  002254                          TST1
 1027  002226  012040                          TLAST
 1028  002230  001214                          #RETURN
 1029  002232     001                .BYTE   1
 1030  002233     001                .BYTE   1
 1031  002234  000403                          BR      4$
 1032  002236  012737  002254  001214  3$:     MOV     #TST1,RETURN            ;START AT TEST 1
 1033  002244  104402  016560           4$:    TYPE    ,MR                     ;TYPE R
 1034  002250  000177  176740                  JMP     @RETURN                 ;START TESTING
 1035                                  ;  TEST 1
 1036                                  ;*************************************************************************
 1037  002254  012737  000001  001226  TST1:   MOV     #1,TSTNO
 1038  002262  012737  002644  001214          MOV     #TST2,RETURN
 1039  002270  012737  002644  0012'6          MOV     #TST2,NEXT
 1040  002276  105737  001302                  TSTB    RUNFLG          ;IS THIS MY FIRST TIME HERE?
 1041  002302  001010                          BNE     1$              ;BR IF FLAG IS SET
 1042  002304  012737  000001  001304          MOV     #BIT0,RUN       ;SET RUN POINTER.
 1043  002312  012737  000020  001306          MOV     #'€.,RUNCNT     ;SET FOR MAX OF 16 DQ1''S PER SYSTEM
 1044  002320  105137  001302                  COMB    RUNFLG          ;SET RUN FLAG
```

```
1045  002324  033737  001304  001500  1$:     BIT     RUN,DQACTV      ;FIND AN ACTIVE DQ11 TO TEST.
1046  002332  001032                          BNE     3$              ;BR IF I FOUND ONE TO TEST.
1047  002334  005737  001500                  TST     DQACTV          ;FIND OUT IF THERE ARE NO DQ11 ACTIVE.
1048  002340  001423                          BEQ     2$              ;BR TO FATAL ERROR. WHY AM I HERE IF NO ACTIVE DQ11'S???
1049  002342  000257                          CCC                     ;CLEAR ALL THE CONDITION CODES OF CPU
1050  002344  006137  001304                  ROL     RUN             ;UPDATE RUN POINTER
1051  002350  062737  000004  001300          ADD     #4,CREAM        ;UPDATE ADDRESS POINTER.
1052  002356  005337  001306                  DEC     RUNCNT          ;DEC NUMBER OF TIMES I LOOKED AT ACTIVE.
1053  002362  001360                          BNE     1$              ;BR AND KEEP LOOKING.
1054  002364  012737  000020  001306          MOV     #16 ,RUNCNT     ;START RESTORING MY POINTERS.
1055  002372  012737  001400  001300          MOV     #1400,CREAM     ;RESTORE  ADDRESS POINTER
1056  002400  012737  000001  001304          MOV     #1,RUN          ;RESTORE RUN POINTER.
1057  002406  000746                          BR      1$              ;KEEP ON TESTING.
1058  002410  104402                  2$:     TYPE                    ;ALLERT OPERATOR OF FATAL ERROR
1059  002412  016563                          MERR2                   ;NO DQ11 ACTIVE. WHY AM I HERE???
1060  002414  000000                          HALT                    ;YOU MUST RELOAD DQ11 DIAGNOSTIC!!
1061  002416  000776                          BR      .-2             ;STICK HERE ON CONT.
1062  002420  000257                  3$:     CCC                     ;CLEAR CPU COND. CODES
1063  002422  006137  001304                  ROL     RUN             ;UPDATE RUN. ACTIVE DQ11 FOUND.
1064  002426  017737  176646  001506          MOV     @CREAM,DQCSR    ;PLACE ADDRESSS OF DQ11 AT DQCSR
1065  002434  062737  000002  001300          ADD     #2,CREAM        ;UPDATE ADDRESS POINTER
1066  002442  017737  176632  001510          MOV     @CREAM,DQSTAT   ;PLACE STATUS OF DQ11 AT DQSTAT
1067  002450  062737  000002  001300          ADD     #2,CREAM        ;UPDATE ADDRESS POINTER
1068  002456  013737  001506  001360          MOV     DQCSR,DQRCSR
1069  002464  013737  001510  001350          MOV     DQSTAT,DQRVEC
1070  002472  042737  177007  001350          BIC     #177007,DQRVEC
1071  002500  013737  001350  001352          MOV     DQRVEC,DQRLVL   ;GENERATE ADDRESS OF RECEIVER INTERRUPT SERVICE PS
1072  002506  062737  000002  001352          ADD     #2,DQRLVL
1073  002514  013737  001352  001354          MOV     DQRLVL,DQTVEC   ;GENERATE ADDRESS OF TRANSMITTER INTERRUPT VECTOR
1074  002522  062737  000002  001354          ADD     #2,DQTVEC
1075  002530  013737  001354  001356          MOV     DQTVEC,DQTLVL   ;GENERATE ADDRESS  OF TRANSMITTER INTERRUPT SERVICE PS
1076  002536  062737  000002  001356          ADD     #2,DQTLVL
1077  002544  013737  001360  001362          MOV     DQRCSR,DQRCSH
1078  002552  005237  001362                  INC     DQRCSH          ;GENERATE ADDRESS OF HIGH BYTE
1079  002556  013737  001360  001364          MOV     DQRCSR,DQTCSR   ;GENERATE ADDRESS OF TRANSMITTER CONTROL REGISTER
1080  002564  062737  000002  001364          ADD     #2,DQTCSR
1081  002572  013737  001364  001366          MOV     DQTCSR,DQERR    ;GENERATE ADDRESS OF ERROR REGISTER
1082  002600  062737  000002  001366          ADD     #2,DQERR
1083  002606  013737  001366  001370          MOV     DQERR,DQREG     ;GENERATE ADDRESS OF HIGH BYTE OF ERROR REGISTER
1084  002614  005237  001370                  INC     DQREG
1085  002620  013737  001370  001372          MOV     DQREG,DQSEC     ;GENERATE ADDRESS OF SECONDARY REGISTER
1086  002626  005237  001372                  INC     DQSEC
1087  002632  013737  001372  001374          MOV     DQSEC,DQSECH    ;GENERATE ADDRESS OF HIGH BYTE
1088  002640  005237  001374                  INC     DQSECH
1089
1090
1091
1092                                          ;DQ11 HELL RAISER!!!
1093                                          ;THIS TEST WILL EXERCISE:
1094                                          ;DQ11 RECEIVER AND TRANSMITTER INTERUPTS
1095                                          ;ENTER T AND EXIT T (IF AB OPTION INSTALLED)
1096                                          ;VRC
1097                                          ;THE CABLE AND TURN AROUND  (DATA ONLY)
1098                                          ;CHARACTER TRANSFERS.
1099
1100
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1101                                    ;  TEST 2
1102                                    ;*************************************************************************
1103  002644  012737  000002  001226  TST2:   MOV     #2,TSTNO
1104  002652  012737  002734  001214          MOV     #2$,RETURN
1105  002660  012737  000036  001222          MOV     #30.,ICOUNT
1106  002666  012737  003756  001216          MOV     #TST3,NEXT
1107                                          ;ADJUST SYNC CHARACTERS.
1108
1109  002674  032737  100000  001510          BIT     #SYNBIT,DQSTAT  ;ONE SYNC CHAR OR TWO?
1110  002702  001006                          BNE     1$              ;BR IF TWO
1111  002704  112737  000377  013052          MOVB    #377,SYNC       ;SET ONE SYNC.                          ;;++D
1112  002712  005037  013656                  CLR     XSYNC           ;DBL SYNC SET TO ONE.
1113  002716  000406                          BR      2$              ;CONT.
1114  002720  112737  000026  013052  1$:     MOVB    #26,SYNC        ;LOAD FOR TWO SYNC
1115  002726  012737  013026  013656          MOV     #13026,XSYNC    ;SAME FOR DBL SYNC
1116  002734  104413                  2$:     MEMCLR                  ;CLEAR ALL REGISTERS GIVE MSTCLR
1117  002736  005037  014302                  CLR     GDCHAR          ;ZERO POINTER
1118  002742  005037  014274                  CLR     CHAR            ;
1119  002746  005037  177776                  CLR     PS              ;ZERO PROC. PRIO.
1120  002752  105077  176412          SETON:  CLRB    @DQREG          ;SEL THE RX BA PRI.
1121  002756  012777  013256  176406          MOV     #RXBUFF,@DQSEC  ;LOAD RX BA PRI.
1122  002764  105277  176400                  INCB    @DQREG          ;SEL RX WC PRI.
1123  002770  012777  177600  176374          MOV     #-200,@DQSEC    ;SET FOR 200 (8) CHARS
1124  002776  105277  176366                  INCB    @DQREG          ;SEL THE TX BA PRI.
1125  003002  012777  013052  176362          MOV     #SYNC,@DQSEC    ;LOAD WITH SYNC POINTER
1126  003010  105277  176354                  INCB    @DQREG          ;SEL THE TX WC PRI.
1127  003014  012777  177576  176350          MOV     #-202,@DQSEC    ;SET FOR 2 SYNC AND 200 (8) CHARS.
1128  003022  105277  176342                  INCB    @DQREG          ;SEL THE RX BA SEC
1129  003026  012777  014064  176336          MOV     #XRXBUF,@DQSEC  ;LOAD RX BA SEC
1130  003034  105277  176330                  INCB    @DQREG          ;SEL RX WC SEC
1131  003040  012777  177600  176324          MOV     #-200,@DQSEC    ;SET FOR 200(8) CHARS
1132  003046  105277  176316                  INCB    @DQREG          ;SEL THE TX BA SEC
1133  003052  012777  013662  176312          MOV     #XTXBUF,@DQSEC  ;LOAD IT
1134  003060  105277  176304                  INCB    @DQREG          ;SEL THE TX WC SEC
1135  003064  012777  177600  176300          MOV     #-200,@DQSEC    ;SET FOR 200 CHARS
1136  003072  112777  000011  176270          MOVB    #11,@DQREG      ;SEL THE SYNC REGISTER
1137  003100  013777  013050  176264          MOV     .SYNC,@DQSEC    ;LOAD SYNCS
1138  003106  105277  176256                  INCB    @DQREG          ;SEL THE MISC REGISTER
1139  003112  012777  104000  176252          MOV     #104000,@DQSEC  ;SET 8 BITS PER CHAR AND VRC ENABLE.
1140  003120  032737  040000  001510          BIT     #JUMBIT,DQSTAT  ;IS JUMPER AT END OF CABLE?
1141  003126  001003                          BNE     .+10            ;BR IF YES
1142  003130  052777  000010  176234          BIS     #BIT3,@DQSEC    ;NO CABLE SET TEST LOOP FOR DATA TURN AROUND
1143  003136  112777  000017  176224          MOVB    #17,@DQREG      ;SEL THE POLY REGISTER
1144  003144  012777  123456  176220          MOV     #123456,@DQSEC  ;SET PLOYNOMIAL.
1145
1146  003152  012700  013054                  MOV     #TXBFA,R0       ;START TO FILL TX BUFFERS
1147  003156  012703  000177                  MOV     #177,R3         ;COUNTER
1148  003162  110320                  1$:     MOVB    R3,(R0)+        ;PRIMARY IS BINARY COUNT BACKWARDS.
1149  003164  105303                          DECB    R3              ;DONE?
1150  003166  001375                          BNE     1$              ;NO
1151  003170  012700  013662                  MOV     #XTXBUF,R0      ;SET SEC BUFFER
1152  003174  005003                          CLR     R3              ;
1153  003176  110320                  2$:     MOVB    R3,(R0)+        ;SECONDARY IS BINARY COUNT
1154  003200  105203                          INCB    R3              ;DONE?
1155  003202  100375                          BPL     2$              ;NO
1156  003204  012777  003502  176136          MOV     #RXISR,@DQRVEC  ;SET RECEIVER INTERUPT POINTER
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 1157  003212  012777  000240  176132          MOV     #240,@DQRLVL    ;SET PRIO: TO 5
 1158  003220  012777  003334  176126          MOV     #TXISR,@DQTVEC  ;SET TX VECTOR
 1159  003226  012777  000240  176122          MOV     #240,@DQTLVL    ;SET PRIO TO 5
 1160  003234  012777  000041  176116          MOV     #BIT5+BIT0,@DQRCSR      ;SET RX GO AND IE
 1161  003242  012777  000051  176114          MOV     #BIT5+BIT3+BIT0,@DQTCSR ;SET TX GO AND IE AND ERROR IE
 1162  003250  005037  001246                  CLR     TEMP2           ;SET TIMER
 1163  003254  012737  000113  001250          MOV     #75.,TEMP3      ;SET NUMBER OF INTERUPTS WANTED
 1164  003262  012737  000020  001252  4$:     MOV     #16.,TEMP4      ;SET FOR 16 REGISTERS
 1165  003270  142777  000017  176072          BICB    #17,@DQREG      ;SEL RX BA PRI.
 1166  003276  105777  176066          3$:     TSTB    @DQREG          ;SIT HERE AND MAKE WAVES
 1167  003302  005777  176064                  TST     @DQSEC          ;WHILE INTERUPTS OCCUR
 1168  003306  105277  176056                  INCB    @DQREG          ;*#*#*#*#*#*#*#*#*#*#*#*#*#*#*
 1169  003312  005337  001252                  DEC     TEMP4           ;*#*#*#*#*#*#*#*#*#*#*#*#*#*#*
 1170  003316  001367                          BNE     3$              ;SAME
 1171  003320  005237  001246                  INC     TEMP2           ;UPDATE COUNTER
 1172  003324  001356                          BNE     4$              ;KEEP GOING
 1173  003326  104005                          HLT     5               ;RX FAILED TO CONTINUSLY INTERUPT
 1174                                                                  ;*****STRONGLY SUGGEST SW08-1 (GOTO TOP OF TEST OF ERROR
 1175  003330  000754                          BR      4$              ;KEEP IT GOING.
 1176  003332  104400                  ENDTS2: SCOPE                   ;SCOPE THIS TEST.....
 1177
 1178
 1179  003334  017737  176026  014266  TXISR:  MOV     @DQERR,ERR      ;ANY ERRORS
 1180  003342  100001                          BPL     .+4             ;BR IF NO
 1181  003344  104004                          HLT     4               ;DQ11 ERROR FLAG IS SET.
 1182                                                                  ;*****STRONGLY SUGGEST SW08-1 (GOTO TOP OF TEST OF ERROR
 1183  003346  032777  000004  176010          BIT     #BIT2,@DQTCSR   ;WHO SHOULD I SERVICE PRI OR SEC?
 1184  003354  001425                          BEQ     1$              ;BR IF SEC NEEDS SERVICE
 1185  003356  112777  000002  176004          MOVB    #2,@DQREG       ;SEL TX BA PRI
 1186  003364  042777  000200  175772          BIC     #BIT7,@DQTCSR   ;CLEAR TX PRI DONE.
 1187  003372  012777  013054  175772          MOV     #TXBFA,@DQSEC   ;LOAD THE TX BA PRI
 1188  003400  105277  175764                  INCB    @DQREG          ;SEL THE TX WC PRI.
 1189  003404  152777  000120  175756          BISB    #BIT6+BIT4,@DQREG       ;SET WRITE EN. AND ENTER T
 1190  003412  012777  177600  175752          MOV     #-200,@DQSEC    ;LOAD TX WC PRI.
 1191  003420  142777  000017  175742          BICB    #17,@DQREG      ;CLEAR REG POINTER.
 1192  003426  000002                          RTI                     ;EXIT  STAGE RIGHT
 1193  003430  042777  000100  175726  1$:     BIC     #BIT6,@DQTCSR   ;CLEAR TX SEC DONE
 1194  003436  112777  000006  175724          MOVB    #6,@DQREG       ;SEL THE TX BA PRI.
 1195  003444  012777  013662  175720          MOV     #XTXBUF,@DQSEC  ;LOAD THE TX BA SEC
 1196  003452  105277  175712                  INCB    @DQREG          ;SEL THE TX WC SEC
 1197  003456  152777  000060  175704          BISB    #BIT5+BIT4,@DQREG       ;SET WRITE EN. AND EXIT T
 1198  003464  012777  177600  175700          MOV     #-200,@DQSEC    ;LOAD THE TX WC SEC
 1199  003472  142777  000017  175670  2$:     BICB    #17,@DQREG      ;CLEAR REG POINTER
 1200  003500  000002                          RTI                     ;EXIT    STAGE LEFT.
 1201
 1202  003502                          RXISR:
 1203  003502  005037  001246                  CLR     TEMP2           ;LET TIMER KNOW THAT RX INTERUPTED
 1204  003506  017737  175654  014266          MOV     @DQERR,ERR      ;ANY ERRORS
 1205  003514  100001                          BPL     .+4             ;BR IF NO
 1206  003516  104004                          HLT     4               ;DQ11 ERROR FLAG SET!!!!
 1207                                                                  ;*****STRONGLY SUGGEST SW08-1 (GOTO TOP OF TEST OF ERROR
 1208  003520  032777  000004  175632          BIT     #BIT2,@DQRCSR   ;WHO SERVICE  PRI OR SEC
 1209  003526  001426                          BEQ     2$              ;BR IF SEC NEEDS SERVICE
 1210  003530  042777  000200  175622          BIC     #BIT7,@DQRCSR   ;CLEAR RX PRI. DONE
 1211  003536  105077  175626                  CLRB    @DQREG          ;SEL RX BA PRI.
 1212  003542  012777  013256  175622          MOV     #RXBUFF,@DQSEC  ;LOAD IT
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1213  003550  105277  175614                    INCB    @DQREG          ;SEL THE RX WC PRI.
1214  003554  152777  000120  175606            BISB    #BIT6+BIT4,@DQREG       ;SET WRITE EN. AND ENTER T
1215  003562  012777  177600  175602            MOV     #-200,@DQSEC    ;LOAD RX WC SEC
1216  003570  012701  013054                    MOV     #TXBFA,R1       ;PREPARE TO CHECK DATA. SET TX POINTER
1217  003574  012702  013256                    MOV     #RXBUFF,R2      ;SET RX POINTER
1218  003600  000137  003656          1$:       JMP     3$              ;GO AND CHECK DATA
1219  003604  042777  000100  175546  2$:       BIC     #BIT6,@DQRCSR   ;CLEAR RX SEC DONE
1220  003612  112777  000004  175550            MOVB    #4,@DQREG       ;SEL RX BA SEC
1221  003620  012777  014064  175544            MOV     #XRXBUF,@DQSEC  ;LOAD IT
1222  003626  105277  175536                    INCB    @DQREG          ;SEL THE RX WC SEC
1223  003632  152777  000060  175530            BISB    #BIT5+BIT4,@DQREG       ;SET WRITE EN. AND EXIT T
1224  003640  012777  177600  175524            MOV     #-200,@DQSEC    ;WRITE RX WC SEC
1225  003646  012701  013662                    MOV     #XTXBUF,R1      ;GET TX BUFFER POINTER
1226  003652  012702  014064                    MOV     #XRXBUF,R2      ;GET RX POINTER
1227  003656  012700  000200          3$:       MOV     #200,R0         ;GET NUMBER OF CHARS
1228  003662  142711  000200          4$:       BICB    #BIT7,(R1)      ;CLEAR VRC
1229  003666  142712  000200                    BICB    #BIT7,(R2)      ;CLEAR VRC
1230  003672  122122                            CMPB    (R1)+,(R2)+     ;DATA OK?
1231  003674  001414                            BEQ     7$              ;BR IF YES
1232  003676  112777  000012  175464            MOVB    #12,@DQREG      ;SEL MISC REG
1233  003704  052777  000002  175460            BIS     #BIT1,@DQSEC    ;STOP THE DQ11 CLOCK.
1234  003712  114137  014302                    MOVB    -(R1),GDCHAR    ;STORE GOOD CHAR
1235  003716  114237  014274                    MOVB    -(R2),CHAR      ;STORE BAD CHAR.
1236  003722  104003                            HLT     3               ;DATA COMPARE ERROR
1237                                            ;*****STRONGLY SUGGEST SW08-1 (GOTO TOP OF TEST OF ERROR
1238  003724  122122                            CMPB    (R1)+,(R2)+     ;POP POINTERS
1239  003726  005300                  7$:       DEC     R0              ;ALL DATA CHECKED?
1240  003730  001354                            BNE     4$              ;BR IF NO
1241  003732  005337  001250                    DEC     TEMP3           ;ALL INTERUPTS DONE?
1242  003736  001003                            BNE     6$              ;NO KEEP INTERUPTING
1243  003740  000005                  5$:       RESET                   ;STOP THE SHOW CLEAR THE WORLD
1244  003742  012716  003332                    MOV     #ENDTS2,(SP)    ;SET FOR END TEST RETURN
1245  003746  142777  000017  175414  6$:       BICB    #17,@DQREG      ;CLEAR REG POINTER
1246  003754  000002                            RTI                     ;EXIT  STAGE MIDDLE
1247
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1248
1249
1250                                    ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1251                                    ;THIS TEST WILL XMIT AND RECV CHARACTERS
1252                                    ;AT 2 BITS/PER/CHAR.
1253                                    ;DATA CHECKING WILL BE PERFORMED!
1254
1255                                ;  TEST 3
1256                                ;*************************************************************************
1257  003756  012737  000003  001226 TST3:   MOV     #3,TSTNO
1258  003764  012737  004324  001216         MOV     #TST4,NEXT
1259  003772  104413                        MEMCLR                  ;CLEAR ALL THE DQ11
1260  003774  012700  013256                MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1261  004000  005001                        CLR     R1              ;SET UP TO CLEAR THE BUFFER
1262  004002  005020                5$:     CLR     (R0)+           ;CLEAR IT
1263  004004  105201                        INCB    R1              ;DONE?
1264  004006  100375                        BPL     5$              ;BRANCH IF NO
1265  004010  112777  000011  175352        MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1266  004016  013737  013052  001246        MOV     SYNC,TEMP2      ;LOAD SYNCS
1267  004024  012737  177774  012370        MOV     #177774,MASK    ;LOAD THE MASK
1268  004032  143737  012370  001246        BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1269  004040  005737  001510                TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
1270  004044  100003                        BPL     10$             ;IF YES,BR.                             ;;++D
1271  004046  000241                        CLC                     ;CORRECT SYNC CHARACTER
1272  004050  106037  001246                RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1273  004054  143737  012370  001247 10$:    BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO                     ;;++D
1274  004062  000241                        CLC                     ;COME UP WITH THE
1275  004064  106037  001247                RORB    TEMP2+1         ;PROPER SYNC CHARACTER
1276  004070  013737  001246  012372        MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1277  004076  013737  001246  012374        MOV     TEMP2,SYNC2     ;DITTO
1278  004104  013777  001246  175260        MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1279  004112  105277  175252                INCB    @DQREG          ;SEL THE MISC REGISTER
1280  004116  012777  000010  175246        MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1281  004124  012700  000016                MOV     #16,R0          ;
1282  004130  000300                        SWAB    R0              ;FLIP THE BYTES
1283  004132  050077  175234                BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1284  004136  052777  000002  175226        BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1285  004144  042777  000002  175220        BIC     #BIT1,@DQSEC    ;AND ON
1286  004152  105077  175212                CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1287  004156  012777  013256  175206        MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1288  004164  105277  175200                INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1289  004170  012777  177734  175174        MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1290  004176  105277  175166                INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1291  004202  012777  012374  175162        MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1292  004210  105277  175154                INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1293  004214  012777  177732  175150        MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1294  004222  005277  175132                INC     @DQRCSR         ;SET RX GO
1295  004226  005277  175132                INC     @DQTCSR         ;SET TX GO
1296  004232  005005                        CLR     R5              ;START TIMING
1297  004234  105777  175120         1$:    TSTB    @DQRCSR         ;IS DONE UP?
1298  004240  100404                        BMI     2$              ;BRANCH IF YES
1299  004242  062705  000001                ADD     #1,R5           ;WAIT
1300  004246  001372                        BNE     1$              ;BR IF MORE TO GO
1301  004250  104001                        HLT     1               ;ERROR--NO RX DONE
1302  004252  012700  012376         2$:    MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1303  004256  012701  013256                MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
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1304  004262  012702  000044              MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1305  004266                        3$:
1306  004266  112005                      MOVB    (R0)+,R5        ;GET A CHARACTER TO COPMARE
1307  004270  005037  001246              CLR     TEMP2           ;;
1308  004274  112137  001246              MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1309  004300  013704  001246              MOV     TEMP2,R4        ;MOVE TO R4
1310  004304  043705  012370              BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1311  004310  020504                      CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1312  004312  001401                      BEQ     4$              ;BR IF OK
1313  004314  104002                      HLT     2               ;ERROR--DATA DOESN'T MATCH
1314  004316  005302              4$:     DEC     R2              ;ALL DONE?
1315  004320  001362                      BNE     3$              ;NO--GO BACK FOR MORE
1316  004322  104400                      SCOPE                   ;SCOPE THIS TEST
1317
1318
1319                                      ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1320                                      ;THIS TEST WILL XMIT AND RECV CHARACTERS
1321                                      ;AT 3 BITS/PER/CHAR.
1322                                      ;DATA CHECKING WILL BE PERFORMED!
1323
1324                              ;  TEST 4
1325                              ;*****************************************************************************
1326  004324  012737  000004  001226  TST4:   MOV     #4,TSTNO
1327  004332  012737  004672  001216          MOV     #TST5,NEXT
1328  004340  104413                         MEMCLR                  ;CLEAR ALL THE DQ11
1329  004342  012700  013256                 MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1330  004346  005001                         CLR     R1              ;SET UP TO CLEAR THE BUFFER
1331  004350  005020                  5$:    CLR     (R0)+           ;CLEAR IT
1332  004352  105201                         INCB    R1              ;DONE?
1333  004354  100375                         BPL     5$              ;BRANCH IF NO
1334  004356  112777  000011  175004         MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1335  004364  013737  013052  001246         MOV     SYNC,TEMP2      ;LOAD SYNCS
1336  004372  012737  177770  012370         MOV     #177770,MASK    ;LOAD THE MASK
1337  004400  143737  012370  001246         BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1338  004406  005737  001510                 TST     DQSTAT          ;SINGLE SYNC CHARACTER?         ;;++D
1339  004412  100003                         BPL     10$             ;IF YES,BR.                     ;;++D
1340  004414  000241                         CLC                     ;CORRECT SYNC CHARACTER
1341  004416  106037  001246                 RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1342  004422  143737  012370  001247  10$:   BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO             ;;++D
1343  004430  000241                         CLC                     ;COME UP WITH THE
1344  004432  106037  001247                 RORB    TEMP2+1         ;PROPER SYNC CHARACTER
1345  004436  013737  001246  012372         MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1346  004444  013737  001246  012374         MOV     TEMP2,SYNC2     ;DITTO
1347  004452  013777  001246  174712         MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1348  004460  105277  174704                 INCB    @DQREG          ;SEL THE MISC REGISTER
1349  004464  012777  000010  174700         MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1350  004472  012700  000015                 MOV     #15,R0          ;
1351  004476  000300                         SWAB    R0              ;FLIP THE BYTES
1352  004500  050077  174666                 BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1353  004504  052777  000002  174660         BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1354  004512  042777  000002  174652         BIC     #BIT1,@DQSEC    ;AND ON
1355  004520  105077  174644                 CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1356  004524  012777  013256  174640         MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1357  004532  105277  174632                 INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1358  004536  012777  177734  174626         MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1359  004544  105277  174620                 INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
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1360  004550  012777  012374  174614          MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1361  004556  105277  174606                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1362  004562  012777  177732  174602          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1363  004570  005277  174564                  INC     @DQRCSR         ;SET RX GO
1364  004574  005277  174564                  INC     @DQTCSR         ;SET TX GO
1365  004600  005005                          CLR     R5              ;START TIMING
1366  004602  105777  174552          1$:     TSTB    @DQRCSR         ;IS DONE UP?
1367  004606  100404                          BMI     2$              ;BRANCH IF YES
1368  004610  062705  000001                  ADD     #1,R5           ;WAIT
1369  004614  001372                          BNE     1$              ;BR IF MORE TO GO
1370  004616  104001                          HLT     1               ;ERROR--NO RX DONE
1371  004620  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1372  004624  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1373  004630  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1374  004634                          3$:
1375  004634  112005                          MOVB    (R0)+,R5        ;GET A CHARACTER TO COPMARE
1376  004636  005037  001246                  CLR     TEMP2           ;;
1377  004642  112137  001246                  MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1378  004646  013704  001246                  MOV     TEMP2,R4        ;MOVE TO R4
1379  004652  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1380  004656  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1381  004660  001401                          BEQ     4$              ;BR IF OK
1382  004662  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1383  004664  005302          4$:     DEC     R2              ;ALL DONE?
1384  004666  001362                          BNE     3$              ;NO--GO BACK FOR MORE
1385  004670  104400                          SCOPE                   ;SCOPE THIS TEST
1386
1387
1388                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1389                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
1390                                          ;AT 4 BITS/PER/CHAR.
1391                                          ;DATA CHECKING WILL BE PERFORMED!
1392
1393                                  ;  TEST 5
1394                                  ;*************************************************************************
1395  004672  012737  000005  001226  TST5:   MOV     #5,TSTNO
1396  004700  012737  005240  001216          MOV     #TST6,NEXT
1397  004706  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
1398  004710  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1399  004714  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
1400  004716  005020          5$:     CLR     (R0)+           ;CLEAR IT
1401  004720  105201                          INCB    R1              ;DONE?
1402  004722  100375                          BPL     5$              ;BRANCH IF NO
1403  004724  112777  000011  174436          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1404  004732  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
1405  004740  012737  177760  012370          MOV     #177760,MASK    ;LOAD THE MASK
1406  004746  143737  012370  001246          BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1407  004754  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
1408  004760  100003                          BPL     10$             ;IF YES,BR.                             ;;++D
1409  004762  000241                          CLC                     ;CORRECT SYNC CHARACTER
1410  004764  106037  001246                  RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1411  004770  143737  012370  001247  10$:   BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO                     ;;++D
1412  004776  000241                          CLC                     ;COME UP WITH THE
1413  005000  106037  001247                  RORB    TEMP2+1         ;PROPER SYNC CHARACTER
1414  005004  013737  001246  012372          MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1415  005012  013737  001246  012374          MOV     TEMP2,SYNC2     ;DITTO
```

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1416  005020  013777  001246  174344          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1417  005026  105277  174336                  INCB    @DQREG          ;SEL THE MISC REGISTER
1418  005032  012777  000010  174332          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1419  005040  012700  000014                  MOV     #14,R0          ;
1420  005044  000300                          SWAB    R0              ;FLIP THE BYTES
1421  005046  050077  174320                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1422  005052  052777  000002  174312          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1423  005060  042777  000002  174304          BIC     #BIT1,@DQSEC    ;AND ON
1424  005066  105077  174276                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1425  005072  012777  013256  174272          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1426  005100  105277  174264                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1427  005104  012777  177734  174260          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1428  005112  105277  174252                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1429  005116  012777  012374  174246          MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1430  005124  105277  174240                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1431  005130  012777  177732  174234          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1432  005136  005277  174216                  INC     @DQRCSR         ;SET RX GO
1433  005142  005277  174216                  INC     @DQTCSR         ;SET TX GO
1434  005146  005005                          CLR     R5              ;START TIMING
1435  005150  105777  174204          1$:     TSTB    @DQRCSR         ;IS DONE UP?
1436  005154  100404                          BMI     2$              ;BRANCH IF YES
1437  005156  062705  000001                  ADD     #1,R5           ;WAIT
1438  005162  001372                          BNE     1$              ;BR IF MORE TO GO
1439  005164  104001                          HLT     1               ;ERROR--NO RX DONE
1440  005166  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1441  005172  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1442  005176  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1443  005202                          3$:
1444  005202  112005                          MOVB    (R0)+,R5        ;GET A CHARACTER TO COMPARE
1445  005204  005037  001246                  CLR     TEMP2           ;;
1446  005210  112137  001246                  MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1447  005214  013704  001246                  MOV     TEMP2,R4        ;MOVE TO R4
1448  005220  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1449  005224  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1450  005226  001401                          BEQ     4$              ;BR IF OK
1451  005230  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1452  005232  005302                  4$:     DEC     R2              ;ALL DONE?
1453  005234  001362                          BNE     3$              ;NO--GO BACK FOR MORE
1454  005236  104400                          SCOPE                   ;SCOPE THIS TEST
1455
1456
1457                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1458                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
1459                                          ;AT 5 BITS/PER/CHAR.
1460                                          ;DATA CHECKING WILL BE PERFORMED.
1461
1462                                  ;  TEST 6
1463                                  ;*****************************************************************
1464  005240  012737  000006  001226  TST6:   MOV     #6,TSTNO
1465  005246  012737  005606  001216          MOV     #TST7,NEXT
1466  005254  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
1467  005256  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1468  005262  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
1469  005264  005020                  5$:     CLR     (R0)+           ;CLEAR IT
1470  005266  105201                          INCB    R1              ;DONE?
1471  005270  100375                          BPL     5$              ;BRANCH IF NO
```

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1472  005272  112777  000011  174070          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1473  005300  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
1474  005306  012737  177740  012370          MOV     #177740,MASK    ;LOAD THE MASK
1475  005314  143737  012370  001246          BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1476  005322  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
1477  005326  100003                          BPL     10$             ;IF YES,BR.                             ;;++D
1478  005330  000241                          CLC                     ;CORRECT SYNC CHARACTER
1479  005332  106037  001246                  RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1480  005336  143737  012370  001247  10$:    BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO                     ;;++D
1481  005344  000241                          CLC                     ;COME UP WITH THE
1482  005346  106037  001247                  RORB    TEMP2+1         ;PROPER SYNC CHARACTER
1483  005352  013737  001246  012372          MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1484  005360  013737  001246  012374          MOV     TEMP2,SYNC2     ;DITTO
1485  005366  013777  001246  173776          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1486  005374  105277  173770                  INCB    @DQREG          ;SEL THE MISC REGISTER
1487  005400  012777  000010  173764          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1488  005406  012700  000013                  MOV     #13,R0          ;
1489  005412  000300                          SWAB    R0              ;FLIP THE BYTES
1490  005414  050077  173752                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1491  005420  052777  000002  173744          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1492  005426  042777  000002  173736          BIC     #BIT1,@DQSEC    ;AND ON
1493  005434  105077  173730                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1494  005440  012777  013256  173724          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1495  005446  105277  173716                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1496  005452  012777  177734  173712          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1497  005460  105277  173704                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1498  005464  012777  012374  173700          MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1499  005472  105277  173672                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1500  005476  012777  177732  173666          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1501  005504  005277  173650                  INC     @DQRCSR         ;SET RX GO
1502  005510  005277  173650                  INC     @DQTCSR         ;SET TX GO
1503  005514  005005                          CLR     R5              ;START TIMING
1504  005516  105777  173636          1$:     TSTB    @DQRCSR         ;IS DONE UP?
1505  005522  100404                          BMI     2$              ;BRANCH IF YES
1506  005524  062705  000001                  ADD     #1,R5           ;WAIT
1507  005530  001372                          BNE     1$              ;BR IF MORE TO GO
1508  005532  104001                          HLT     1               ;ERROR--NO RX DONE
1509  005534  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1510  005540  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1511  005544  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1512  005550                          3$:
1513  005550  112005                          MOVB    (R0)+,R5        ;GET A CHARACTER TO COPMARE
1514  005552  005037  001246                  CLR     TEMP2           ;;
1515  005556  112137  001246                  MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1516  005562  013704  001246                  MOV     TEMP2,R4        ;MOVE TO R4
1517  005566  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1518  005572  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1519  005574  001401                          BEQ     4$              ;BR IF OK
1520  005576  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1521  005600  005302          4$:             DEC     R2              ;ALL DONE?
1522  005602  001362                          BNE     3$              ;NO--GO BACK FOR MORE
1523  005604  104400                          SCOPE                   ;SCOPE THIS TEST
1524
1525
1526                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1527                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
```

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1528                                            ;AT 6 BITS/PER/CHAR.
1529                                            ;DATA CHECKING WILL BE PERFORMED.
1530
1531                                    ;  TEST 7
1532                                    ;*************************************************************************
1533  005606  012737  000007  001226  TST7:    MOV     #7,TSTNO
1534  005614  012737  006154  001216          MOV     #TST10,NEXT
1535  005622  104413                         MEMCLR                  ;CLEAR ALL THE DQ11
1536  005624  012700  013256                 MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1537  005630  005001                         CLR     R1              ;SFT UP TO CLEAR THE BUFFER
1538  005632  005020                  5$:    CLR     (R0)+           ;CLEAR IT
1539  005634  105201                         INCB    R1              ;DONE?
1540  005636  100375                         BPL     5$              ;BRANCH IF NO
1541  005640  112777  000011  173522         MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1542  005646  013737  013052  001246         MOV     SYNC,TEMP2      ;LOAD SYNCS
1543  005654  012737  177700  012370         MOV     #177700,MASK    ;LOAD THE MASK
1544  005662  143737  012370  001246         BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1545  005670  005737  001510                 TST     DQSTAT          ;SINGLE SYNC CHARACTER?         ;;++D
1546  005674  100003                         BPL     10$             ;IF YES,BR.                     ;;++D
1547  005676  000241                         CLC                     ;CORRECT SYNC CHARACTER
1548  005700  106037  001246                 RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1549  005704  143737  012370  001247  10$:    BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO             ;;++D
1550  005712  000241                         CLC                     ;COME UP WITH THE
1551  005714  106037  001247                 RORB    TEMP2+1         ;PROPER SYNC CHARACTER
1552  005720  013737  001246  012372         MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1553  005726  013737  001246  012374         MOV     TEMP2,SYNC2     ;DITTO
1554  005734  013777  001246  173430         MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1555  005742  105277  173422                 INCB    @DQREG          ;SEL THE MISC REGISTER
1556  005746  012777  000010  173416         MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1557  005754  012700  000012                 MOV     #12,R0          ;
1558  005760  000300                         SWAB    R0              ;FLIP THE BYTES
1559  005762  050077  173404                 BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1560  005766  052777  000002  173376         BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1561  005774  042777  000002  173370         BIC     #BIT1,@DQSEC    ;AND ON
1562  006002  105077  173362                 CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1563  006006  012777  013256  173356         MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1564  006014  105277  173350                 INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1565  006020  012777  177734  173344         MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1566  006026  105277  173336                 INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1567  006032  012777  012374  173332         MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1568  006040  105277  173324                 INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1569  006044  012777  177732  173320         MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1570  006052  005277  173302                 INC     @DQRCSR         ;SET RX GO
1571  006056  005277  173302                 INC     @DQTCSR         ;SET TX GO
1572  006062  005005                         CLR     R5              ;START TIMING
1573  006064  105777  173270          1$:    TSTB    @DQRCSR         ;IS DONE UP?
1574  006070  100404                         BMI     2$              ;BRANCH IF YES
1575  006072  062705  000001                 ADD     #1,R5           ;WAIT
1576  006076  001372                         BNE     1$              ;BR IF MORE TO GO
1577  006100  104001                         HLT     1               ;ERROR--NO RX DONE
1578  006102  012700  012376          2$:    MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1579  006106  012701  013256                 MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1580  006112  012702  000044                 MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1581  006116                           3$:
1582  006116  112005                         MOVB    (R0)+,R5        ;GET A CHARACTER TO COMPARE
1583  006120  005037  001246                 CLR     TEMP2           ;.
```

```
1584  006124  112137  001246                  MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1585  006130  013704  001246                  MOV     TEMP2,R4        ;MOVE TO R4
1586  006134  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1587  006140  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1588  006142  001401                          BEQ     4$              ;BR IF OK
1589  006144  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1590  006146  005302                  4$:     DEC     R2              ;ALL DONE?
1591  006150  001362                          BNE     3$              ;NO--GO BACK FOR MORE
1592  006152  104400                          SCOPE                   ;SCOPE THIS TEST
1593
1594
1595                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1596                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
1597                                          ;AT 7 BITS/PER/CHAR.
1598                                          ;DATA CHECKING WILL BE PERFORMED!
1599
1600                                  .  TEST 10
1601                                  ;*****************************************************************************
1602  006154  012737  000010  001226  TST10:  MOV     #10,TSTNO
1603  006162  012737  006522  001216          MOV     #TST11,NEXT
1604  006170  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
1605  006172  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1606  006176  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
1607  006200  005020                  5$:     CLR     (R0)+           ;CLEAR IT
1608  006202  105201                          INCB    R1              ;DONE?
1609  006204  100375                          BPL     5$              ;BRANCH IF NO
1610  006206  112777  000011  173154          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1611  006214  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
1612  006222  012737  177600  012370          MOV     #177600,MASK    ;LOAD THE MASK
1613  006230  143737  012370  001246          BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1614  006236  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
1615  006242  100003                          BPL     10$             ;IF YES,BR.                             ;;++D
1616  006244  000241                          CLC                     ;CORRECT SYNC CHARACTER
1617  006246  106037  001246                  RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1618  006252  143737  012370  001247  10$:    BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO                     ;;++D
1619  006260  000241                          CLC                     ;COME UP WITH THE
1620  006262  106037  001247                  RORB    TEMP2+1         ;PROPFR SYNC CHARACTER
1621  006266  013737  001246  012372          MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1622  006274  013737  001246  012374          MOV     TEMP2,SYNC2     ;DITTO
1623  006302  013777  001246  173062          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1624  006310  105277  173054                  INCB    @DQREG          ;SEL THE MISC REGISTER
1625  006314  012777  000010  173050          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1626  006322  012700  000011                  MOV     #11,R0          ;
1627  006326  000300                          SWAB    R0              ;FLIP THE BYTES
1628  006330  050077  173036                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1629  006334  052777  000002  173030          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1630  006342  042777  000002  173022          BIC     #BIT1,@DQSEC    ;AND ON
1631  006350  105077  173014                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1632  006354  012777  013256  173010          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1633  006362  105277  173002                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1634  006366  012777  177734  172776          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1635  006374  105277  172770                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1636  006400  012777  012374  172764          MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1637  006406  105277  172756                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1638  006412  012777  177732  172752          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1639  006420  005277  172734                  INC     @DQRCSR         ;SET RX GO
```

```
                        PROGRAM INITIALIZATION AND START UP.

1640  006424  005277  172734            INC     @DQTCSR         ;SET TX GO
1641  006430  005005                    CLR     R5              ;START TIMING
1642  006432  105777  172722    1$:     TSTB    @DQRCSR         ;IS DONE UP?
1643  006436  100404                    BMI     2$              ;BRANCH IF YES
1644  006440  062705  000001            ADD     #1,R5           ;WAIT
1645  006444  001372                    BNE     1$              ;BR IF MORE TO GO
1646  006446  104001                    HLT     1               ;ERROR--NO RX DONE
1647  006450  012700  012376    2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1648  006454  012701  013256            MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1649  006460  012702  000044            MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1650  006464                    3$:
1651  006464  112005                    MOVB    (R0)+,R5        ;GET A CHARACTER TO COPMARE
1652  006466  005037  001246            CLR     TEMP2           ;;
1653  006472  112137  001246            MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1654  006476  013704  001246            MOV     TEMP2,R4        ;MOVE TO R4
1655  006502  043705  012370            BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1656  006506  020504                    CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1657  006510  001401                    BEQ     4$              ;BR IF OK
1658  006512  104002                    HLT     2               ;ERROR--DATA DOESN'T MATCH
1659  006514  005302            4$:     DEC     R2              ;ALL DONE?
1660  006516  001362                    BNE     3$              ;NO--GO BACK FOR MORE
1661  006520  104400                    SCOPE                   ;SCOPE THIS TEST
1662
1663
1664                                    ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1665                                    ;THIS TEST WILL XMIT AND RECV CHARACTERS
1666                                    ;AT 8 BITS/PER/CHAR.
1667                                    ;DATA CHECKING WILL BE PERFORMED
1668
1669                            ;  TEST 11
1670                            ;*************************************************************************
1671  006522  012737  000011  001226    TST11:  MOV     #11,TSTNO
1672  006530  012737  007070  001216            MOV     #TST12,NEXT
1673  006536  104413                    MEMCLR                  ;CLEAR ALL THE DQ11
1674  006540  012700  013256            MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1675  006544  005001                    CLR     R1              ;SET UP TO CLEAR THE BUFFER
1676  006546  005020            5$:     CLR     (R0)+           ;CLEAR IT
1677  006550  105201                    INCB    R1              ;DONE?
1678  006552  100375                    BPL     5$              ;BRANCH IF NO
1679  006554  112777  000011  172606    MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1680  006562  013737  013052  001246    MOV     SYNC,TEMP2      ;LOAD SYNCS
1681  006570  012737  177400  012370    MOV     #177400,MASK    ;LOAD THE MASK
1682  006576  143737  012370  001246    BICB    MASK,TEMP2      ;SET UP A MASK TO GET THE
1683  006604  005737  001510            TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;**D
1684  006610  100003                    BPL     10$             ;IF YES,BR.                             ;;**D
1685  006612  000241                    CLC                     ;CORRECT SYNC CHARACTER
1686  006614  106037  001246            RORB    TEMP2           ;FOR THIS CHARACTER LENGTH
1687  006620  143737  012370  001247    10$:    BICB    MASK,TEMP2+1    ;MANIPULATE DATA TO             ;;**D
1688  006626  000241                    CLC                     ;COME UP WITH THE
1689  006630  106037  001247            RORB    TEMP2+1         ;PROPER SYNC CHARACTER
1690  006634  013737  001246  012372    MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER
1691  006642  013737  001246  012374    MOV     TEMP2,SYNC2     ;DITTO
1692  006650  013777  001246  172514    MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1693  006656  105277  172506            INCB    @DQREG          ;SEL THE MISC REGISTER
1694  006662  012777  000010  172502    MOV     #2**T3,@DQSEC   ;SET TEST LOOP
1695  006670  012700  000010            MOV     #10,R0          ;
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1696  006674  000300                          SWAB    R0              ;FLIP THE BYTES
1697  006676  050077  172470                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1698  006702  052777  000002  172462          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1699  006710  042777  000002  172454          BIC     #BIT1,@DQSEC    ;AND ON
1700  006716  105077  172446                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1701  006722  012777  013256  172442          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1702  006730  105277  172434                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1703  006734  012777  177734  172430          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1704  006742  105277  172422                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1705  006746  012777  012374  172416          MOV     #SYNC2,@DQSEC   ;LOAD THE SYNC CHAR
1706  006754  105277  172410                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1707  006760  012777  177732  172404          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1708  006766  005277  172366                  INC     @DQRCSR         ;SET RX GO
1709  006772  005277  172366                  INC     @DQTCSR         ;SET TX GO
1710  006776  005005                          CLR     R5              ;START TIMING
1711  007000  105777  172354          1$:     TSTB    @DQRCSR         ;IS DONE UP?
1712  007004  100404                          BMI     2$              ;BRANCH IF YES
1713  007006  062705  000001                  ADD     #1,R5           ;WAIT
1714  007012  001372                          BNE     1$              ;BR IF MORE TO GO
1715  007014  104001                          HLT     1               ;ERROR--NO RX DONE
1716  007016  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1717  007022  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1718  007026  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1719  007032                          3$:
1720  007032  112005                          MOVB    (R0)+,R5        ;GET A CHARACTER TO COPMARE
1721  007034  005037  001246                  CLR     TEMP2           ;;
1722  007040  112137  001246                  MOVB    (R1)+,TEMP2     ;GET REC CHARACTER
1723  007044  013704  001246                  MOV     TEMP2,R4        ;MOVE TO R4
1724  007050  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1725  007054  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1726  007056  001401                          BEQ     4$              ;BR IF OK
1727  007060  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1728  007062  005302          4$:             DEC     R2              ;ALL DONE?
1729  007064  001362                          BNE     3$              ;NO--GO BACK FOR MORE
1730  007066  104400                          SCOPE                   ;SCOPE THIS TEST
1731
1732
1733                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1734                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
1735                                          ;AT 9 BITS/PER/CHAR.
1736                                          ;DATA CHECKING WILL BE PERFORMED.
1737
1738                                  ;  TEST 12
1739                                  ;*****************************************************************************
1740  007070  012737  000012  001226  TST12:  MOV     #12,TSTNO
1741  007076  012737  007420  001216          MOV     #TST13,NEXT
1742  007104  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
1743  007106  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1744  007112  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
1745  007114  005020          5$:             CLR     (R0)+           ;CLEAR IT
1746  007116  105201                          INCB    R1              ;DONE?
1747  007120  100375                          BPL     5$              ;BRANCH IF NO
1748  007122  112777  000011  172240          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1749  007130  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
1750  007136  012737  177000  012370          MOV     #177000,MASK    ;LOAD THE MASK
1751  007144  043737  012370  001246          BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
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1752  007152  000241                          CLC             ;CORRECT SYNC CHARACTER
1753  007154  006037  001246                  ROR     TEMP2   ;SHIFT IT
1754  007160  005737  001510                  TST     DQSTAT  ;SINGLE SYNC CHARACTER?                 ;;++D
1755  007164  100404                          BMI     10$     ;IF NO,BR.                              ;;++D
1756  007166  012737  177777  012372          MOV     #-1,SYNC1 ;IF YES, MARK.                        ;;++D
1757  007174  000403                          BR      20$     ;CONTINUE.                              ;;++D
1758  007176  013737  001246  012372  10$:    MOV     TEMP2,SYNC1 ;LOAD THE CHARACTER                 ;;++D
1759  007204  013737  001246  012374  20$:    MOV     TEMP2,SYNC2 ;DITTO                              ;;++D
1760  007212  013777  001246  172152          MOV     TEMP2,@DQSEC ;LOAD THE SYNC REGISTER
1761  007220  105277  172144                  INCB    @DQREG  ;SEL THE MISC REGISTER
1762  007224  012777  000010  172140          MOV     #BIT3,@DQSEC ;SET TEST LOOP
1763  007232  012700  000007                  MOV     #7,R0   ;
1764  007236  000300                          SWAB    R0      ;FLIP THE BYTES
1765  007240  050077  172126                  BIS     R0,@DQSEC ;SET CHARACTER LENGTH
1766  007244  052777  000002  172120          BIS     #BIT1,@DQSEC ;TURN CLOCK OFF...
1767  007252  042777  000002  172112          BIC     #BIT1,@DQSEC ;AND ON
1768  007260  105077  172104                  CLRB    @DQREG  ;SEL RX PRIMARY ADRESS
1769  007264  012777  013256  172100          MOV     #RXBUFF,@DQSEC ;SET ADRESS
1770  007272  105277  172072                  INCB    @DQREG  ;SEL RX PRIMARY CHAR COUNT
1771  007276  012777  177734  172066          MOV     #-36.,@DQSEC ;SET CHAR COUNT
1772  007304  105277  172060                  INCB    @DQREG  ;SEL TX PRIMARY ADDRESS
1773  007310  012777  012372  172054          MOV     #SYNC1,@DQSEC ;LOAD THE SYNC CHAR
1774  007316  105277  172046                  INCB    @DQREG  ;SEL TX PRI CHAR COUNT
1775  007322  012777  177732  172042          MOV     #-38.,@DQSEC ;SET CHAR COUNT
1776  007330  005277  172024                  INC     @DQRCSR ;SET RX GO
1777  007334  005277  172024                  INC     @DQTCSR ;SET TX GO
1778  007340  005005                          CLR     R5      ;START TIMING
1779  007342  105777  172012          1$:     TSTB    @DQRCSR ;IS DONE UP?
1780  007346  100404                          BMI     2$      ;BRANCH IF YES
1781  007350  062705  000001                  ADD     #1,R5   ;WAIT
1782  007354  001372                          BNE     1$      ;BR IF MORE TO GO
1783  007356  104001                          HLT     1       ;ERROR--NO RX DONE
1784  007360  012700  012376          2$:     MOV     #TXBUFF,R0 ;LOAD BUFFER POINTER
1785  007364  012701  013256                  MOV     #RXBUFF,R1 ;LOAD RX BUFFER POINTER
1786  007370  012702  000044                  MOV     #36.,R2 ;SET UP TO COUNT CHARACTERS
1787  007374                          3$:
1788  007374  012005                          MOV     (R0)+,R5 ;GET ANOTHER CHAR
1789  007376  012104                          MOV     (R1)+,R4 ;GET A REC CHAR
1790  007400  043705  012370                  BIC     MASK,R5 ;MASK OUT UNWANTED BITS
1791  007404  020504                          CMP     R5,R4   ;DO THE CHARACTERS MATCH?
1792  007406  001401                          BEQ     4$      ;BR IF OK
1793  007410  104002                          HLT     2       ;ERROR--DATA DOESN'T MATCH
1794  007412  005302                  4$:     DEC     R2      ;ALL DONE?
1795  007414  001367                          BNE     3$      ;NO--GO BACK FOR MORE
1796  007416  104400                          SCOPE           ;SCOPE THIS TEST
1797
1798
1799                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1800                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
1801                                          ;AT 10 BITS/PER/CHAR.
1802                                          ;DATA CHECKING WILL BE PERFORMED.
1803
1804                                  ;  TEST 13
1805                                  ;*****************************************************************
1806  007420  012737  000013  001226  ST13:   MOV     #13.,TSTNO
1807  007426  012737  007750  001216          MOV     #TST14,NEXT
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1808  007434  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
1809  007436  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER PC NTER
1810  007442  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
1811  007444  005020                  5$:     CLR     (R0)+           ;CLEAR IT
1812  007446  105201                          INCB    R1              ;DONE?
1813  007450  100375                          BPL     5$              ;BRANCH IF NO
1814  007452  112777  000011  171710          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1815  007460  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
1816  007466  012737  176000  012370          MOV     #176000,MASK    ;LOAD THE MASK
1817  007474  043737  012370  001246          BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
1818  007502  000241                          CLC                     ;CORRECT SYNC CHARACTER
1819  007504  006037  001246                  ROR     TEMP2           ;SHIFT IT
1820  007510  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?         ;;++D
1821  007514  100404                          BMI     10$             ;IF NO,BR.                      ;;++D
1822  007516  012737  177777  012372          MOV     #-1,SYNC1       ;IF YES, MARK.                  ;;++D
1823  007524  000403                          BR      20$             ;CONTINUE.                      ;;++D
1824  007526  013737  001246  012372   0$:    MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER             ;;++D
1825  007534  013737  001246  012374  20$:    MOV     TEMP2,SYNC2     ;DITTO                          ;;++D
1826  007542  013777  001246  171622          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1827  007550  105277  171614                  INCB    @DQREG          ;SEL THE MISC REGISTER
1828  007554  012777  000010  171610          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1829  007562  012700  000006                  MOV     #6,R0           ;
1830  007566  000300                          SWAB    R0              ;FLIP THE BYTES
1831  007570  050077  171576                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1832  007574  052777  000002  171570          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1833  007602  042777  000002  171562          BIC     #BIT1,@DQSEC    ;AND ON
1834  007610  105077  171554                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1835  007614  012777  013256  171550          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1836  007622  105277  171542                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1837  007626  012777  177734  171536          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1838  007634  105277  171530                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1839  007640  012777  012372  171524          MOV     #SYNC1,@DQSEC   ;LOAD THE SYNC CHAR
1840  007646  105277  171516                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1841  007652  012777  177732  171512          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1842  007660  005277  171474                  INC     @DQRCSR         ;SET RX GO
1843  007664  005277  171474                  INC     @DQTCSR         ;SET TX GO
1844  007670  005005                          CLR     R5              ;START TIMING
1845  007672  105777  171462          1$:     TSTB    @DQRCSR         ;IS DONE UP?
1846  007676  100404                          BMI     2$              ;BRANCH IF YES
1847  007700  062705  000001                  ADD     #1,R5           ;WAIT
1848  007704  001372                          BNE     1$              ;BR IF MORE TO GO
1849  007706  104001                          HLT     1               ;ERROR--NO RX DONE
1850  007710  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1851  007714  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1852  007720  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1853  007724                          3$:
1854  007724  012005                          MOV     (R0)+,R5        ;GET ANOTHER CHAR
1855  007726  012104                          MOV     (R1)+,R4        ;GET A REC CHAR
1856  007730  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1857  007734  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1858  007736  001401                          BEQ     4$              ;BR IF OK
1859  007740  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1860  007742  005302                  4$:     DEC     R2              ;ALL DONE?
1861  007744  001367                          BNE     3$              ;NO--GO BACK FOR MORE
1862  007746  104400                          SCOPE                   ;SCOPE THIS TEST
1863
```

```
1864
1865                                        ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1866                                        ;THIS TEST WILL XMIT AND RECV CHARACTERS
1867                                        ;AT 11 BITS/PER/CHAR.
1868                                        ;DATA CHECKING WILL BE PERFORMED!
1869
1870                                    ;  TEST 14
1871                                    ;*************************************************************************
1872  007750  012737  000014  001226  TST14:  MOV     #14,TSTNO
1873  007756  012737  010300  001216          MOV     #TST15,NEXT
1874  007764  104413                         MEMCLR                  ;CLEAR ALL THE DQ11
1875  007766  012700  013256                 MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
1876  007772  005001                         CLR     R1              ;SET UP TO CLEAR THE BUFFER
1877  007774  005020                  5$:    CLR     (R0)+           ;CLEAR IT
1878  007776  105201                         INCB    R1              ;DONE?
1879  010000  100375                         BPL     5$              ;BRANCH IF NO
1880  010002  112777  000011  171360         MOVB    #11,@DQREG      ;SELECT THE SYNC REG
1881  010010  013737  013052  001246         MOV     SYNC,TEMP2      ;LOAD SYNCS
1882  010016  012737  174000  012370         MOV     #174000,MASK    ;LOAD THE MASK
1883  010024  043737  012370  001246         BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
1884  010032  000241                         CLC                     ;CORRECT SYNC CHARACTER
1885  010034  006037  001246                 ROR     TEMP2           ;SHIFT IT
1886  010040  005737  001510                 TST     DQSTAT          ;SINGLE SYNC CHARACTER?          ;;++D
1887  010044  100404                         BMI     10$             ;IF NO,BR.                       ;;++D
1888  010046  012737  177777  012372         MOV     #-1,SYNC1       ;IF YES, MARK.                   ;;++D
1889  010054  000403                         BR      20$             ;CONTINUE.                       ;;++D
1890  010056  013737  001246  012372  10$:    MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER              ;;++D
1891  010064  013737  001246  012374  20$:    MOV     TEMP2,SYNC2     ;DITTO                           ;;++D
1892  010072  013777  001246  171272         MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
1893  010100  105277  171264                 INCB    @DQREG          ;SEL THE MISC REGISTER
1894  010104  012777  000010  171260         MOV     #BIT3,@DQSEC    ;SET TEST LOOP
1895  010112  012700  000005                 MOV     #5,R0           ;
1896  010116  000300                         SWAB    R0              ;FLIP THE BYTES
1897  010120  050077  171246                 BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
1898  010124  052777  000002  171240         BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
1899  010132  042777  000002  171232         BIC     #BIT1,@DQSEC    ;AND ON
1900  010140  105077  171224                 CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
1901  010144  012777  013256  171220         MOV     #RXBUFF,@DQSEC  ;SET ADRESS
1902  010152  105277  171212                 INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
1903  010156  012777  177734  171206         MOV     #-36.,@DQSEC    ;SET CHAR COUNT
1904  010164  105277  171200                 INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
1905  010170  012777  012372  171174         MOV     #SYNC1,@DQSEC   ;LOAD THE SYNC CHAR
1906  010176  105277  171166                 INCB    @DQREG          ;SEL TX PRI CHAR COUNT
1907  010202  012777  177732  171162         MOV     #-38.,@DQSEC    ;SET CHAR COUNT
1908  010210  005277  171144                 INC     @DQRCSR         ;SET RX GO
1909  010214  005277  171144                 INC     @DQTCSR         ;SET TX GO
1910  010220  005005                         CLR     R5              ;START TIMING
1911  010222  105777  171132           1$:   TSTB    @DQRCSR         ;IS DONE UP?
1912  010226  100404                         BMI     2$              ;BRANCH IF YES
1913  010230  062705  000001                 ADD     #1,R5           ;WAIT
1914  010234  001372                         BNE     1$              ;BR IF MORE TO GO
1915  010236  104001                         HLT     1               ;ERROR--NO RX DONE
1916  010240  012700  012376           2$:   MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1917  010244  012701  013256                 MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1918  010250  012702  000044                 MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1919  010254                           3$:
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 1920  010254  012005                          MOV     (R0)+,R5        ;GET ANOTHER CHAR
 1921  010256  012104                          MOV     (R1)+,R4        ;GET A REC CHAR
 1922  010260  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
 1923  010264  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
 1924  010266  001401                          BEQ     4$              ;BR IF OK
 1925  010270  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
 1926  010272  005302                  4$:     DEC     R2              ;ALL DONE?
 1927  010274  001367                          BNE     3$              ;NO--GO BACK FOR MORE
 1928  010276  104400                          SCOPE                   ;SCOPE THIS TEST
 1929
 1930
 1931                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
 1932                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
 1933                                          ;AT 12 BITS/PER/CHAR.
 1934                                          ;DATA CHECKING WILL BE PERFORMED!
 1935
 1936                                  . TEST 15 .
 1937                                  ;*************************************************************************
 1938  010300  012737  000015  001226  TST15:  MOV     #15,TSTNO
 1939  010306  012737  010630  001216          MOV     #TST16,NEXT
 1940  010314  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
 1941  010316  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
 1942  010322  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
 1943  010324  005020                  5$:     CLR     (R0)+           ;CLEAR IT
 1944  010326  105201                          INCB    R1              ;DONE?
 1945  010330  100375                          BPL     5$              ;BRANCH IF NO
 1946  010332  112777  000011  171030          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
 1947  010340  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
 1948  010346  012737  170000  012370          MOV     #170000,MASK    ;LOAD THE MASK
 1949  010354  043737  012370  001246          BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
 1950  010362  000241                          CLC                     ;CORRECT SYNC CHARACTER
 1951  010364  006037  001246                  ROR     TEMP2           ;SHIFT IT
 1952  010370  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
 1953  010374  100404                          BMI     10$             ;IF NO,BR.                              ;;++D
 1954  010376  012737  177777  012372          MOV     #-1,SYNC1       ;IF YES, MARK.                          ;;++D
 1955  010404  000403                          BR      20$             ;CONTINUE.                              ;;++D
 1956  010406  013737  001246  012372  10$:    MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER                     ;;++D
 1957  010414  013737  001246  012374  20$:    MOV     TEMP2,SYNC2     ;DITTO                                  ;;++D
 1958  010422  013777  001246  170742          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
 1959  010430  105277  170734                  INCB    @DQREG          ;SEL THE MISC REGISTER
 1960  010434  012777  000010  170730          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
 1961  010442  012700  000004                  MOV     #4,R0           ;
 1962  010446  000300                          SWAB    R0              ;FLIP THE BYTES
 1963  010450  050077  170716                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
 1964  010454  052777  000002  170710          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
 1965  010462  042777  000002  170702          BIC     #BIT1,@DQSEC    ;AND ON
 1966  010470  105077  170674                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
 1967  010474  012777  013256  170670          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
 1968  010502  105277  170662                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
 1969  010506  012777  177734  170656          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
 1970  010514  105277  170650                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
 1971  010520  012777  012372  170644          MOV     #SYNC1,@DQSEC   ;LOAD THE SYNC CHAR
 1972  010526  105277  170636                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
 1973  010532  012777  177732  170632          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
 1974  010540  005277  170614                  INC     @DQRCSR         ;SET RX GO
 1975  010544  005277  170614                  INC     @DQTCSR         ;SET TX GO
```

```
1976  010550  005005                          CLR     R5              ;START TIMING
1977  010552  105777  170602          1$:     TSTB    @DQRCSR         ;IS DONE UP?
1978  010556  100404                          BMI     2$              ;BRANCH IF YES
1979  010560  062705  000001                  ADD     #1,R5           ;WAIT
1980  010564  001372                          BNE     1$              ;BR IF MORE TO GO
1981  010566  104001                          HLT     1               ;ERROR--NO RX DONE
1982  010570  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
1983  010574  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
1984  010600  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
1985  010604                          3$:
1986  010604  012005                          MOV     (R0)+,R5        ;GET ANOTHER CHAR
1987  010606  012104                          MOV     (R1)+,R4        ;GET A REC CHAR
1988  010610  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
1989  010614  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
1990  010616  001401                          BEQ     4$              ;BR IF OK
1991  010620  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
1992  010622  005302          4$:             DEC     R2              ;ALL DONE?
1993  010624  001367                          BNE     3$              ;NO--GO BACK FOR MORE
1994  010626  104400                          SCOPE                   ;SCOPE THIS TEST
1995
1996
1997                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
1998                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
1999                                          ;AT 13 BITS/PER/CHAR.
2000                                          ;DATA CHECKING WILL BE PERFORMED
2001
2002                                  ;  TEST 16
2003                                  ;*************************************************************************
2004  010630  012737  000016  001226  TST16:  MOV     #16,TSTNO
2005  010636  012737  011160  001216          MOV     #TST17,NEXT
2006  010644  104413                          MEMCLR                  ;CLEAR ALL THE DQ11
2007  010646  012700  013256                  MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
2008  010652  005001                          CLR     R1              ;SET UP TO CLEAR THE BUFFER
2009  010654  005020          5$:             CLR     (R0)+           ;CLEAR IT
2010  010656  105201                          INCB    R1              ;DONE?
2011  010660  100375                          BPL     5$              ;BRANCH IF NO
2012  010662  112777  000011  170500          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
2013  010670  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
2014  010676  012737  160000  012370          MOV     #160000,MASK    ;LOAD THE MASK
2015  010704  043737  012370  001246          BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
2016  010712  000241                          CLC                     ;CORRECT SYNC CHARACTER
2017  010714  006037  001246                  ROR     TEMP2           ;SHIFT IT
2018  010720  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
2019  010724  100404                          BMI     10$             ;IF NO,BR.                              ;;++D
2020  010726  012737  177777  012372          MOV     #-1,SYNC1       ;IF YES, MARK.                          ;;++D
2021  010734  000403                          BR      20$             ;CONTINUE.                              ;;++D
2022  010736  013737  001246  012372  10$:     MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER                     ;;++D
2023  010744  013737  001246  012374  20$:     MOV     TEMP2,SYNC2     ;DITTO                                  ;;++D
2024  010752  013777  001246  170412          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
2025  010760  105277  170404                  INCB    @DQREG          ;SEL THE MISC REGISTER
2026  010764  012777  000010  170400          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
2027  010772  012700  000003                  MOV     #3,R0           ;
2028  010776  000300                          SWAB    R0              ;FLIP THE BYTES
2029  011000  050077  170366                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
2030  011004  052777  000002  170360          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
2031  011012  042777  000002  170352          BIC     #BIT1,@DQSEC    ;AND ON
```

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2032  011020  105077  170344                CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
2033  011024  012777  013256  170340        MOV     #RXBUFF,@DQSEC  ;SET ADRESS
2034  011032  105277  170332                INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
2035  011036  012777  177734  170326        MOV     #-36.,@DQSEC    ;SET CHAR COUNT
2036  011044  105277  170320                INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
2037  011050  012777  012372  170314        MOV     #SYNC1,@DQSEC   ;LOAD THE SYNC CHAR
2038  011056  105277  170306                INCB    @DQREG          ;SEL TX PRI CHAR COUNT
2039  011062  012777  177732  170302        MOV     #-38.,@DQSEC    ;SET CHAR COUNT
2040  011070  005277  170264                INC     @DQRCSR         ;SET RX GO
2041  011074  005277  170264                INC     @DQTCSR         ;SET TX GO
2042  011100  005005                        CLR     R5              ;START TIMING
2043  011102  105777  170252        1$:     TSTB    @DQRCSR         ;IS DONE UP?
2044  011106  100404                        BMI     2$              ;BRANCH IF YES
2045  011110  062705  000001                ADD     #1,R5           ;WAIT
2046  011114  001372                        BNE     1$              ;BR IF MORE TO GO
2047  011116  104001                        HLT     1               ;ERROR--NO RX DONE
2048  011120  012700  012376        2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
2049  011124  012701  013256                MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
2050  011130  012702  000044                MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
2051  011134                        3$:
2052  011134  012005                        MOV     (R0)+,R5        ;GET ANOTHER CHAR
2053  011136  012104                        MOV     (R1)+,R4        ;GET A REC CHAR
2054  011140  043705  012370                BIC     MASK,R5         ;MASK OUT UNWANTED BITS
2055  011144  020504                        CMP     R5,R4           ;DO THE CHARACTERS MATCH?
2056  011146  001401                        BEQ     4$              ;BR IF OK
2057  011150  104002                        HLT     2               ;ERROR--DATA DOESN'T MATCH
2058  011152  005302        4$:             DEC     R2              ;ALL DONE?
2059  011154  001367                        BNE     3$              ;NO--GO BACK FOR MORE
2060  011156  104400                        SCOPE                   ;SCOPE THIS TEST
2061
2062
2063                                        ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
2064                                        ;THIS TEST WILL XMIT AND RECV CHARACTERS
2065                                        ;AT 14 BITS/PER/CHAR.
2066                                        ;DATA CHECKING WILL BE PERFORMED.
2067
2068                                ;  TEST 17
2069                                ;*************************************************************************
2070  011160  012737  000017  001226  TST17:  MOV     #17,TSTNO
2071  011166  012737  011510  001216          MOV     #TST20,NEXT
2072  011174  104413                        MEMCLR                  ;CLEAR ALL THE DQ11
2073  011176  012700  013256                MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
2074  011202  005001                        CLR     R1              ;SET UP TO CLEAR THE BUFFER
2075  011204  005020        5$:             CLR     (R0)+           ;CLEAR IT
2076  011206  105201                        INCB    R1              ;DONE?
2077  011210  100375                        BPL     5$              ;BRANCH IF NO
2078  011212  112777  000011  170150        MOVB    #11,@DQREG      ;SELECT THE SYNC REG
2079  011220  013737  013052  001246        MOV     SYNC,TEMP2      ;LOAD SYNCS
2080  011226  012737  140000  012370        MOV     #140000,MASK    ;LOAD THE MASK
2081  011234  043737  012370  001246        BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
2082  011242  000241                        CLC                     ;CORRECT SYNC CHARACTER
2083  011244  006037  001246                ROR     TEMP2           ;SHIFT IT
2084  011250  005737  001510                TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
2085  011254  100404                        BMI     10$             ;IF NO,BR.                              ;;++D
2086  011256  012737  177777  012372        MOV     #-1,SYNC1       ;IF YES, MARK.                          ;;++D
2087  011264  000403                        BR      20$             ;CONTINUE.                              ;;++D
```

```
2088  011266  013737  001246  012372  10$:    MOV     TEMP2,SYNC1      ;LOAD THE CHARACTER                    ;;++D
2089  011274  013737  001246  012374  20$:    MOV     TEMP2,SYNC2      ;DITTO                                 ;;++D
2090  011302  013777  001246  170062          MOV     TEMP2,@DQSEC     ;LOAD THE SYNC REGISTER
2091  011310  105277  170054                  INCB    @DQREG           ;SEL THE MISC REGISTER
2092  011314  012777  000010  170050          MOV     #BIT3,@DQSEC     ;SET TEST LOOP
2093  011322  012700  000002                  MOV     #2,R0            ;
2094  011326  000300                          SWAB    R0               ;FLIP THE BYTES
2095  011330  050077  170036                  BIS     R0,@DQSEC        ;SET CHARACTER LENGTH
2096  011334  052777  000002  170030          BIS     #BIT1,@DQSEC     ;TURN CLOCK OFF...
2097  011342  042777  000002  170022          BIC     #BIT1,@DQSEC     ;AND ON
2098  011350  105077  170014                  CLRB    @DQREG           ;SEL RX PRIMARY ADRESS
2099  011354  012777  013256  170010          MOV     #RXBUFF,@DQSEC   ;SET ADRESS
2100  011362  105277  170002                  INCB    @DQREG           ;SEL RX PRIMARY CHAR COUNT
2101  011366  012777  177734  167776          MOV     #-36.,@DQSEC     ;SET CHAR COUNT
2102  011374  105277  167770                  INCB    @DQREG           ;SEL TX PRIMARY ADDRESS
2103  011400  012777  012372  167764          MOV     #SYNC1,@DQSEC    ;LOAD THE SYNC CHAR
2104  011406  105277  167756                  INCB    @DQREG           ;SEL TX PRI CHAR COUNT
2105  011412  012777  177732  167752          MOV     #-38.,@DQSEC     ;SET CHAR COUNT
2106  011420  005277  167734                  INC     @DQRCSR          ;SET RX GO
2107  011424  005277  167734                  INC     @DQTCSR          ;SET TX GO
2108  011430  005005                          CLR     R5               ;START TIMING
2109  011432  105777  167722          1$:     TSTB    @DQRCSR          ;IS DONE UP?
2110  011436  100404                          BMI     2$               ;BRANCH IF YES
2111  011440  062705  000001                  ADD     #1,R5            ;WAIT
2112  011444  001372                          BNE     1$               ;BR IF MORE TO GO
2113  011446  104001                          HLT     1                ;ERROR--NO RX DONE
2114  011450  012700  012376          2$:     MOV     #TXBUFF,R0       ;LOAD BUFFER POINTER
2115  011454  012701  013256                  MOV     #RXBUFF,R1       ;LOAD RX BUFFER POINTER
2116  011460  012702  000044                  MOV     #36.,R2          ;SET UP TO COUNT CHARACTERS
2117  011464                          3$:
2118  011464  012005                          MOV     (R0)+,R5         ;GET ANOTHER CHAR
2119  011466  012104                          MOV     (R1)+,R4         ;GET A REC CHAR
2120  011470  043705  012370                  BIC     MASK,R5          ;MASK OUT UNWANTED BITS
2121  011474  020504                          CMP     R5,R4            ;DO THE CHARACTERS MATCH?
2122  011476  001401                          BEQ     4$               ;BR IF OK
2123  011500  104002                          HLT     2                ;ERROR--DATA DOESN'T MATCH
2124  011502  005302                  4$:     DEC     R2               ;ALL DONE?
2125  011504  001367                          BNE     3$               ;NO--GO BACK FOR MORE
2126  011506  104400                          SCOPE                    ;SCOPE THIS TEST
2127
2128
2129                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
2130                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
2131                                          ;AT 15 BITS/PER/CHAR.
2132                                          ;DATA CHECKING WILL BE PERFORMED.
2133
2134                                  ;  TEST 20
2135                                  ;*************************************************************************
2136  011510  012737  000020  001226  TST20:  MOV     #20,TSTNO
2137  011516  012737  012040  001216          MOV     #TST21,NEXT
2138  011524  104413                          MEMCLR                   ;CLEAR ALL THE DQ11
2139  011526  012700  013256                  MOV     #RXBUFF,R0       ;LOAD THE BUFFER POINTER
2140  011532  005001                          CLR     R1               ;SET UP TO CLEAR THE BUFFER
2141  011534  005020                  5$:     CLR     (R0)+            ;CLEAR IT
2142  011536  105201                          INCB    R1               ;DONE?
2143  011540  100375                          BPL     5$               ;BRANCH IF NO
```

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2144  011542  112777  000011  167620          MOVB    #11,@DQREG      ;SELECT THE SYNC REG
2145  011550  013737  013052  001246          MOV     SYNC,TEMP2      ;LOAD SYNCS
2146  011556  012737  100000  012370          MOV     #100000,MASK    ;LOAD THE MASK
2147  011564  043737  012370  001246          BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
2148  011572  000241                          CLC                     ;CORRECT SYNC CHARACTER
2149  011574  006037  001246                  ROR     TEMP2           ;SHIFT IT
2150  011600  005737  001510                  TST     DQSTAT          ;SINGLE SYNC CHARACTER?         ;;++D
2151  011604  100404                          BMI     10$             ;IF NO,BR.                      ;;++D
2152  011606  012737  177777  012372          MOV     #-1,SYNC1       ;IF YES, MARK.                  ;;++D
2153  011614  000403                          BR      20$             ;CONTINUE.                      ;;++D
2154  011616  013737  001246  012372  10$:    MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER             ;;++D
2155  011624  013737  001246  012374  20$:    MOV     TEMP2,SYNC2     ;DITTO                          ;;++D
2156  011632  013777  001246  167532          MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
2157  011640  105277  167524                  INCB    @DQREG          ;SEL THE MISC REGISTER
2158  011644  012777  000010  167520          MOV     #BIT3,@DQSEC    ;SET TEST LOOP
2159  011652  012700  000001                  MOV     #1,R0           ;
2160  011656  000300                          SWAB    R0              ;FLIP THE BYTES
2161  011660  050077  167506                  BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
2162  011664  052777  000002  167500          BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
2163  011672  042777  000002  167472          BIC     #BIT1,@DQSEC    ;AND ON
2164  011700  105077  167464                  CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
2165  011704  012777  013256  167460          MOV     #RXBUFF,@DQSEC  ;SET ADRESS
2166  011712  105277  167452                  INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
2167  011716  012777  177734  167446          MOV     #-36.,@DQSEC    ;SET CHAR COUNT
2168  011724  105277  167440                  INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
2169  011730  012777  012372  167434          MOV     #SYNC1,@DQSEC   ;LOAD THE SYNC CHAR
2170  011736  105277  167426                  INCB    @DQREG          ;SEL TX PRI CHAR COUNT
2171  011742  012777  177732  167422          MOV     #-38.,@DQSEC    ;SET CHAR COUNT
2172  011750  005277  167404                  INC     @DQRCSR         ;SET RX GO
2173  011754  005277  167404                  INC     @DQTCSR         ;SET TX GO
2174  011760  005005                          CLR     R5              ;START TIMING
2175  011762  105777  167372          '$:     TSTB    @DQRCSR         ;IS DONE UP?
2176  011766  100404                          BMI     2$              ;BRANCH IF YES
2177  011770  062705  000001                  ADD     #1,R5           ;WAIT
2178  011774  001372                          BNE     1$              ;BR IF MORE TO GO
2179  011776  104001                          HLT     1               ;ERROR--NO RX DONE
2180  012000  012700  012376          2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
2181  012004  012701  013256                  MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
2182  012010  012702  000044                  MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
2183  012014                          3$:
2184  012014  012005                          MOV     (R0)+,R5        ;GET ANOTHER CHAR
2185  012016  012104                          MOV     (R1)+,R4        ;GET A REC CHAR
2186  012020  043705  012370                  BIC     MASK,R5         ;MASK OUT UNWANTED BITS
2187  012024  020504                          CMP     R5,R4           ;DO THE CHARACTERS MATCH?
2188  012026  001401                          BEQ     4$              ;BR IF OK
2189  012030  104002                          HLT     2               ;ERROR--DATA DOESN'T MATCH
2190  012032  005302          4$:             DEC     R2              ;ALL DONE?
2191  012034  001367                          BNE     3$              ;NO--GO BACK FOR MORE
2192  012036  104400                          SCOPE                   ;SCOPE THIS TEST
2193
2194
2195                                          ;TEST OF TRANSMITTER AND RECEIVER CHARATER LENGHTHS
2196                                          ;THIS TEST WILL XMIT AND RECV CHARACTERS
2197                                          ;AT 16 BITS/PER/CHAR.
2198                                          ;DATA CHECKING WILL BE PERFORMED.
2199
```

```
2200                                    ;  TEST 21
2201                                    ;*********************************************************************************
2202  012040  012737  000021  001226    TST21:  MOV     #21,TSTNO
2203  012046  012737  014306  001216            MOV     #.EOP,NEXT
2204  012054  104413                    ;       MEMCLR                  ;CLEAR ALL THE DQ11
2205  012056  012700  013256            ;       MOV     #RXBUFF,R0      ;LOAD THE BUFFER POINTER
2206  012062  005001                    ;       CLR     R1              ;SET UP TO CLEAR THE BUFFER
2207  012064  005020                    5$:     CLR     (R0)+           ;CLEAR IT
2208  012066  105201                    ;       INCB    R1              ;DONE?
2209  012070  100375                    ;       BPL     5$              ;BRANCH IF NO
2210  012072  112777  000011  167270    ;       MOVB    #11,@DQREG      ;SELECT THE SYNC REG
2211  012100  013737  013052  001246    ;       MOV     SYNC,TEMP2      ;LOAD SYNCS
2212  012106  012737  000000  012370    ;       MOV     #000000,MASK    ;LOAD THE MASK
2213  012114  043737  012370  001246    ;       BIC     MASK,TEMP2      ;SET UP THE MASK FOR THE
2214  012122  000241                    ;       CLC                     ;CORRECT SYNC CHARACTER
2215  012124  006037  001246            ;       ROR     TEMP2           ;SHIFT IT
2216  012130  005737  001510            ;       TST     DQSTAT          ;SINGLE SYNC CHARACTER?                 ;;++D
2217  012134  100404                    ;       BMI     10$             ;IF NO,BR.                              ;;++D
2218  012136  012737  177777  012372    ;       MOV     #-1,SYNC1       ;IF YES, MARK.                          ;;++D
2219  012144  000403                    ;       BR      20$             ;CONTINUE.                              ;;++D
2220  012146  013737  001246  012372    10$:    MOV     TEMP2,SYNC1     ;LOAD THE CHARACTER                     ;;++D
2221  012154  013737  001246  012374    20$:    MOV     TEMP2,SYNC2     ;DITTO                                  ;;++D
2222  012162  013777  001246  167202            MOV     TEMP2,@DQSEC    ;LOAD THE SYNC REGISTER
2223  012170  105277  167174                    INCB    @DQREG          ;SEL THE MISC REGISTER
2224  012174  012777  000010  167170            MOV     #BIT3,@DQSEC    ;SET TEST LOOP
2225  012202  012700  000000                    MOV     #0,R0           ;
2226  012206  000300                            SWAB    R0              ;FLIP THE BYTES
2227  012210  050077  167156                    BIS     R0,@DQSEC       ;SET CHARACTER LENGTH
2228  012214  052777  000002  167150            BIS     #BIT1,@DQSEC    ;TURN CLOCK OFF...
2229  012222  042777  000002  167142            BIC     #BIT1,@DQSEC    ;AND ON
2230  012230  105077  167134                    CLRB    @DQREG          ;SEL RX PRIMARY ADRESS
2231  012234  012777  013256  167130            MOV     #RXBUFF,@DQSEC  ;SET ADRESS
2232  012242  105277  167122                    INCB    @DQREG          ;SEL RX PRIMARY CHAR COUNT
2233  012246  012777  177734  167116            MOV     #-36.,@DQSEC    ;SET CHAR COUNT
2234  012254  105277  167110                    INCB    @DQREG          ;SEL TX PRIMARY ADDRESS
2235  012260  012777  012372  167104            MOV     #SYNC1,@DQSEC   ;LOAD THE SYNC CHAR
2236  012266  105277  167076                    INCB    @DQREG          ;SEL TX PRI CHAR COUNT
2237  012272  012777  177732  167072            MOV     #-38.,@DQSEC    ;SET CHAR COUNT
2238  012300  005277  167054                    INC     @DQRCSR         ;SET RX GO
2239  012304  005277  167054                    INC     @DQTCSR         ;SET TX GO
2240  012310  005005                            CLR     R5              ;START TIMING
2241  012312  105777  167042            1$:     TSTB    @DQRCSR         ;IS DONE UP?
2242  012316  100404                            BMI     2$              ;BRANCH IF YES
2243  012320  062705  000001                    ADD     #1,R5           ;WAIT
2244  012324  001372                            BNE     1$              ;BR IF MORE TO GO
2245  012326  104001                            HLT     1               ;ERROR--NO RX DONE
2246  012330  012700  012376            2$:     MOV     #TXBUFF,R0      ;LOAD BUFFER POINTER
2247  012334  012701  013256                    MOV     #RXBUFF,R1      ;LOAD RX BUFFER POINTER
2248  012340  012702  000044                    MOV     #36.,R2         ;SET UP TO COUNT CHARACTERS
2249  012344                            3$:
2250  012344  012005                            MOV     (R0)+,R5        ;GET ANOTHER CHAR
2251  012346  012104                            MOV     (R1)+,R4        ;GET A REC CHAR
2252  012350  043705  012370                    BIC     MASK,R5         ;MASK OUT UNWANTED BITS
2253  012354  020504                            CMP     R5,R4           ;DO THE CHARACTERS MATCH?
2254  012356  001401                            BEQ     4$              ;BR IF OK
2255  012360  104002                            HLT     2               ;ERROR--DATA DOESN'T MATCH
```

```
2256  012362  005302                  4$:     DEC     R2              ;ALL DONE?
2257  012364  001367                          BNE     3$              ;NO--GO BACK FOR MORE
2258  012366  104400                          SCOPE                   ;SCOPE THIS TEST
2259
2260
2261
2262  012370  000000                  MASK:   0
2263  012372     026      026         SYNC1:  .BYTE   26,26
2264  012374     026      026         SYNC2:  .BYTE   26,26
2265  012376                          TXBUFF:
2266  012376  177777                          ^B<1111111111111111>
2267  012400  000000                          ^B<0000000000000000>
2268  012402  125252                          ^B<1010101010101010>
2269  012404  052525                          ^B<0101010101010101>
2270  012406  000001                          ^B<0000000000000001>
2271  012410  000002                          ^B<0000000000000010>
2272  012412  000004                          ^B<0000000000000100>
2273  012414  000010                          ^B<0000000000001000>
2274  012416  000020                          ^B<0000000000010000>
2275  012420  000040                          ^B<0000000000100000>
2276  012422  000100                          ^B<0000000001000000>
2277  012424  000200                          ^B<0000000010000000>
2278  012426  000400                          ^B<0000000100000000>
2279  012430  001000                          ^B<0000001000000000>
2280  012432  002000                          ^B<0000010000000000>
2281  012434  004000                          ^B<0000100000000000>
2282  012436  010000                          ^B<0001000000000000>
2283  012440  020000                          ^B<0010000000000000>
2284  012442  040000                          ^B<0100000000000000>
2285  012444  100000                          ^B<1000000000000000>
2286  012446  077777                          ^B<0111111111111111>
2287  012450  137777                          ^B<1011111111111111>
2288  012452  157777                          ^B<1101111111111111>
2289  012454  167777                          ^B<1110111111111111>
2290  012456  173777                          ^B<1111011111111111>
2291  012460  175777                          ^B<1111101111111111>
2292  012462  176777                          ^B<1111110111111111>
2293  012464  177377                          ^B<1111111011111111>
2294  012466  177577                          ^B<1111111101111111>
2295  012470  177677                          ^B<1111111110111111>
2296  012472  177737                          ^B<1111111111011111>
2297  012474  177757                          ^B<1111111111101111>
2298  012476  177767                          ^B<1111111111110111>
2299  012500  177773                          ^B<1111111111111011>
2300  012502  177775                          ^B<1111111111111101>
2301  012504  177776                          ^B<1111111111111110>
2302  012506  000100                          .BLKW   100
2303  012706                      .MEMCLR:
2304  012706  005077  166446                  CLR     @#DQRCSR
2305  012712  005077  166440                  CLR     @#DQTCSR
2306  012716  005077  166444                  CLR     @#DQERR
2307  012722  012705  000020                  MOV     #16.,R5
2308  012726  152777  000020  166434  1$:     BISB    #BIT4,@#DQREG
2309  012734  142777  000140  166426          BICB    #140,@#DQREG
2310  012742  005077  166424                  CLR     @#DQSEC
2311  012746  105277  166416                  INCB    @#DQREG
```

```
2312  012752  005303                          DEC     R5
2313  012754  001364                          BNE     1$
2314  012756  105077  166406                  CLRB    @DQREG
2315  012762  105077  166374                  CLRB    @DQRCSH
2316  012766  012705  000020                  MOV     #16.,R5
2317  012772  112777  000010  166370  2$:     MOVB    #10,@DQREG
2318  013000  005077  166366                  CLR     @DQSEC
2319  013004  112777  000014  166356          MOVB    #14,@DQREG
2320  013012  005077  166354                  CLR     @DQSEC
2321  013016  105277  166340                  INCB    @DQRCSH
2322  013022  005305                          DEC     R5
2323  013024  001362                          BNE     2$
2324  013026  105077  166330                  CLRB    @DQRCSH
2325  013032                          .MSTCLR:
2326  013032  112777  000012  166330          MOVB    #MISC.,@DQREG
2327  013040  012777  000040  166324          MOV     #BIT5,@DQSEC
2328  013046  000002                          RTI
2329  013050     026     026          .SYNC:  .BYTE   26,26
2330  013052     026     026          SYNC:   .BYTE   26,26
2331  013054  000000                  TXBFA:  0
2332          013256                          .=.+200
2333  013256                          RXBUFF:
2334  013256  000200                          .BLKW   200
2335  013656     026     026          XSYNC:  .BYTE   26,26
2336  013660     026     026          XSYNC2: .BYTE   26,26
2337  013662  000000                  XTXBUF:0
2338          014064                          .=.+200
2339  014064  000000                  XRXBUF: 0
2340          014266                          .=.+200
2341  014266  000000                  ERR:    0
2342  014270  000000                  POLY:   0
2343  014272  000000                  XPOLY:  0
2344  014274  000000                  CHAR:   0
2345  014276  000000                  COUNT:  0
2346  014300  000000                  ADDR:   0
2347  014302  000000                  GDCHAR: 0
2348  014304  000000                  DETCAR: 0
2349
2350                                  ;END OF PASS
2351                                  ;TYPE NAME OF TEST
2352                                  ;UPDATE PASS COUNT
2353                                  ;CHECK FOR EXIT TO ACT-11
2354                                  ;RESTART TEST
2355
2356  014306  005037  001234  .EOP:  CLR     LSTERR          ;CLEAR LAST ERROR PC
2357  014312  005037  001312          CLR     ERRFLG          ;CLEAR ERROR FLAG
2358  014316  005237  001230          INC     PASCNT          ;UPDATE PASS COUNT
2359  014322  104402                  TYPE
2360  014324  016536                  MEPASS
2361  014326  104402                  TYPE
2362  014330  016717                  MCSRX
2363  014332  104411                  CNVRT
2364  014334  014444                  XCSR
2365  014336  104402                  TYPE
2366  014340  016725                  MVECX
2367  014342  104411                  CNVRT
```

```
2368  014344  014452                        XVEC
2369  014346  104402                        TYPE
2370  014350  016733                        MPASSX
2371  014352  104411                        CNVRT
2372  014354  014460                        XPASS
2373  014356  104402                        TYPE
2374  014360  016744                        MERRX
2375  014362  104411                        CNVRT
2376  014364  014466                        XERR
2377  014366  013777  001230  164606        MOV     PASCNT,@LIGHTS          ;DISPLAY PASS COUNT
2378  014374  005337  001276                DEC     SAVNUM
2379  014400  001013                        BNE     RESTRT
2380  014402  013737  001504  001276        MOV     DQNUM,SAVNUM
2381  014410  013701  000042                MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
2382  014414  001405                        BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
2383  014416  000005                        RESET
2384  014420                        LOGICAL:
2385  014420  004711                        JSR     PC,(R1)
2386  014422  000240                        NOP
2387  014424  000240                        NOP
2388  014426  000240                        NOP
2389  014430  104414                RESTRT: CKSWR
2390  014432  012737  002254  001214        MOV     #TST1,RETURN
2391  014440  000137  002254                JMP     TST1
2392  014444  000001                XCSR:   1
2393  014446     006     002                .BYTE   6,2
2394  014450  001360                        DQRCSR
2395  014452  000001                XVEC:   1
2396  014454     003     002                .BYTE   3,2
2397  014456  001350                        DQRVEC
2398  014460  000001                XPASS:  1
2399  014462     006     002                .BYTE   6,2
2400  014464  001230                        PASCNT
2401  014466  000001                XERR:   1
2402  014470     006     002                .BYTE   6,2
2403  014472  001232                        ERRCNT
2404
2405                                        ;SCOPE LOOP AND INTERATION HANDLER
2406
2407  014474  104414                .SCOPE: CKSWR
2408  014476  032777  040000  164474        BIT     #BIT14,@SWR
2409  014504  001407                TTST:   BEQ     1$
2410  014506  000432                        BR      3$
2411  014510  105777  164470                TSTB    @TKCSR
2412  014514  100027                        BPL     3$
2413  014516  017700  164464                MOV     @TKDBR,R0
2414  014522  000412                        BR      2$
2415  014524  032777  004000  164446  1$:   BIT     #SW11,@SWR
2416  014532  001006                        BNE     2$
2417  014534  005237  001224                INC     LPCNT
2418  014540  023737  001224  001222        CMP     LPCNT,ICOUNT
2419  014546  001012                        BNE     3$
2420  014550  105037  001312          2$:   CLRB    ERRFLG
2421  014554  005037  001224                CLR     LPCNT
2422  014560  012737  000017  001222        MOV     #15.,ICOUNT
2423  014566  013737  001216  001214        MOV     NEXT,RETURN
```

```
2424  014574  013716  001214          3$:     MOV     RETURN,(SP)
2425  014600  000002                          RTI
2426  014602  001407                  BRW:    1407
2427  014604  000432                  BRX:    432
2428
2429                                          ;CHECK FOR FREEZE ON CURRENT DATA
2430
2431  014606  104414                  .SCOP1: CKSWR
2432  014610  032777  001000  164362          BIT     #SW09,@SWR
2433  014616  001402                          BEQ     1$
2434  014620  013716  001220                  MOV     LOCK,(SP)
2435  014624  000002                  1$:     RTI
2436
2437                                          ;TELETYPE OUTPUT ROUTINE
2438
2439  014626  010546                  .TYPE:  MOV     R5,-(SP)
2440  014630  017605  000002                  MOV     @2(SP),R5
2441  014634  062766  000002  000002          ADD     #2,2(SP)
2442  014642  005737  016316          1$:     TST     @#PDSW
2443  014646  001004                          BNE     300$
2444  014650  032777  010000  164322          BIT     #SW12,@SWR
2445  014656  001024                          BNE     3$
2446  014660  105715                  300$:   TSTB    (R5)
2447  014662  100014                          BPL     2$
2448  014664  105777  164320                  TSTB    @TPCSR
2449  014670  100375                          BPL     .-4
2450  014672  012777  000015  164312          MOV     #15,@TPDBR
2451  014700  105777  164304                  TSTB    @TPCSR
2452  014704  100375                          BPL     .-4
2453  014706  012777  000012  164276          MOV     #12,@TPDBR
2454  014714  105777  164270          2$:     TSTB    @TPCSR
2455  014720  100375                          BPL     2$
2456  014722  112577  164264                  MOVB    (R5)+,@TPDBR
2457  014726  001345                          BNE     1$
2458  014730  012605                  3$:     MOV     (SP)+,R5
2459  014732  000002                          RTI
2460
2461                                          ;ASCII STRING INPUT ROUTINE
2462
2463  014734  010346                  .INSTR: MOV     R3,-(SP)
2464  014736  010446                          MOV     R4,-(SP)
2465  014740  017637  000004  014756          MOV     @4(SP),.MSG
2466  014746  062766  000002  000004          ADD     #2,4(SP)
2467  014754  104402                  .INST1: TYPE
2468  014756  000000                  .MSG:   0
2469  014760  012704  017110                  MOV     #INBUF,R4
2470  014764  012703  000007                  MOV     #7,R3
2471  014770  105777  164210          1$:     TSTB    @TKCSR
2472  014774  100375                          BPL     1$
2473  014776  117714  164204                  MOVB    @TKDBR,(R4
2474  015002  142714  000200                  BICB    #200,(R4)
2475  015006  121427  000025                  CMPB    (R4),#25                ;IS IT CTRL-U
2476  015012  001003                          BNE     200$
2477  015014  104402  016476                  TYPE,MCRLF
2478  015020  000755                          BR      .-^:ST1
2479  015022  122427  000015          200$:   CMPB    (R4)+,#15
```

```
2480  015026  001423                        BEQ     INSTR2
2481  015030  117777  164152  164154        MOVB    @TKDBR,@TPDBR
2482  015036  105777  164146        2$:     TSTB    @TPCSR
2483  015042  100375                        BPL     2$
2484  015044  005303                        DEC     R3
2485  015046  001350                        BNE     1$
2486  015050  000402                        BR      .INSTG
2487  015052  010346              .INSTE:   MOV     R3,-(SP)
2488  015054  010446                        MOV     R4,-(SP)
2489  015056  104402              .INSTG:   TYPE
2490  015060  016472                        MQM
2491  015062  005737  016316                TST     @#RDSW
2492  015066  001402                        BEQ     400$
2493  015070  104402  016476              TYPE,MCRLF
2494  015074  000727              400$:     BR      .INST1
2495  015076  012604              INSTR2:   MOV     (SP)+,R4
2496  015100  012603                        MOV     (SP)+,R3
2497  015102  000002                        RTI
2498
2499                                        ;CONVERT ASCII STRING TO OCTAL
2500
2501  015104  010546              .PARAM:   MOV     R5,-(SP)
2502  015106  010446                        MOV     R4,-(SP)
2503  015110  016605  000004                MOV     4(SP),R5
2504  015114  012537  015310                MOV     (R5)+,LOLIM
2505  015120  012537  015312                MOV     (R5)+,HILIM
2506  015124  012537  015314                MOV     (R5)+,DEVADR
2507  015130  112537  015316                MOVB    (R5)+,LOBITS
2508  015134  112537  015317                MOVB    (R5)+,ADRCNT
2509  015140  010566  000004                MOV     R5,4(SP)
2510  015144  005005              PARAM1:   CLR     R5
2511  015146  012704  017110                MOV     #INBUF,R4
2512  015152  122714  000015                CMPB    #15,(R4)
2513  015156  001420                        BEQ     PARERR
2514  015160  121427  000060        1$:     CMPB    (R4),#60
2515  015164  002415                        BLT     PARERR
2516  015166  121427  000067                CMPB    (R4),#67
2517  015172  003012                        BGT     PARERR
2518  015174  142717  000060                BICB    #60,(R4)
2519  015200  152405                        BISB    (R4)+,R5
2520  015202  122714  000015                CMPB    #15,(R4)
2521  015206  001414                        BEQ     LIMITS
2522  015210  006305                        ASL     R5
2523  015212  006305                        ASL     R5
2524  015214  006305                        ASL     R5
2525  015216  000760                        BR      1$
2526  015220  122714  000015        PARERR: CMPB    #15,(R4)        ;IS FIRST CHARACTER A <CR>
2527  015224  001003                        BNE     120$
2528  015226  005737  016316                TST     @#RDSW          ;IS CKSWR ROUTINE BEING USED
2529  015232  001023                        BNE     PARTI
2530  015234  104404              120$:     INSTER
2531  015236  000742                        BR      PARAM1
2532
2533                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
2534
2535  015240  020537  015312        LIMITS: CMP     R5,HILIM
```

```
2536  015244  101365                          BHI     PARERR
2537  015246  020537  015310                  CMP     R5,LOLIM
2538  015252  103762                          BLO     PARERR
2539  015254  133705  015316                  BITB    LOBITS,R5
2540  015260  001357                          BNE     PARERR
2541
2542                                          ;STORE NUMBER AT SPECIFIED ADDRESS
2543
2544  015262  013704  015314                  MOV     DEVADR,R4
2545  015266  010524                  1$:     MOV     R5,(R4)+
2546  015270  062705  000002                  ADD     #2,R5
2547  015274  105337  015317                  DECB    ADRCNT
2548  015300  001372                          BNE     1$
2549  015302  012604                  PARTI:  MOV     (SP)+,R4
2550  015304  012605                          MOV     (SP)+,R5
2551  015306  000002                          RTI
2552  015310  000000                  LOLIM:  0
2553  015312  000000                  HILIM:  0
2554  015314  000000                  DEVADR: 0
2555  015316  000000                  LOBITS: 0
2556          015317                  ADRCNT=LOBITS+1
2557
2558                                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
2559
2560  015320  016637  000004  001274  .SAV05: MOV     4(SP),SAVPC
2561
2562                                          ;SAVE R0-R5
2563
2564  015326  010537  001270          SV05:   MOV     R5,SAVR5
2565  015332  010437  001266                  MOV     R4,SAVR4
2566  015336  010337  001264                  MOV     R3,SAVR3
2567  015342  010237  001262                  MOV     R2,SAVR2
2568  015346  010137  001260                  MOV     R1,SAVR1
2569  015352  010037  001256                  MOV     R0,SAVR0
2570  015356  000002                          RTI
2571
2572                                          ;RESTORE R0-R5
2573
2574  015360  013700  001256          .RES05: MOV     SAVR0,R0
2575  015364  013701  001260                  MOV     SAVR1,R1
2576  015370  013702  001262                  MOV     SAVR2,R2
2577  015374  013703  001264                  MOV     SAVR3,R3
2578  015400  013704  001266                  MOV     SAVR4,R4
2579  015404  013705  001270                  MOV     SAVR5,R5
2580  015410  000002                          RTI
2581
2582                                          ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
2583
2584  015412  104402                  .CONVR: TYPE
2585  015414  016476                          MCRLF
2586  015416  010046                  .CNVRT: MOV     R0,-(SP)
2587  015420  010146                          MOV     R1,-(SP)
2588  015422  010346                          MOV     R3,-(SP)
2589  015424  010446                          MOV     R4,-(SP)
2590  015426  010546                          MOV     R5,-(SP)
2591  015430  017601  000012                  MOV     @12(SP),R1
```

```
2592  015434  013737  017152  001250          MOV     TEMP,TEMP3
2593  015442  062766  000002  000012          ADD     #2,12(SP)
2594  015450  012137  015632                  MOV     (R1)+,WRDCNT
2595  015454  112137  015634          1$:     MOVB    (R1)+,CHRCNT
2596  015460  112137  015635                  MOVB    (R1)+,SPACNT
2597  015464  013137  015636                  MOV     @(R1)+,BINWRD
2598  015470  013704  015636          2$:     MOV     BINWRD,R4
2599  015474  113705  015634                  MOVB    CHRCNT,R5
2600  015500  012700  017152                  MOV     #TEMP,R0
2601  015504  010403                  3$:     MOV     R4,R3
2602  015506  042703  177770                  BIC     #177770,R3
2603  015512  062703  000060                  ADD     #060,R3
2604  015516  110320                          MOVB    R3,(R0)+
2605  015520  000241                          CLC
2606  015522  006004                          ROR     R4
2607  015524  000241                          CLC
2608  015526  006004                          ROR     R4
2609  015530  000241                          CLC
2610  015532  006004                          ROR     R4
2611  015534  005305                          DEC     R5
2612  015536  001362                          BNE     3$
2613  015540  012703  017214                  MOV     #MDATA,R3
2614  015544  114023                  4$:     MOVB    -(R0),(R3)+
2615  015546  105337  015634                  DECB    CHRCNT
2616  015552  001374                          BNE     4$
2617  015554  105737  015635                  TSTB    SPACNT
2618  015560  001405                          BEQ     6$
2619  015562  112723  000040          5$:     MOVB    #040,(R3)+
2620  015566  105337  015635                  DECB    SPACNT
2621  015572  001373                          BNE     5$
2622  015574  105013                  6$:     CLRB    (R3)
2623  015576  104402                          TYPE
2624  015600  017214                          MDATA
2625  015602  005337  015632                  DEC     WRDCNT
2626  015606  001322                          BNE     1$
2627  015610  013737  001250  017152          MOV     TEMP3,TEMP
2628  015616  012605                          MOV     (SP)+,R5
2629  015620  012604                          MOV     (SP)+,R4
2630  015622  012603                          MOV     (SP)+,R3
2631  015624  012601                          MOV     (SP)+,R1
2632  015626  012600                          MOV     (SP)+,R0
2633  015630  000002                          RTI
2634  015632  000000              WRDCNT: 0
2635  015634  000000              CHRCNT: 0
2636          015635              SPACNT=CHRCNT+1
2637  015636  000000              BINWRD: 0
2638                                      ;TRAP DISPATCH SERVICE
2639                                      ;ARGUMENT OF TRAP IS EXTRACTED
2640                                      ;AND USED AS OFFSET TO OBTAIN POINTER
2641                                      ;TO SELECTED SUBROUTINE
2642
2643  015640  011646              .TRPSR: MOV     (SP),-(SP)      ;GET PC OF RETURN
2644  015642  162716  000002              SUB     #2,(SP)         ;=PC OF TRAP
2645  015646  017616  000000              MOV     @(SP),(SP)      ;GET TRP
2646  015652  006316              TRPOK:  ASL     (SP)            ;MULTIPLY TRAP ARG BY 2
2647  015654  042716  177001              BIC     #177001,(SP)    ;CLEAR UNWANTED BITS
```

```
2648  015660  062716  001314                  ADD     #.TPPTAB,(SP)           ;POINTER TO SUBROUTINE ADDRESS
2649  015664  017616  000000                  MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
2650  015670  000136                          JMP     @(SP)+                  ;GO TO SUBROUTINE
2651
2652                                          ;ERROR HANDLER
2653
2654  015672  104414                  .HLT:   CKSWR
2655  015674  032777  010000  163276          BIT     #SW12,@SWR
2656  015702  001406                          BEQ     XBX
2657  015704  105777  163300                  TSTB    @TPCSR
2658  015710  100003                          BPL     XBX
2659  015712  112777  000207  163272          MOVB    #207,@TPDBR
2660  015720  032777  020000  163252  XBX:    BIT     #SW13,@SWR
2661  015726  001074                          BNE     HALTS
2662  015730  021637  001234                  CMP     (SP),LSTERR
2663  015734  001404                          BEQ     1$
2664  015736  011637  001234                  MOV     (SP),LSTERR
2665  015742  105037  001312                  CLRB    ERRFLG
2666  015746  104406                  1$:     SAV05
2667  015750  011605                          MOV     (SP),R5
2668  015752  162705  000002                  SUB     #2,R5
2669  015756  011504                          MOV     (R5),R4
2670  015760  006304                          ASL     R4
2671  015762  061504                          ADD     (R5),R4
2672  015764  006304                          ASL     R4
2673  015766  042704  177001                  BIC     #177001,R4
2674  015772  062704  017624                  ADD     #.ERRTAB,R4
2675  015776  012437  016070                  MOV     (R4)+,ERRMSG
2676  016002  012437  016102                  MOV     (R4)+,DATAHD
2677  016006  011437  016114                  MOV     (R4),DATABP
2678  016012  105737  001312                  TSTB    ERRFLG
2679  016016  001403                          BEQ     TYPMSG
2680  016020  005737  016114                  TST     DATABP
2681  016024  001027                          BNE     TYPDAT
2682  016026  104402                  TYPMSG: TYPE
2683  016030  016755                          MTSTN
2684  016032  104411                          CNVRT
2685  016034  016214                          XTSTN
2686  016036  104402                          TYPE
2687  016040  017043                          MERRPC
2688  016042  104411                          CNVRT
2689  016044  016206                          ERTABO
2690  016046  104402                          TYPE
2691  016050  016476                          MCRLF
2692  016052  112737  177777  001312          MOVB    #-1,ERRFLG
2693  016060  005737  016070                  TST     ERRMSG
2694  016064  001402                          BEQ     WRKO.FM
2695  016066  104402                          TYPE
2696  016070  000000                  ERRMSG: 0
2697  016072                          WRKO.FM:
2698  016072  005737  016102                  TST     DATAHD
2699  016076  001402                          BEQ     TYPDAT
2700  016100  104402                          TYPE
2701  016102  000000                  DATAHD: 0
2702  016104  005737  016114          TYPDAT: TST     DATABP
2703  016110  001402                          BEQ     RESREG
```

```
 2704  016112  104410                          CONVRT
 2705  016114  000000                  DATABF: 0
 2706  016116  104407                  RESREG: RES05
 2707  016120  005777  163054          HALTS:  TST     @SWR
 2708  016124  100005                          BPL     EXITER
 2709  016126  010046                          PUSHR0
 2710  016130  016600  000002                  MOV     2(SP),R0
 2711  016134  000000                          HALT
 2712  016136  012600                          POPR0
 2713  016140  104414                  EXITER: CKSWR
 2714  016142  005237  001232                  INC     ERRCNT
 2715  016146  032777  000400  163024          BIT     #SW08,@SWR
 2716  016154  001007                          BNE     1$
 2717  016156  032777  002000  163014          BIT     #SW10,@SWR
 2718  016164  001407                          BEQ     2$
 2719  016166  013737  001216  001214          MOV     NEXT,RETURN
 2720  016174  012706  001200           $:     MOV     #STACK,SP
 2721  016200  000177  163010                  JMP     @RETURN
 2722  016204  000002                  2$:     RTI
 2723  016206  000001                  ERTABO: 1
 2724  016210     006     002                  .BYTE   6,2
 2725  016212  001274                          SAVPC
 2726  016214  000001                  XTSTN:  1
 2727  016216     003     002                  .BYTE   3,2
 2728  016220  001226                          TSTNO
 2729                                          ;ENTER HERE ON POWER FAILURE
 2730
 2731
 2732  016222                          .PFAIL:
 2733  016222  012737  016234  000024          MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
 2734  016230  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
 2735  016232  000777                          BR      .
 2736
 2737                                          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
 2738
 2739  016234                          RESTAR:
 2740  016234  012737  016222  000024          MOV     #.PFAIL,24              ;SET UP FOR POWER FAILURE
 2741  016242  012706  001200                  MOV     #STACK,SP
 2742  016246  005037  017152                  CLR     TEMP
 2743  016252  005237  017152                  INC     TEMP
 2744  016256  001375                          BNE     .-4
 2745  016260  104402                          TYPE
 2746  016262  016500                          MPFAIL
 2747  016264  104411                          CNVRT
 2748  016266  016310                          PFTAB
 2749  016270  005037  001312                  CLR     ERRFLG
 2750  016274  005037  001234                  CLR     LSTERR
 2751  016300  104412                          MSTCLR
 2752  016302  104413                          MEMCLR
 2753  016304  000177  162704                  JMP     @RETURN
 2754  016310  000001                  PFTAB:  1
 2755  016312     003     002          .BYTE   3,2
 2756  016314  001226                          TSTNO
 2757
 2758
 2759                                          ;CHECK SWITCH REGISTER ROUTINE. CHECKS FOR ^G TO ALLOW CHANGING
```

```
                                        ;OF LOC.176.
                                        ;LOCATIONS USED:
016316  000000                          RDSW.   .WORD   0

016320  005737  000042          .CKSWR: TST     @#42
016324  001042                          BNE     OUT
016326  022737  000176  001200          CMP     #SWREG,SWR      ;SOFTWARE SWITCH REGISTER PRESENT
016334  001036                          BNE     OUT             ;NO, GET OUT
016336  105777  162642                  TSTB    @TKCSR          ;YES,WAIT FOR
016342  100033                          BPL     OUT             ;READY, GET CHARACTER
016344  017737  162636  014756          MOV     @TKDBR,.MSG     ;AND STRIP OFF
016352  042737  177600  014756          BIC     #177600,.MSG    ;THE GARBAGE
016360  122737  000007  014756          CMPB    #7,.MSG         ;IS IT A <^G>
016366  001021                          BNE     OUT
016370  104402  016446                  TYPE,$CNTG
016374  005137  016316          .CNTLU: COM     @#RDSW
016400  104402  016452                  TYPE,$MSWR
016404  104411  016440                  CNVRT,SWREGC
016410  104403  016461                  INSTR,$MNEW
016414  104405                          PARAM
016416  000000                          0
016420  177777                          177777
016422  000176                          SWREG
016424     000     001          .BYTE           0,1
016426  104402  016476                  TYPE,MCRLF
016432  005037  016316          OUT:    CLR     @#RDSW
016436  000002                          RTI
016440  000001                  SWREGC: 1
016442     006     002          .BYTE   6,2
016444  000176                          SWREG
016446  057377  000107          $CNTG:  .ASCIZ  <377>/^G/
016452  051777  051127  020075  $MSWR:  .ASCIZ  <377>/SWR= /
016460     000
016461     040  047040  053505  $MNEW:  .ASCIZ  /  NEW= /
016466  020075     000
016472                          .EVEN
016472  020040  000077          MQM:    .ASCIZ  /  ?/
016476  000377                  MCRLF:  .ASCIZ   <377>
016500  050377  051127  043040  MPFAIL: .ASCIZ  <377>/PWR FAILED. RESTART AT TEST /
016506  044501  042514  027104
016514  051040  051505  040524
016522  052122  040440  020124
016530  042524  052123  000040
016536  042777  042116  050040  MEPASS: .ASCIZ  <377>/END PASS DZDQH  /
016544  051501  020123  055104
016552  050504  020110  000040
016560  051377     000          MR:     .ASCIZ  <377>/R/
016563     377  051120  043517  MERR2:  .ASCIZ  <377>/PROGRAM INDICATES NO DEVICES PRESENT./
016570  040522  020115  047111
016576  044504  040503  042524
016604  020123  047516  042040
016612  053105  041511  051505
016620  050040  042522  042523
016626  052116  000056
016632  044777  051516  043125  MERR3:  .ASCIZ  <377>/INSUFFICIENT DATA./
```

```
2816  016640  044506  044503  047105
2817  016646  020124  040504  040524
2818  016654  000041
2819  016656  052377  051505  020124  MTSTPC: .ASCIZ  <377>/TEST PC-/
2820  016664  041520  000055
2821  016670  046377  041517  020113  MLOCK:  .ASCIZ  <377>/LOCK ON SELECTED TEST/
2822  016676  047117  051440  046105
2823  016704  041505  042524  020104
2824  016712  042524  052123     000
2825  016717     103  051123  020072  MCSRX:  .ASCIZ   /CSR: /
2826  016724     000
2827  016725     126  041505  020072  MVECX:  .ASCIZ  /VEC: /
2828  016732     000
2829  016733     120  051501  042523  MPASSX: .ASCIZ  /PASSES: /
2830  016740  035123  000040
2831  016744  051105  047522  051522  MERRX:  .ASCIZ  /ERRORS: /
2832  016752  020072     000
2833  016755     377  052377  051505  MTSTN:  .ASCIZ  <377><377> /TEST NO: /
2834  016762  020124  047516  020072
2835  016770     000
2836  016771     377  042523  020124  MNEW:   .ASCIZ  <377>/SET SWITCH REG TO DQ11'S DESIRED ACTIVE./
2837  016776  053523  052111  044103
2838  017004  051040  043505  052040
2839  017012  020117  050504  030461
2840  017020  051447  042040  051505
2841  017026  051111  042105  040440
2842  017034  052103  053111  027105
2843  017042     000
2844  017043     120  035103  000040  MERRPC: .ASCIZ  /PC: /
2845  017050  046777  050101  047440  XHEAD:  .ASCIZ  <377>/MAP OF DQ11 STATUS/<377>
2846  017056  020106  050504  030461
2847  017064  051440  040524  052524
2848  017072  177523     000
2849          017076                  .EVEN
2850  017076  000002                  XSTATQ: 2
2851  017100     006     003                  .BYTE   6,3
2852  017102  001244                          TEMP1
2853  017104     006     002                  .BYTE   6,2
2854  017106  001246                          TEMP2
2855                                  .EVEN
2856
2857                                          ;BUFFERS FOR INPUT-OUTPUT
2858
2859  017110  000000                  INBUF:  0
2860          017152                  .=.+40
2861  017152  000000                  TEMP:   0
2862          017214                  .=.+40
2863  017214  000000                  MDATA:  0
2864          017256                  .=.+40
2865  017256  005015  042522  042503  EM0:    .ASCIZ  <15><12>/RECEIVER DONE PRIMARY NOT SET./
      017317     015  042012  052101  EM1:    .ASCIZ  <15><12>/DATA COMPARISON ERROR.../
      017352  005015  050504  042440  EM2:    .ASCIZ  <15><12>/DQ ERROR FLAG SET. /
      017400  005015  047516  051040  EM3:    .ASCIZ  <15><12>/NO RECEIVER INTERRUPTS!... /
      017436  005015  054105  042520  DH0:    .ASCIZ  <15><12>/EXPECTED  FOUND  RX ADDR.  TX ADDR.  MASK /
      017513     015  042412  050130  DH1:    .ASCIZ  <15><12>/EXPECTED RECEIVED  /
      017541     015  042012  042521  DH2:    .ASCIZ  <15><12>/DQERR    /
```

```
                017556                  .EVEN
          017556 000005                 DT0:    5
 2866     017560    006       004              .BYTE   6,4
 2867     017562 001270                        SAVR5
 2868     017564    006       001              .BYTE   6,1
 2869     017566 001266                        SAVR4
 2870     017570    006       004              .BYTE   6,4
 2871     017572 001260                        SAVR1
 2872     017574    006       004              .BYTE   6,4
 2873     017576 001256                        SAVR0
 2874     017600    006       002              .BYTE   6,2
 2875     017602 012370                        MASK
 2876     017604 000002                 DT1:    2
 2877     017606    003       006              .BYTE   3,6
 2878     017610 014302                        GDCHAR
 2879     017612    003       002              .BYTE   3,2
 2880     017614 014274                        CHAR
 2881     017616 000001                 DT2:    1
 2882     017620    006       002              .BYTE   6,2
 2883     017622 014266                        ERR
 2884     017624                         .ERRTAB:
 2885     017624 000000                        0
 2886     017626 000000                        0
 2887     017630 000000                        0
 2888     017632 017256                        EM0
 2889     017634 000000                        0       ;HALT   1
 2890     017636 000000                        0
 2891     017640 017317                        EM1
 2892     017642 017436                        DH0     ;HALT   2
 2893     017644 017556                        DT0
 2894     017646 017317                        EM1
 2895     017650 017513                        DH1     ;HALT   3
 2896     017652 017604                        DT1
 2897     017654 017352                        EM2
 2898     017656 017541                        DH2     ;HALT   4
 2899     017660 017616                        DT2
 2900     017662 017400                        EM3
 2901     017664 000000                        0       ;HALT   5
 2902     017666 000000                        0
 2903            000001          .END
```

```
ABBIT = 002000            609#    723
ACTBIT= 004000            610#    731
ADDR    014300           2346#
ADRCNT= 015317           2508*   2547*   2556#
BABIT = 010000            611#    727
BBBIT = 020000            612#    718
BINWRD  015636           2597*   2598    2637#
BIT0  = 000001            604#   1042    1160    1161
BIT1  = 000002            603#   1233    1284    1285    1353    1354    1422    1423    1491    1492    1560    1561    1629
                         1630    1698    1699    1766    1767    1832    1833    1898    1899    1964    1965    2030    2031
                         2096    2097    2162    2163    2228    2229
BIT10 = 002000            594#
BIT11 = 004000            593#
BIT12 = 010000            592#
BIT13 = 020000            591#
BIT14 = 040000            590#   2408
BIT15 = 100000            589#
BIT2  = 000004            602#   1013    1183    1208
BIT3  = 000010            601#   1142    1161    1280    1349    1418    1487    1556    1625    1694    1762    1828    1894
                         1960    2026    2092    2158    2224
BIT4  = 000020            600#   1189    1197    1214    1223    2308
BIT5  = 000040            599#   1160    1161    1197    1223    2327
BIT6  = 000100            598#   1189    1193    1214    1219
BIT7  = 000200            597#   1186    1210    1228    1229
BIT8  = 000400            596#
BIT9  = 001000            595#
BRW     014602           1019    2426#
BRX     014604           1020    2427#
CHAR    014274           1118*   1235*   2344#   2880
CHARDT= 000010             629#
CHAR1   001236             800#
CHAR2   001240             801#
CHAR3   001242             802#
CHRCNT  015634           2595*   2599    2615*   2635#   2636
CKSWR - 104414             861#    987     997    1012    2389    2407    2431    2654    2713
CNTLU - 104415             863#    969
CNVRT = 104411             855#   2363    2367    2371    2375    2684    2688    2747    2778
CONVRT- 104410             853#    977    2704
COUNT   014276           2345#
CREAM   001300             817#    941*   1051*   1055*   1064    1065*   1066    1067*
CSRMAP  000220             698#    972
DATABP  016114           2677*   2680    2702    2705#
DATAHD  016102           2676*   2698    2701#
DETCAR  014304           2348#
DEVADR  015314           2506*   2544    2554#
DH0     017436           2865#   2892
DH1     017513           2865#   2895
DH2     017541           2865#   2898
DISPRE  000174             689#    957
DLIGHT- 177570             574#    948
DQACTV  001500             669     743*    749*    750*    754     920#    994*    995    1045    1047
DQCR00  001400             888#
DQCR01  001404             890#
DQCR02  001410             892#
DQCR03  001414             894#
DQCR04  001420             896#
```

```
DQCR05  001424  898#
DQCR06  001430  900#
DQCR07  001434  902#
DQCR10  001440  904#
DQCR11  001444  906#
DQCR12  001450  908#
DQCR13  001454  910#
DQCR14  001460  912#
DQCR15  001464  914#
DQCR16  001470  916#
DQCR17  001474  918#
DQCSR   001506  923#  1064*  1068
DQERR   001366  878#  1081*  1082*  1083  1179  1204  2306*
DQNUM   001504  702*   739*   744   746   922#   936  2380
DQRCSH  001362  876#  1077*  1078*  2315*  2321*  2324*
DQRCSR  001360  875#  1068*  1077  1079  1160*  1208  1210*  1219*  1294*  1297  1363*  1366  1432*
                1435  1501*  1504  1570*  1573  1639*  1642  1708*  1711  1776*  1779  1842*  1845
                1908*  1911  1974*  1977  2040*  2043  2106*  2109  2172*  2175  2238*  2241  2304*
                2394
DQREG   001370   879#  1083*  1084*  1085  1120*  1122*  1124*  1126*  1128*  1130*  1132*  1134*  1136*
                1138*  1143*   165*  1166  1168*  1185*  1188*  1189*  1191*  1194*  1196*  1197*  1199*
                1211*  1213*  1214*  1220*  1222*  1223*  1232*  1245*  1265*  1279*  1286*  1288*  1290*
                1292*  1334*  1348*  1355*  1357*  1359*  1361*  1403*  1417*  1424*  1426*  1428*  1430*
                1472*  1486*  1493*  1495*  1497*  1499*  1541*  1555*  1562*  1564*  1566*  1568*  1610*
                1624*  1631*  1633*  1635*  1637*  1679*  1693*  1700*  1702*  1704*  1706*  1748*  1761*
                1768*  1770*  1772*  1774*  1814*  1827*  1834*  1836*  1838*  1840*  1880*  1893*  1900*
                1902*  1904*  1906*  1946*  1959*  1966*  1968*  1970*  1972*  2012*  2025*  2032*  2034*
                2036*  2038*  2078*  2091*  2098*  2100*  2102*  2104*  2144*  2157*  2164*  2166*  2168*
                2170*  2210*  2223*  2230*  2232*  2234*  2236*  2308*  2309*  2311*  2314*  2317*  2319*
                2326*
DQRLVL  001352   872#  1071*  1072*  1073  1157*
DQRVEC  001350   871#  1069*  1070*  1071  1156*  2397
DQSEC   001372   880#  1085*  1086*  1087  1121*  1123*  1125*  1127*  1129*  1131*  1133*  1135*  1137*
                1139*  1142*  1144*  1167  1187*  1190*  1195*  1198*  1212*  1215*  1221*  1224*  1233*
                1278*  1280*  1283*  1284*  1285*  1287*  1289*  1291*  1293*  1347*  1349*  1352*  1353*
                1354*  1356*  1358*  1360*  1362*  1416*  1418*  1421*  1422*  1423*  1425*  1427*  1429*
                1431*  1485*  1487*  1490*  1491*  1492*  1494*  1496*  1498*  1500*  1554*  1556*  1559*
                1560*  1561*  1563*  1565*  1567*  1569*  1623*  1625*  1628*  1629*  1630*  1632*  1634*
                1636*  1638*  1692*  1694*  1697*  1698*  1699*  1701*  1703*  1705*  1707*  1760*  1762*
                1765*  1766*  1767*  1769*  1771*  1773*  1775*  1826*  1828*  1831*  1832*  1833*  1835*
                1837*  1839*  1841*  1892*  1894*  1897*  1898*  1899*  1901*  1903*  1905*  1907*  1958*
                1960*  1963*  1964*  1965*  1967*  1969*  1971*  1973*  2024*  2026*  2029*  2030*  2031*
                2033*  2035*  2037*  2039*  2090*  2092*  2095*  2096*  2097*  2099*  2101*  2103*  2105*
                2156*  2158*  2161*  2162*  2163*  2165*  2167*  2169*  2171*  2222*  2224*  2227*  2228*
                2229*  2231*  2233*  2235*  2237*  2310*  2318*  2320*  2327*
DQSECH  001374   881#  1087*  1088*
DQSTAT  001510   924#  1066*  1069  1109  1140  1269  1338  1407  1476  1545  1614  1683  1754
                1820  1886  1952  2018  2084  2150  2216
DQST00  001402   889#
DQST01  001406   891#
DQST02  001412   893#
DQST03  001416   895#
DQST04  001422   897#
DQST05  001426   899#
DQST06  001432   901#
DQST07  001436   903#
```

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DQST10  001442            905#
DQST11  001446            907#
DQST12  001452            909#
DQST13  001456            911#
DQST14  001462            913#
DQST15  001466            915#
DQST16  001472            917#
DQST17  001476            919#
DQTCSR  001364            877#  1079*  1080*  1081   1161*  1183   1186*  1193*  1295*  1364*  1433*  1502*  1571*
                         1640*  1709*  1777*  1843*  1909*  1975*  2041*  2107*  2173*  2239*  2305*
DQTLVL  001356            874#  1075*  1076*  1159*
DQTVEC  001354            873#  1073*  1074*  1075   1158*
DSWR  = 177570            573#   947
DT0     017556           2865#  2893
DT1     017604           2876#  2896
DT2     017616           2881#  2899
EM0     017256           2865#  2888
EM1     017317           2865#  2891   2894
EM2     017352           2865#  2897
EM3     017400           2865#  2900
ENDTS2  003332           1176#  1244
ERR     014266           1179*  1204*  2341#  2883
ERRCNT  001232            795#   942*  2403   2714*
ERRFLG  001312            826#   939*  2357*  2420*  2665*  2678   2692*  2749*
ERRMSG  016070           2675*  2693   2696#
ERTABO  016206           2689   2723#
EXITER  016140           2708   2713#
GDCHAR  014302           1117*  1234*  2347#  2878
HALTS   016120           2661   2707#
HILIM   015312           2505*  2535   2553#
ICOUNT  001222            791#  1105*  2418   2422*
INBUF   017110           2469   2511   2859#
INIFLG  001310            824#   963    966*
INSTER= 104404            845#  2530
INSTR = 104403            843#  1023   2779
INSTR2  015076           2480   2495#
JUMBIT= 040000            613#   730   1140
LIGHTS  001202            780#   948*   957*  2377*
LIMITS  015240           2521   2535#
LOBITS  015316           2507*  2539   2555#  2556
LOCK    001220            790#  2434
LOGICA  014420            651   2384#
LOKFLG  001313            827#
LOLIM   015310           2504*  2537   2552#
LPCNT   001224            792#  2417*  2418   2421*
LSTERR  001234            796#   943*  2356*  2662   2664*  2750*
MASK    012370           1267*  1268   1273   1310   1356*  1337   1342   1379   1405*  1406   1411   1448   1474*
                         1475   1480   1517   1543*  1544   1549   1586   1612*  1613   1618   1655   1681*  1682
                         1687   1724   1750*  1751   1790   1816*  1817   1856   1882*  1883   1922   1948*  1949
                         1988   2014*  2015   2054   2080*  2081   2120   2146*  2147   2186   2212*  2213   2252
                         2262#  2875
MCRLF   016476           2477   2493   2585   2691   2785   2798#
MCSRX   016717           2362   2825#
MDATA   017214           2613   2624   2863#
MEMCLR- 104413            859#  1116   1259   1328   1397   1466   1535   1604   1673   1742   1808   1874   1940
                         2006   2072   2138   2204   2752
```

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MEPASS  016536            2360    2804#
MERRP^  017043            2687    2844#
MERRX   016744            2374    2831#
MERR2   016563             761    1059    2808#
MERR3   016632             991    2815#
MISC. = 000012             631#   2326
MLOCK   016670            1015    2821#
MNEW    016771             984    2836#
MPASSX  016733            2370    2829#
MPFAIL  016500            2746    2799#
MQM     016472            2490    2797#
MR      016560            1033    2807#
MSTCLR= 104412             857#   2751
MTITLE  001000             770#    965
MTSTN   016755            2683    2833#
MTSTPC  016656            1024    2819#
MVECX   016725            2366    2827#
NEXT    001216             789#   1039*   1106*   1258*   1327*   1396*   1465*   1534*   1603*   1672*   1741*   1807*   1873*
                          1939*   2005*   2071*   2137*   2203*   2423    2719
ODDBIT= 001000             614#    732
OUT     016432            2766    2768    2770    2774    2786#
PARAM = 104405             847#   1025    2780
PARAM1  015144            2510#   2531
PARERR  015220            2513    2515    2517    2526#   2536    2538    2540
PARTI   015302            2529    2549#
PASCNT  001230             794#    938*   2358*   2377    2400
PFTAB   016310            2748    2754#
POLY    014270            2342#
POLY. = 000017             636#
POPRO - 012600             583#   2712
POP1SP= 005726             581#
POP2SP= 022626             585#
PS      = 177776           575#    672*    933*   1008*   1119*
PUSHR0= 010046             582#   2709
PUSH1S  005746             580#
PUSH2S- 024646             584#
RDSW    016316            2442    2491    2528    2762#   2776*   2786*
RESREG  016116            2703    2706#
RESTAR  016234            2733    2739#
RESTRT  014430            2379    2382    2389#
RESO5 = 104407             851#   2706
RETURN  001214             788#    945*   1028    1032*   1034    1038*   1104*   2390*   2423*   2424    2719*   2721    2753
RUN     001304             819#   1042*   1045    1050*   1056*   1063*
RUNCNT  001306             820#   1043*   1052*   1054*
RUNFLG  001302             818#    940*   1040    1044*
RXBA.P= 000000             620#
RXBA.S= 000004             624#
RXBUFF  013256            1121    1212    1217    1260    1287    1303    1329    1356    1372    1398    1425    1441    1467
                          1494    1510    1536    1563    1579    1605    1632    1648    1674    1701    1717    1743    1769
                          1785    1809    1835    1851    1875    1901    1917    1941    1967    1983    2007    2033    2049
                          2073    2099    2115    2139    2165    2181    2205    2231    2247    2333#
RXISR   003502            1156    1202#
RXWC.P= 000001             621#
RXWC.S= 000005             625#
RX.BCC= 000015             634#
SAVACT  001502             754*    ^21#    288
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```
SAVNUM  001276          747*   816#   936*  2378*  2380*
SAVPC   001274          815#  2560*  2725
SAVR0   001256          808#  2569*  2574   2873
SAVR1   001260          809#  2568*  2575   2871
SAVR2   001262          810#  2567*  2576
SAVR3   001264          811#  2566*  2577
SAVR4   001266          812#  2565*  2578   2869
SAVR5   001270          813#  2564*  2579   2867
SAVSP   001272          814#
SAV05 = 104406          849#  2666
SCOPE = 104400          837#  1176   1316   1385   1454   1523   1592   1661   1730   1796   1862   1928   1994
                       2060   2126   2192   2258
SCOP1 - 104401          839#
SEQ.  - 000014          633#
SETON   002752         1120#
SPACNT= 015635         2596*  2617   2620*  2636#
STACK - 001200          576#   934   1009   2720   2741
STFLG   001311          825#   937*
SV05    015326         2564#
SWR     001200          779#   947*   952    956*   967    970    981    988    994   1013   1021   2408   2415
                       2432   2444   2655   2660   2707   2715   2717   2767
SWREG   000176          690#   956    967    2767   2783   2790
SWREGC  016440         2778   2788#
SW00  = 000001          556#   981
SW01  = 000002          555#  1021
SW02  = 000004          554#
SW03  = 000010          553#
SW04  = 000020          552#
SW05  = 000040          551#
SW06  - 000100          550#
SW08  = 000400          549#  2715
SW09  = 001000          548#  2432
SW10  = 002000          547#  2717
SW11  = 004000          546#  2415
SW12  = 010000          545#  2444   2655
SW13  = 020000          544#  2660
SW14  = 040000          543#
SW15  = 100000          542#
SYNBIT= 100000          615#   712   1109
SYNC    013052         1111*  1114*  1125   1266   1335   1404   1473   1542   1611   1680   1749   1815   1881
                       1947   2013   2079   2145   2211   2330#
SYNC.   000011          630#
SYNC1   012372         1276*  1345*  1414*  1483*  1552*  1621*  1690*  1756*  1758*  1773   1822*  1824*  1839
                       1888*  1890*  1905   1954*  1956*  1971   2020*  2022*  2037   2086*  2088*  2103   2152*
                       2154*  2169   2218*  2220*  2235   2263#
SYNC2   012374         1277*  1291   1346*  1360   1415*  1429   1484*  1498   1553*  1567   1622*  1636   1691*
                       1705   1759*  1825*  1891*  1957*  2023*  2089*  2155*  2221*  2264#
TEMP    017152         2592   2600   2627*  2742*  2743*  2861#
TEMP1   001244          669*   670*   803#   974*   975    979*  2852
TEMP2   001246          804#   975*  1162*  1171*  1203*  1266*  1268*  1272*  1273*  1275*  1276   1277   1278
                       1307*  1308*  1309   1335*  1337*  1341*  1342*  1344*  1345   1346   1347   1376*  1377*
                       1378   1404*  1406*  1410*  1411*  1413*  1414   1415   1416   1445*  1446*  1447   1473*
                       1475*  1479*  1480*  1482*  1483   1484   1485   1514*  1515*  1516   1542*  1544*  1548*
                       1549*  1551*  1552   1553   1554   1583*  1584*  1585   1611*  1613*  1617*  1618*  1620*
                       1621   1622   1623   1652*  1653*  1654   1680*  1682*  1686*  1687*  1689*  1690   1691
                       1692   1721*  1722*  1723   1749*  1751*  1753*  1758   1759   1760   1815*  1817*  1819*
```

```
                        1824    1825    1826    1881*   1883*   1885*   1890    189'    1892    1947*   1949*   1951*   1956
                        1957    1958    2013*   2015*   2017*   2022    2023    2024    2079*   2081*   2083*   2088    2089
                        2090    2145*   2147*   2149*   2154    2155    2156    2211*   2213*   2215*   2220    2221    2222
                        2854
TEMP3   001250           805#   1163*   1241*   2592*   2627
TEMP4   001252           806#   1164*   1169*
TEMP5   001254           807#
TKCSR   001204           781#   2411    2471    2769
TKDBR   001206           782#   2413    2473    2481    2771
TLAST = 012040          1027    2350#
TPCSR   001210           783#   2448    2451    2454    2482    2657
TPDBR   001212           784#   2450*   2453*   2456*   2481*   2659*
TRPOK   015652          2646#
TSTNO   001226           793#    944*   1037*   1103*   1257*   1326*   1395*   1464*   1533*   1602*   1671*   1740*   1806*
                        1872*   1938*   2004*   2070*   2136*   2202*   2728    2756
TST1    002254          1026    1032    1037#   2390    2391
TST10   006154          1534    1602#
TST11   006522          1603    1671#
TST12   007070          1672    1740#
TST13   007420          1741    1806#
TST14   007750          1807    1872#
TST15   010300          1873    1938#
TST16   010630          1939    2004#
TST17   011160          2005    2070#
TST2    002644          1038    1039    1103#
TST20   011510          2071    2136#
TST21   012040          2137    2202#   2350
TST22 = ****** U        2203
TST3    003756          1106    1257#
TST4    004324          1258    1326#
TST5    004672          1327    1395#
TST6    005240          1396    1464#
TST7    005606          1465    1533#
TTST    014504          1016*   1017*   1019*   1020*   2409#
TXBA.P- 000002           622#
TXBA.S= 000006           626#
TXBFA   013054          1146    1187    1216    2331#
TXBUFF  012376          1302    137'    1440    1509    1578    1647    1716    1784    1850    1916    1982    2048    2114
                        2180    2246    2265#
TXISR   003334          1158    1179#
TXWC.P= 000003           623#
TXWC.S- 000007           627#
TX.BCC= 000016           635#
TX.MUX= 000013           632#
TYPDAT  016104          2681    2699    2702#
TYPE  = 104402           760     841#    965     973     983     990    1015    1033    1058    2359    2361    2365    2369
                        2373    2467    2477    2489    2493    2584    2623    2682    2686    2690    2695    2700    2745
                        2775    2777    2785
TYPMSG  016026          2679    2682#
VECMAP  000056           662#    759
WRDCNT  015632          2594*   2625*   2634#
WRKO.F  016072          2694    2697#
XBX     015720          2656    2658    2660#
XCSR    014444          2364    2392#
XERR    014466          2376    2401#
XHEAD   017052           973    2845#
```

```
XPASS   014460          2372    2398#
XPOLY   014272          2343#
XRXBUF  014064          1129    1221    1226    2339#
XSTATQ  017076           978    2850#
XSYNC   013656          1112*   1115*   2335#
XSYNC2  013660          2336#
XTSTN   016214          2685    2726#
XTXBUF  013662          1133    1151    1195    1225    2337#
XVEC    014452          2368    2395#
$CNTG   016446          2775    2791#
$E      = 000023           1#   1039    1040#   1106    1107#   1258    1259#   1327    1328#   1396    1397#   1465    1466#
                        1534    1535#   1603    1604#   1672    1673#   1741    1742#   1807    1808#   1873    1874#   1939
                        1940#   2005    2006#   2071    2072#   2137    2138#   2203    2204#
$MNFW   016461          2779    2794#
$MSWR   016452          2777    2792#
$N      = 000021           1#   1035    1040#   1101    1107#   1255    1259#   1324    1328#   1393    1397#   1462    1466#
                        1531    1535#   1600    1604#   1669    1673#   1738    1742#   1804    1808#   1870    1874#   1936
                        1940#   2002    2006#   2068    2072#   2134    2138#   2200    2204#   2350#
$Y      = 000016           1#    828#    837     839#    841#    843#    845#    847#    849#    851#    853#    855#    857#
                         859#    861#    863#    865#
.       = 017670         640#    641     643#    650#    652#    660#    676     688#    694#    697#    701     717     722
                         726     729     764     769#    776#    817#    887#    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#    971     976     980     993     1061    1141    1180    1205
                        2302#   2332#   2334#   2338#   2340#   2449    2452    2735    2744    2796#   2849#   2860#   2862#
                        2864#   2865#
.BEGIN  002116          1008#
.CKSWR  016320           862    2765#
.CNTLU  016374           864    2776#
.CNVRT  015416           856    2586#
.CONVR  015412           854    2584#
.EOP    014306          2203    2356#
.ERRTA  017624          2674    2884#
.HLT    015672           646    2654#
.INSTE  015052           846    2487#
.INSTG  015056          2486    2489#
.INSTR  014734           844    2463#
.INST1  014754          2467#   2478    2494
.MEMCL  012706           860    2303#
.MSG    014756          2465*   2468#   2771*   2772*   2773
.MSTCL  013032           858    2325#
.PARAM  015104           848    2501#
.PFAIL  016222           644     935    2732#   2740
.RESO5  015360           852    2574#
.SAVO5  015320           850    2560#
.SCOPE  014474           838    2407#
.SCOP1  014606           840    2431#
.START  001512           695     933#    945
.SYNC   013050          1137    2329#
.TRPSR  015640           648    2643#
.TRPTA  001314           836#   2648
.TYPE   014626           842    2439#

. ABS.  017670
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ERRORS DETECTED:  0

DSKZ:CZDQHD,DSKZ:CZDQHD.SEQ=DSKZ:CZDQXX.MAC,DSKZ:CZDQHD.P11
RUN-TIME:  7 11 .9 SECONDS
RUN-TIME RATIO:  46/19=2.3
CORE USED:  19K  (37 PAGES)

DOCUMENT PAGES:  63
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