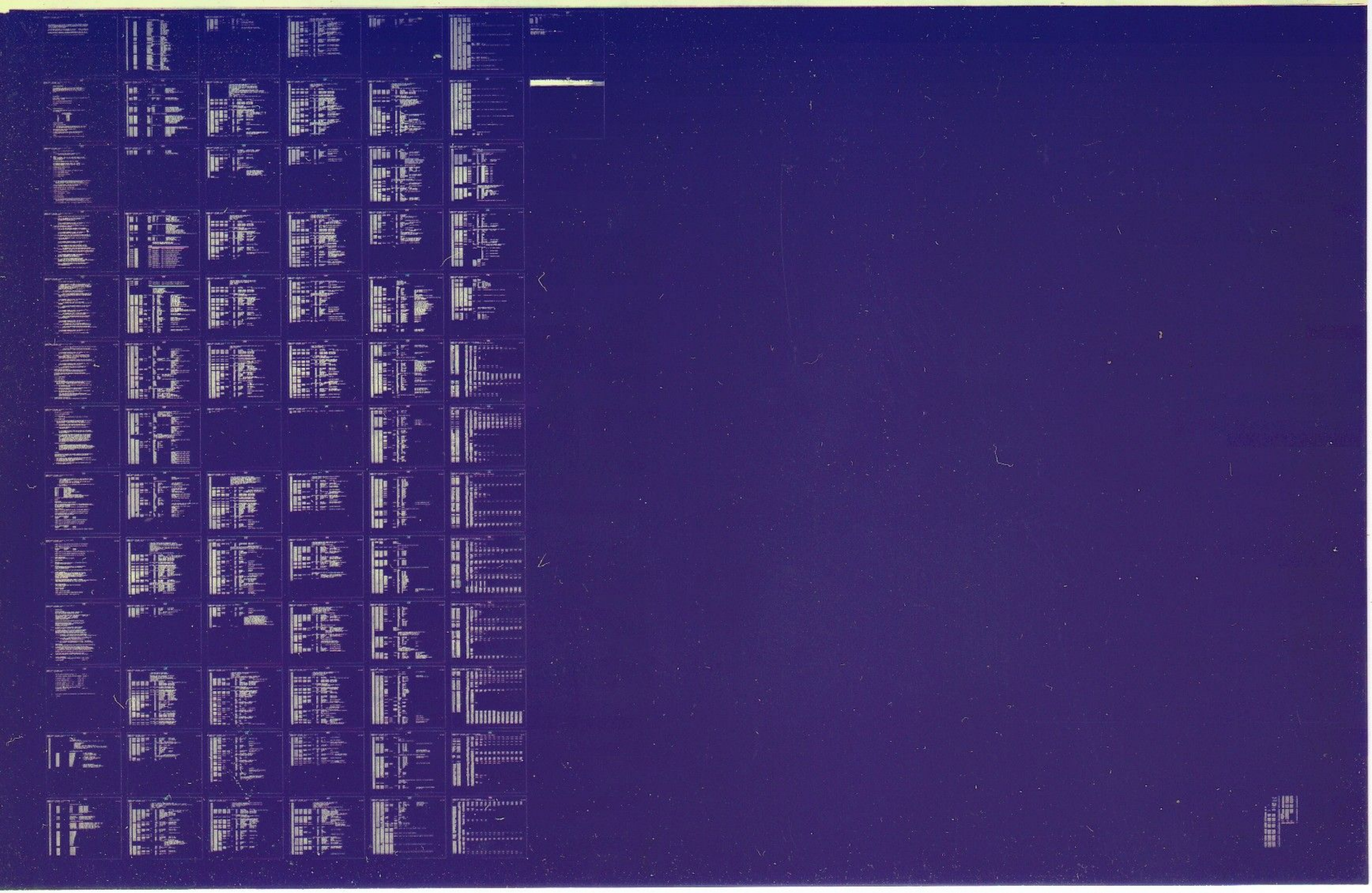
DU11

TIMING&INTERFACE
MD-11-DZDUE-C

EP-DZDUE-C-DL-A

FICHE 1 OF 1

NOV 1976
digital
MADE IN USA



GENERAL DESCRIPTION

THIS DIAGNOSTIC CAN CHAIN 16 DU11'S. THIS MEANS THAT
16 DEVICES CAN BE SEQUENTIALLY EXERCISED. THE DIAGNOSTIC
MAKES ONE PASS BEFORE PROCEEDING TO THE NEXT DEVICE,
AND CONTINUES EXERCISING ALL DEVICES IN THIS FASHION UNTIL
HALTED.

2. REQUIREMENTS

PDP-11 FAMILY STANDARD COMPUTER WITH OR WITHOUT HARDWARE SWITCH
REGISTER (LOC. 177570)

DU11 SYNCRONOUS/ISOCRONOUS OPTION

ONE CONSOLE TELETYPE OR EQUIVALENT

2.2 STORAGE

3. LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING ABSOLUTE BINARY TAPES
IS TO BE USED.

	STARTING ADDRESS FOR ABSOLUTE LOADER
4K	017500
8K	037500
12K	057500
16K	077500
20K	117500
24K	137500
28K	157500

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

NOTE: SOFTWARE SWITCH REGISTER IS DEFINED AS LOC. 176, WHILE
THE SOFTWARE DISPLAY REGISTER IS DEFINED AS LOC. 174.

4.1.1 AFTER PROGRAM LOAD (INITIAL PROGRAM START)
ALL CONSOLE SWITCHES DOWN

4.1.2 TO MODIFY DEVICE VECTOR AND CONTROL REGISTER ADDRESSES
AFTER PROGRAM RESTART OR TO RUN MULTIPLE DEVICES

SW00=1

4.1.3 TO START PROGRAM AT SELECTED TEST AFTER A PROGRAM RESTART

(ONLY IN SINGLE DEVICE TESTS)
SW01=1

4.1.4 TO LOCK ON SELECTED TEST AFTER A PROGRAM RESTART
(ONLY IN SINGLE DEVICE TESTS)

SW02=1
NOTE1: IN GENERAL SW01 WILL BE USED WHEN SW02=1 IS USED
NOTE2: WITHOUT SW01=1 "LOCK ON TEST" WILL DEFAULT TO TEST 1

4.2 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200

THE RETARTING ADDRESS FOR ALL TESTS IS 000200
THE STARTING ADDRESS TO ENTER A SELECTED TEST IS 000200
THE STARTING ADDRESS TO LOCK ON TEST IS 000200

4.3 PROGRAM AND/OR OPERATOR ACTION

4.3.1 INITIAL PROGRAM START

4.3.1.1 LOAD PROGRAM INTO MEMORY WITH ABSOLUTE LOADER

4.3.1.2 LOAD ADDRESS 000200

4.3.1.3 CLEAR CONSOLE SWITCHES

4.3.1.4 PRESS START

NOTE:IF THE SOFTWARE SWITCH REGISTER IS SELECTED THEN THE FOLLOWING
WILL BE TYPED AFTER THE PROGRAM IDENTIFIES ITSELF:
SWR=XXXXXX NEW= (REFER TO SECTION 5. FOR OPERATOR'S OPTION)

4.3.1.7 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT IS ABOUT
TO START TESTING ,AND THEN TESTING WILL BEGIN

4.3.2 PROGRAM RESTART WITH ALL SWITCHES DOWN

4.3.2.1 THE PROGRAM WILL TYPE "R" AND WILL COMMENCE TESTING

4.3.3 PROGRAM RESTART WITH SW00=1

4.3.3.1 LOAD ADDRESS 000200

4.3.3.2 SET SW00=1

4.3.3.3 PRESS START

NOTE:IF THE SOFTWARE SWITCH REGISTER IS SELECTED THEN THE FOLLOWING
WILL BE TYPED AFTER THE PROGRAM IDENTIFIES ITSELF:
SWR=XXXXXX NEW= (REFER TO SECTION 5. FOR OPERATOR'S OPTION)

4.3.3.4 THE PROGRAM WILL TYPE " 1ST DEVICE: RECEIVER CONTROL REGISTER

ADDRESS" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.5 TYPE IN THE ADDRESS OF THE FIRST RECEIVER CONTROL
REGISTER ADDRESS OF THE DU11 TO BE TESTED
FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED ,THE PROGRAM WILL TYPE "?"
AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.4

4.3.3.6 THE PROGRAM WILL TYPE "VECTOR ADDRESS-" AND WAIT FOR AN
INPUT FROM THE TELETYPE KEYBOARD

4.3.3.7 TYPE IN THE BASE RECEIVER INTERRUPT VECTOR ADDRESS
FOR THE DU11 TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED ,THE PROGRAM WILL TYPE "?"
AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.6

4.3.3.8 THE PROGRAM WILL TYPE "ARE YOU RUNNING MULTIPLE DEVICES ?"
(Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.9 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A
<CARRIAGE RETURN>

IF AN INCORRECT ANSWER IS GIVEN, THE PROGRAM WILL TYPE "?"
AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.8

IF A "NO" ANSWER IS GIVEN: JUMP TO SECTION 4.3.3.12
IF A "YES" ANSWER IS GIVEN:THE NEXT QUESTION IS ASKED

4.3.3.10 THE PROGRAM WILL TYPE "LAST DEVICE:RECEIVER CONTROL
REGISTER ADDRESS-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.11 TYPE IN THE ADDRESS OF THE LAST RECEIVER CONTROL REGISTER
ADDRESS OF THE DU11 TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?"
AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.10
NOTE:ALL ADDRESSES SHALL BE CONTIGUOUS

4.3.3.11.1 IF AN "OUT OF RANGE" ADDRESS IS TYPED
IE. MORE THAN 16 (10) DEVICES AWAY (UPWARDS).....THE
PROGRAM WILL TYPE "OUT OF RANGE:RETYPE LAST DEVICE RXCSR ADDRESS-"
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.11.2 TYPE IN THE ADDRESS OF THE LAST RECEIVER CONTROL
REGISTER ADDRESS OF THE DU11 TO BE TESTED FOLLOWED
BY A <CARRIAGE RETURN>

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?"

AND WILL REPEAT THE MESSAGE OF 4.3.3.11.1

IF A DEVICE ADDRESS LOWER THAN 1ST DEVICE ADDRESS IS TYPED.....
....SCHOOLS OUT.....THERE IS NO PROTECTION FOR THIS.
THE PROGRAM WILL DEFAULT TO TWO DEVICES ACTIVE (UPWARDS FROM
1ST DEVICE ADDRESS).THE SAME APPLIES TO IDENTICAL ADDRESSES
TYPED FOR FIRST AND LAST DEVICE.
OBSERVE LOCATION @ ACTREG: SEE SECTION 7.2

4.3.3.12 THE PROGRAM WILL TYPE "DU PRIORITY LEVEL-" AND
WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.13 TYPE IN THE APPROPRIATE DEVICE PRIORITY LEVEL OF THE
DU11 OR DU11'S TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>
(NOTE THAT ALL MULTIPLE DEVICES MUST BE AT THE SAME PRIORITY
LEVEL). IE "5"

IF AN INCORRECT LEVEL IS TYPED ,THE PROGRAM WILL TYPE "?"
AND REPEAT THE MESSAGE OF 4.3.3.12

4.3.3.14 THE PROGRAM WILL TYPE "# OF SYNC CHARS
SELECTED (1 OR 2)-" AND WAIT FOR AN INPUT FROM THE TELETYPE
KEYBOARD

4.3.3.15 TYPE IN THE APPROPRIATE ANSWER "1" OR "2" FOLLOWED
BY A <CARRIAGE RETURN>.(NOTE:ALL MULTIPLE DEVICES MUST
BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?"
AND WILL REPEAT THE MESSAGE OF 4.3.3.14

4.3.3.16 THE PROGRAM WILL TYPE " IS SEC XMIT JUMPER #6 IN ? (Y OR N)-"
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.17 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED
BY A <CARRIAGE RETURN>.(NOTE THAT ALL MULTIPLE DEVICES
MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?"
AND WILL REPEAT THE MESSAGE OF 4.3.3.16

4.3.3.18 THE PROGRAM WILL TYPE "IS SEC REC JUMPER # 5 I ?
(Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.19 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED
BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?"
AND WILL REPEAT THE MESSAGE OF 4.3.3.18

4.3.3.20 THE PROGRAM WILL TYPE "IS OPT CLR ENABLE JUMPER

4 IN ? (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.21 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.20

4.3.3.22 THE PROGRAM WILL TYPE "ARE YOU RUNNING IN MAINT. MODE EXTERNAL ? AND .....DO YOU HAVE THE EXTERNAL MODEM BYPASS JUMPER CONNECTOR ON ? (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.23 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.22

4.3.3.24 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED AND WILL COMMENCE TESTING AT TEST 1

4.3.4 PROGRAM RESTART WITH SW01=1
NOTE: THIS WILL ONLY WORK WHEN A SINGLE DEVICE IS SELECTED
,,,IT WILL NOT WORK IF MULTIPLE DEVICES ARE SELECTED

IF MULTIPLE DEVICES WERE PREVIOUSLY SELECTED,LOAD 000200, AND SELECT SW00=1 AND ANSWER "NO" TO THE MULTIPLE DEVICE QUESTION
SEE 4.3.3

4.3.4.1 LOAD 000200

4.3.4.2 SET SW01=1

4.3.4.3 PRESS START
NOTE:IF THE SOFTWARE SWITCH REGISTER IS SELECTED THEN THE FOLLOWING
WILL BE TYPED AFTER THE PROGRAM IDENTIFIES ITSELF:
SWR=XXXXXX NEW= (REFER TO SECTION 5. FOR OPERATOR'S OPTION)

4.3.4.4 THE PROGRAM WILL TYPE "TEST PC-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.4.5 TYPE IN THE ADDRESS OF THE TEST AT WHICH THE PROGRAM IS TO BE STARTED FOLLOWED BY A <CARRIAGE RETURN>

4.3.4.6 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED TESTING AT THE SELECTED TEST

NOTE: CARE MUST BE TAKEN WHEN THIS FEATURE IS USED SINCE THERE IS NO PROTECTION AGAINST SELECTING AN ADDRESS THAT IS IN THE MIDDLE OF A TEST

4.3.5 PROGRAM RESTART WITH SW02 =1
NOTE: THIS WILL ONLY WORK WHEN A SINGLE DEVICE IS SELECTED

SEE NOTE IN 4.3.4 FOR MORE DETAILS

4.3.5.1 LOAD ADDRESS 000200

4.3.5.2 SET SW02 =1
NOTE: IT MAY BE ADVANTAGEOUS TO SET SW01=1 (OPTIONAL)

4.3.5.3 PRESS START

NOTE:IF THE SOFTWARE SWITCH REGISTER IS SELECTED THEN THE FOLLOWING
WILL BE TYPED AFTER THE PROGRAM IDENTIFIES ITSELF:
SWR=XXXXXX NEW= (REFER TO SECTION 5. FOR OPERATOR'S OPTION)

4.3.5.4 THE PROGRAM WILL TYPE "LOCK ON SELECTED TEST ? (Y OR N)-"
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.5.5 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A
<CARRIAGE RETURN>

IF A NO ANSWER IS GIVEN: THIS LOCK ON TEST WILL BE IGNORED
AND THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED
TESTING AT TEST 1

4.3.5.6 IF A YES ANSWER WAS GIVEN:THE PROGRAM WILL ACT AS FOLLOWS...
THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED
TESTING AT TEST 1 AND WILL REMAIN IN TEST 1 UNTIL HALTED
OR IF ANY KEY IS STRUCK ON THE TELETYPE ,THE PROGRAM
WILL FREEZE ON THE NEXT TEST UNTIL A KEY IS STRUCK ON
THE TELETYPE AND SO FORTH THRU THE PROGRAM. IF SW01 =1 IT
WILL PERFORM AS IN SECTION 4.3.4 ALLOWING ONE TO FREEZE
ON A SELECTED TEST RATHER THAN DEFAULTING TO TEST 1

5. OPERATING PROCEDURE

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.

5.1 OPERATIONAL SWITCH SETTINGS

SW15 =1	HALT ON ERROR
SW14 =1	LOOP ON CURRENT TEST
SW13 =1	INHIBIT ERROR TYPEOUT
SW11 =1	INHIBIT ITERATIONS
SW10 =1	ESCAPE TO NEXT TEST ON ERROR
SW08 =1	LOOP ON ERROR
SW02 =1	LOCK ON TEST
SW01 =1	RESTART PROGRAM AT SELECTED TEST
SW00 =1	RESELECT VECTOR AND CONTROL REGISTER ADRESSES &PARAMETERS AFTER A PROGRAM RESTART

TO INHIBIT "END OF PASS" TYPEOUT - TURN TELETYPE OFF

6. ERRORS

6.1 ERROR HALTS
THERE ARE FOUR DISTINCT ERROR TYPEOUTS

NOTE: 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 5. FOR OPERATOR OPTION)

6.1.1 PC+2 = ERROR PC
WHERE PC +2 IS THE ADDRESS OF THE CALL TO THE ERROR HANDLER +2

REFER TO THE ABOVE "HLT" IN DIAGNOSTIC FOR ERROR DESCRIPTION

CHECK ADDRESS @ RXCSR: TO LOCATE THE DEVICE PRESENTLY UNDER
TEST WHEN RUNNING MULTIPLE DEVICES

6.1.2 PC +2 = REGISTER ERROR PC

REGISTER	EXPECTED	ACTUAL
16XXXX	YYYYYY	ZZZZZZ

WHERE 16XXXX IS THE ADDRESS OF THE FAILING DEVICE REGISTER

WHERE YYYYYY IS THE EXPECTED CONTENTS OF THAT REGISTER

WHERE ZZZZZZ IS THE ACTUAL CONTENTS OF THAT REGISTER

6.1.3 PC +2 = RECEIVER ERROR PC

REGISTER	EXPECTED	ACTUAL
16XXXX	YYYYYY	ZZZZZZ

WHERE 16XXXX IS THE ADDRESS OF THE FAILING RECEIVER (RXDBUF) REGISTER

WHERE YYYYYY IS THE EXPECTED DATA CONTENTS OF THAT REGISTER

WHERE ZZZZZZ IS THE ACTUAL DATA CONTENTS OF THAT REGISTER

6.1.4 PC +2 = TRANSMITTER ERROR PC

REGISTER	EXPECTED	ACTUAL
16XXXX	YYYYYY	ZZZZZZ

WHERE 16XXXX IS THE ADDRESS OF THE FAILING TRANSMITTER (TXCSR) REGISTER

WHERE YYYYYY IS THE EXPECTED CONTENTS OF THAT REGISTER

WHERE ZZZZZZ IS THE ACTUAL CONTENTS OF THAT REGISTER

6.1.5 ERROR DESCRIPTIONS
SEE LISTINGS FOR DETAILS OF ERRORS

6.2 ERROR RECOVERY

6.2.1 SW15 =0
IF THE PROGRAM IS RUN WITH SW15 =0 ,NO OPERATOR ACTION IS
REQUIRED TO CONTINUE TESTING

6.2.2 SW15 =1
IF THE PROGRAM IS RUN WITH SW15 =1 ,TO CONTINUE TESTING
AFTER THE PROGRAM HAS HALTED ,PRESS THE PROCESSOR
CONSOLE "CONTINUE SWITCH"

NOTE: THE PC + 2 OF THE "HLT" WILL BE DISPLAYED IN THE DATA LIGHTS

6.2.3 ILLEGAL INTERRUPTS
IF AN INTERRUPT OCCURS TO A VECTOR ADDRESS NOT SELECTED
DURING PROGRAM INITIALIZATION, THE PROGRAM WILL HALT IN
THE TRAPCATCHER. THE ADDRESS AT WHICH THE PROGRAM
HALTS IS 2 GREATER THAN THE ADDRESS TO WHICH THE INTERRUPT
OCCURED. THE PROGRAM MUST BE RESTARTED AT 000200 TO
RECOVER FROM THIS ERROR.

6.2.4 ADDITIONAL TROUBLESHOOTING AIDS ERRCNT: & PASCNT:
CHECK THESE TWO TAG LOCATIONS FOR TOTAL # OF ERRORS AND PASSES RESPECTIVELY.
LOADING 000200 AND RESTARTING WILL CLEAR THESE LOCATIONS.

6.3 END OF PASS ROUTINE
THIS TYPEOUT IS MENTIONED HERE FOR CONVENIENCE
IT IS IN THE FORM:

END OF PASS TAPE Y
16XXXX = DEVICE

WHERE Y IS THE TAPE LOADED

WHERE 16XXXX IS THE DEVICE'S BASE REGISTER ADDRESS

TO INHIBIT THIS TYPEOUT - TURN TELETYPE OFF

7. RESTRICTIONS

7.1 MULTIPLE DEVICES
UP TO 16(10) DEVICES MAY BE TESTED. HOWEVER, THEY
MUST HAVE CONTIGUOUS ADDRESSES AND VECTORS

NOTE: IF ALL DEVICES UNDER TEST HAVE THE SAME INTERRUPT VECTOR
YOU CAN CHANGE "ZERO: ADD #10,BASEIV ;NEXT BLOCK
(VECTORS)" TO "ZERO: ADD #0,BASEIV";
THEREBY THE VECTOR ADDRESSES WILL NOT BE
UPDATED AFTER EACH PASS.

7.2 DISQUALIFYING DEVICES WHEN RUNNING MULTIPLE DEVICES

WHEN RUNNING MULTIPLE DEVICES AN ACTIVE BIT IS SET
FOR EACH DEVICE RUNNING UNDER TEST IE. BIT 0 FOR
DEVICE 0 ,BIT 15 FOR DEVICE 15
TO DISQUALIFY DEVICES:

7.2.1 IF DEVICE 0 IS TO BE DISQUALIFIED ,SIMPLY RESTART
PROGRAM WITH SW00 =1 AND OMIT THE FIRST DEVICE.

7.2.2 IF HOWEVER, DEVICES 1 THRU 15 OR ANY COMBINATION THEREOF
ARE TO BE DISQUALIFIED...LOAD THE LOCATION OF ACTREG:
OBSERVE THE ACTIVE BITS (ACTIVE =1, NONACTIVE = 0)
AND DEPOSIT 0 WHERE THOSE DEVICES ARE TO BE DISQUALIFIED

7.2.2.1 TO RESTART...LOAD 000200 IN SWR AND DEPRESS START....
THE PROGRAM WILL CONTINUE WITH THE DEVICE IT WAS IN BEFORE HALTING.

7.2.2.2 .....OR .....LOAD 000200 WITH SW00 =1 AND DEPRESS START....
ANSWER THE QUESTION :1ST DEVICE : ETC.....
....THE PROGRAM WILL CONTINUE WITH DEVICE 0

7.2.2.3 IF ALL DEVICES ARE DISQUALIFIED BY MISTAKE THE PROGRAM
WILL TYPEOUT AN ERROR MESSAGE.....LOAD & START AT 000200

7.3 CABLE DELAYS
NOTE: EXTERNAL LOOP BACK TESTS ONLY (MODEM CABLE WITH H315 CONNECTOR ON)

7.3.1 TO PROVIDE SUFFICIENT DELAY FOR CLOCK SIGNAL OVER THE CABLE,
LOCATION "HOLD:" MUST BE MODIFIED TO ACCOMODATE FOR FASTER MACHINES.
PRESENTLY "HOLD:" =20 IS SUFFICIENT TIME ON AN 11/20 MACHINE.
IF RUNNING ON AN 11/40 OR AN 11/45 "HOLD:" MUST BE PATCHED TO 40

BASICALLY DON'T TRY TO EXCEED 10K TO 12K RATE USING THE EIA DRIVERS

7.4 TO USE THE "XOR" TESTER ,THE BRANCH AROUND THE "XOR"
CODE MUST BE PATCHED TO A "NOP". (SEE LISTINGS FOR DETAILS)

8. DEFAULT PARAMETERS:
1ST DEVICE: RECEIVER CONTROL REGISTER ADDRESS- RXCSR: 160040

VECTOR ADDRESS- DURIV: 770

ARE YOU RUNNING MULTIPLE DEVICES ?- NO MULTD: 0

LAST DEVICE: RECEIVER CONTROL REGISTER ADDRESS- LASTADD: 0

DU PRIORITY LEVEL- LEVEL 5 DUPRT: LEVEL 5

OF SYNC CHARS SELECTED - 2 SYNCNO: 377

IS SEC XMIT JUMPER # 6 IN ?- YES SEXMIT: 377

IS SEC REC JUMPER # 5 IN ?- YES SEREC: 377

IS OPT CLR ENABLE JUMPER # 4 IN ?- YES OPTCLR: 377

DO YOU HAVE THE EXTERNAL MODEM BYPASS JUMPER
CONNECTOR ON (H315)- YES JMRBY: 377

9. PROGRAM DESCRIPTION

10. FLOW CHARTS: RECEIVER FLOW,TRANSMITTER FLOW,TRANSMITTER & RECEIVER FLOW

11. LISTINGS

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                                .ENABLE ABS

                                ;DU11 DZDUE-C TAPE E
                                ;COPYRIGHT 1973, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754

                                        ;STARTING PROCEDURE
                                        ;LOAD PROGRAM
                                        ;PRESS START
                                        ;PROGRAM WILL TYPE "DU11 DZDUE-C TAPE E "
                                        ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                        ;AT THE END OF A PASS, PROGRAM WILL TYPE "END OF PASS TAPE E"
                                        ;AND THEN RESUME TESTING


                                ;SWITCH REGISTER OPTIONS

  100000                        SW15=100000             ;=1,HALT ON ERROR
  040000                        SW14=40000              ;=1,LOOP ON CURRENT TEST
  020000                        SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
  010000                        SW12=10000
  004000                        SW11=4000               ;=1,INHIBIT ITERATIONS
  002000                        SW10=2000               ;=1,ESCAPE TO NEXT TEST ON ERROR
  001000                        SW09=1000               ;=1,LOOP WITH CURRENT DATA
  000400                        SW08=400                ;=1,LOOP ON ERROR
  000100                        SW06=100
  000040                        SW05=40
  000020                        SW04=20
  000010                        SW03=10
  000004                        SW02=4                  ;LOCK ON TEST SELECT
  000002                        SW01=2                  ;RESTART PROGRAM AT SELECTED TEST
  000001                        SW00=1                  ;RESELECT VECTOR AND CONTROL REGISTER
                                                        ;ADDRESS AFTER PROGRAM RESTART
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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
001100                          STACK=1100      ;START OF PROCESSOR STACK
                                
                                ;INSTRUCTION DEFINITIONS
                                
005746                          PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD =TST -(SP)
005726                          POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD =TST (SP)+
010046                          PUSHR0=10046    ;SAVE R0 ON STACK =MOV R0,-(SP)
012600                          POPR0=12600     ;RESTORE R0 FROM STACK =MOV (SP)+,R0
024646                          PUSH2SP=24646   ;DECREMENT STACK TWICE =CMP -(SP),-(SP)
022626                          POP2SP=22626    ;INCREMENT STACK TWICE =CMP (SP)+,(SP)+
                                .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
                                
                                ;PROCESSER LEVELS
000340                          LEVEL7=340
000300                          LEVEL6=300
000240                          LEVEL5=240
000200                          LEVEL4=200
000140                          LEVEL3=140
000100                          LEVEL2=100
000040                          LEVEL1=040
000000                          LEVEL0=000
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                        ;REGISTER DEFINITIONS
                                ;RXCSR BIT DEFINITIONS
100000                  DSC=BIT15               ;DATA SET CHANGE
040000                  RING=BIT14              ;RING
020000                  CTS=BIT13               ;CLR TO SEND
010000                  CARDET=BIT12            ;CARRIER DETECT
004000                  RECACT=BIT11            ;REC ACTIVE
002000                  SRD=BIT10               ;SEC REC DATA
001000                  DSR=BIT9                ;DATA SET RDY
000400                  STRSYN=BIT8             ;STRIP SYNC
000200                  RXDONE=BIT7             ;REC DONE
000100                  RINTEN=BIT6             ;REC INTR ENABLE
000040                  DSINTE=BIT5             ;DSC INTR ENABLE
000020                  SYNSCH=BIT4             ;SYNC SEARCH
000010                  STD=BIT3                ;SEC XMIT DATA
000004                  RTS=BIT2                ;REQ TO SEND
000002                  DTR=BIT1                ;DATA TERM RDY
000001                  VOID=BIT0
                                ;RXDBUF BIT DEFINITIONS
100000                  RXERR=BIT15             ;REC ERROR
040000                  OVRRUN=BIT14            ;OVERRUN
020000                  FRMERR=BIT13            ;FRAME ERROR
010000                  PARER=BIT12             ;PARITY ERROR
                                ;PARCSR BIT DEFINITIONS
001000                  PAREN=BIT9              ;PARITY ENABLE
000400                  EVPAR=BIT8              ;EVEN PARITY SENSE
                                ;PARCSR WRD DEFINITIONS
030000                  SYNINT=30000            ;SYNC EXTERNAL MODE
020000                  SYNEXT=20000            ;SYNC INTERNAL MODE
000000                  ISYMOD=0                ;ISOC MODE
000000                  FIVE=0                  ;WORD LENGTH 5 BITS
002000                  SIX=2000                ;WORD LENGTH 6 BITS
004000                  SEVEN=4000              ;WORD LENGTH 7 BITS
006000                  EIGHT=6000              ;WORD LENGTH 8 BITS
000000                  NOPAR=0                 ;NO PARITY
001000                  ODDPAR=1000             ;ODD PARITY
001400                  EVEPAR=1400             ;EVEN PARITY
                                ;TXCSR BIT DEFINITIONS
100000                  DNA=BIT15               ;DATA NOT AVAILABLE
040000                  MTDATA=BIT14            ;MAINT DATA
020000                  CLK=BIT13               ;CLK
002000                  BITW=BIT10              ;BIT WINDOW
000400                  MRESET=BIT8             ;MASTER RESET
000200                  TXDONE=BIT7             ;XMIT DONE
000100                  TXINTE=BIT6             ;XMIT INTR ENABLE
000040                  DMAINTE=BIT5            ;DMA INTR ENAB
000020                  SEND=BIT4               ;SEND
000010                  HDXEN=BIT3              ;HDX/FDX
000001                  BREAK=BIT0              ;BREAK
                                ;TXCSR WRD DEFINITIONS
000000                  USER=0                  ;USER MODE
004000                  MAINT=4000              ;MAINT INT MODE
010000                  MEXT=10000              ;MAINT EXT MODE
014000                  SYSTST=14000            ;SYSTEM TEST MODE
                                ;TRAPCATCHER FOR ILLEGAL INTERRUPTS
```

```
                                        ;STANDARD INTERRUPT VECTORS


                000024                  .=24
000024  014422                          .PFAIL                  ;POWER FAIL HANDLER
000026  000340                          340                     ;SERVICE AT LEVEL 7
000030  014152                          .HLT                    ;ERROR HANDLER
000032  000340                          340                     ;SERVICE AT LEVEL 7
000034  014120                          .TRPSRV                 ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                          340                     ;SERVICE AT LEVEL 7

                                        ;SOFTWARE SWITCH REGISTER

                000174                  .=174
000174  000000                          DISPREG:.WORD 0         ;SOFTWARE DISPLAY REG.
000176  000000                          SWREG:  .WORD 0         ;SOFTWARE SWITCH REGISTER
000200  000167  001054                  JMP     .START          ;GO TO START OF PROGRAM


                001100                  .=1100

                                        ;INDIRECT POINTERS

001100  177570                  SWR:    177570                  ;SWITCH REGISTER POINTER
001102  177570                  LIGHTS: 177570                  ;DISPLAY REGISTER POINTER
001104  177560                  TKCSR:  177560                  ;TELETYPE KEYBOARD CONTROL REGISTER
001106  177562                  TKDBR:  177562                  ;TELETYPE KEYBOARD DATA BUFFER
001110  177564                  TPCSR:  177564                  ;TELEPRINTER CONTROL REGISTER
001112  177566                  TPDBR:  177566                  ;TELEPRINTER DATA BUFFER

                                        ;PROGRAM CONTROL PARAMETERS

001114  000000                  RTRN:   0                       ;SCOPE ADDRESS FOR LOOP ON TEST
001116  000000                  NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
001120  000000                  LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT DATA
001122  000000                  ICOUNT: 0                       ;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE EXECUTED
001124  000000                  LPCNT:  0                       ;NUMBER OF ITEREATIONS COMPLETED
001126  000000                  TSTNO:  0                       ;NUMBER OF TEST IN PROGRESS
001130  000000                  PASCNT: 0                       ;NUMBER OF PASSES COMPLETED
001132  000000                  ERRCNT: 0                       ;TOTAL NUMBER OF ERRORS
001134  000000                  LSTERR: 0                       ;PC OF LAST ERROR CALL

                                        ;PROGRAM VARIABLES

001136  000020                  HOLD:   20                      ;TEMPORARY STORAGE=DELAY TIME FOR CABLES
001140  000000                  SHIFT:  0                       ;TEMPORARY STORAGE= # OF SHIFTS PER CHAR
001142  000000                  COUNT:  0                       ;TEMPORARY STORAGE= # OF TIMES A CHAR WILL BE SENT
001144  000000                  TEMP1:  0                       ;TEMPORARY STORAGE
001146  000000                  TEMP2:  0                       ;TEMPORARY STORAGE
001150  000000                  TEMP3:  0                       ;TEMPORARY STORAGE
001152  000000                  TEMP4:  0                       ;TEMPORARY STORAGE
001154  000000                  TEMP5:  0                       ;TEMPORARY STORAGE
001156  000000                  SAVR0:  0                       ;R0 STORAGE
001160  000000                  SAVR1:  0                       ;R1 STORAGE
001162  000000                  SAVR2:  0                       ;R2 STORAGE
```

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   752  001164  000000                SAVR3:  0               ;R3 STORAGE
   753  001166  000000                SAVR4:  0               ;R4 STORAGE
   754  001170  000000                SAVR5:  0               ;R5 STORAGE
   755  001172  000000                SAVSP:  0               ;STACK POINTER STORAGE
   756  001174  000000                SAVPC:  0               ;PROGRAM COUNTER STORAGE
```

```
                                        ;PROGRAM CONVERSATIONAL PARAMETERS
001176     377          SYNCNO: .BYTE   377             ;# OF SYNC CHARS REQ'D FOR SYNC'ZATION
001177     377          SEXMIT: .BYTE   377             ;SEC XMIT JUMPER "IN"
001200     377          SEREC:  .BYTE   377             ;SEC REC JUMPER "IN"
001201     377          OPTCLR: .BYTE   377             ;OPTIONAL JUMPER CLR "IN"
001202     000          MULTD:  .BYTE   0               ;NO MULTIPLE DEVICE FLAG
001203     377          JMRBY:  .BYTE   377             ;EXTERNAL MODEM BYPASS JUMPER "IN"
                        .EVEN

                                        ;PROGRAM MULTIPLE DEVICE PARAMETERS
001204  000000          BASEADD:        0               ;PROG CONTROLLED 1ST DEVICE ADDR
001206  000000          KEEPADD:        0               ;SAVED 1ST DEVICE ADDR
001210  000000          LASTADD:        0               ;LAST DEVICE RXCSR ADDR
001212  000000          BASEIV:         0               ;PROG CONTPOLLED IV
001214  000000          KEEPIV:         0               ;SAVED INTR VECTOR
001216  000000          ACTREG:         0               ;ACTIVE REGISTER ,,,MODIFY THIS
                                                        ;LOCATION TO DISQUALIFY OR QUALIFY
                                                        ;DEVICES (1= RUN,,,0= DON'T RUN)
001220  000000          ROTADD:         0               ;ROTATING POINTER FOR ACTREG..POINTS
                                                        ;TO DEVICE PRESENTLY UNDER TEST WHEN RUNNING MULTIPLE DE

                                        ;PROGRAM CONTROL FLAGS

001222     000          INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
001223     000          STFLG:  .BYTE   0               ;TEST START FLAG
001224     000          ERRFLG: .BYTE   0               ;ERROR OCCURED FLAG
001225     000          LOKFLG: .BYTE   0               ;LOCK ON CURRENT TEST FLAG

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

001226                  .TRPTAB:
                        ;*****************************************************************
                        ;*****************************************************************
                                SCOPE=TRAP+0    ;CALL TO SCOPE LOOP AND ITERATION HANDLER
            104400      .SCOPE
001226  012704          
                                SCOP1=TRAP+1    ;CALL TO LOOP ON CURRENT DATA HANDLER
            104401      .SCOP1
001230  013070          
                                TYPE=TRAP+2     ;CALL TO TELETYPE OUTPUT ROUTINE
            104402      .TYPE
001232  013110          
                                INSTR=TRAP+3    ;CALL TO ASCII STRING INPUT ROUTINE
            104403      .INSTR
001234  013150          
                                INSTER=TRAP+4   ;CALL TO INPUT ERROR HANDLER
            104404      .INSTER
001236  013266          
                                PARAM=TRAP+5    ;CALL TO NUMERICAL DATA INPUT ROUTINE
            104405      .PARAM
001240  013220          
                                SAVOS=TRAP+6    ;CALL TO REGISTER SAVE ROUTINE
            104406      .SAVOS
001242  013534          
                                RESOS=TRAP+7    ;CALL TO REGISTER RESTORE ROUTINE
            104407      .RESOS
001244  013574          
                                CONVRT=TRAP+10  ;CALL TO DATA OUTPUT ROUTINE
            104410      .CONVRT
001246  013626          
                                CNVRT=TRAP+11   ;CALL TO DATA OUTPUT ROUTINE WITHOUT CR/LF
            104411      .CNVRT
001250  013632          
                                SETFLG=TRAP+12  ;CALL TO FLAG SET ROUTINE
            104412
```

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001252  014052                  .SETFLG
        104413                          CKSWR=TRAP+13   ;CALL TO ALLOW SWREG TO BE LOADED FROM TTY
001254  014566                  .CKSWR
        104414                          CNTLU=TRAP+14   ;CALL TO ALLOW LOADING  OF SWREG FROM TTY
001256  014642                  .CNTLU
                                ;*****************************************************************************
                                ;*****************************************************************************

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

001260  012767  000340  176510  .START: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
001266  012706  001100                  MOV     #STACK,SP               ;SET UP STACK
001272  012737  014422  000024          MOV     #.PFAIL,@#24            ;SET UP POWER FAIL VECTOR
001300  005067  177620                  CLR     LPCNT                   ;CLEAR # OF ITERATION COMPLETED LOCATION
001304  105067  177713                  CLRB    STFLG                   ;CLEAR START FLAG
001310  005067  177614                  CLR     PASCNT                  ;CLEAR PASS COUNT
001314  105067  177704                  CLRB    ERRFLG                  ;CLEAR ERROR FLAG
001320  005067  177606                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
001324  005067  177604                  CLR     LSTERR                  ;CLEAR LAST ERROR POINTER
001330  012767  000001  177570          MOV     #1,TSTNO                ;SET UP FOR TEST 1
001336  012767  001260  177550          MOV     #.START,RTRN            ;SET UP FOR POWER FAIL BEFORE
                                                                        ;TESTING STARTS
001344  105767  177652                  TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED
001350  001004                          BNE     ONCE
001352  104402  014742                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
001356  105167  177640                  COMB    INIFLG                  ;IF NOT SET FLAG AND DO
001362  012767  177570  177510  ONCE:   MOV     #DSWR,SWR               ;RELOAD HARDWARE SWITCH REGISTER INTO POINTER
001370  012767  177570  177504          MOV     #DLIGHTS,LIGHTS         ;RELOAD HARDWARE DISPLAY REGISTER INTO POINTER
001376  013746  000006                  MOV     @#6,-(SP)               ;SAVE VECTORS
001402  013746  000004                  MOV     @#4,-(SP)
001406  012737  001426  000004          MOV     #64$,@#4                ;SET UP FOR TIMEOUT
001414  022777  177777  177456          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
001422  001402                          BEQ     65$
001424  000407                          BR      66$
001426  022626                  64$:    CMP     (SP)+,(SP)+             ;ADJUST STACK
001430  012767  000176  177442  65$:    MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
001436  012767  000174  177436          MOV     #DISPREG,LIGHTS         ;POINT TO SOFT DISPLAY REG
001444  012637  000004          66$:    MOV     (SP)+,@#4               ;RESTORE VECTORS
001450  012637  000006                  MOV     (SP)+,@#6
001454  005737  000042                  TST     @#42                    ;UNDER MONITOR
001460  001005                          BNE     67$
001462  022767  000176  177410          CMP     #SWREG,SWR              ;IS SWREG USED
001470  001001                          BNE     67$
001472  104414                          CNTLU
001474  032777  000001  177376  67$:    BIT     #SW00,@SWR              ;RESELECT VECTOR & CONTROL REG?
001502  001002                          BNE     1$
001504  000167  000446                  JMP     .BEGIN
001510  012700  000300          1$:     MOV     #300,R0                 ;RESTORE VECTOR AREA TO TRAPCATCHER
001514  012701  000302                  MOV     #302,R1                 ;START AT LOCATION 300
001520  012702  000004                  MOV     #4,R2
001524  010110                  2$:     MOV     R1,(R0)
```

G02


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  869  001526  005011                          CLR     (R1)
  870  001530  060200                          ADD     R2,R0
  871  001532  060201                          ADD     R2,R1
  872  001534  022701  001000                  CMP     #1000,R1                ;END AT LOCATION 776
  873  001540  002771                          BLT     2$
  874  001542  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
  875  001544  015016                          MREGAD                          ;MESSAGE
  876  001546  104405                          PARAM                           ;CONVERT STRING
  877  001550  160000                          160000                          ;LOW LIMIT
  878  001552  167776                          167776                          ;HIGH LIMIT
  879  001554  016652                          DUBASE                          ;STORE AT THIS LOCATION
  880  001556     001                  .BYTE   1                               ;MASK
  881  001557     001                  .BYTE   1                               ;HOW MANY TIMES + 2
  882  001560  016767  015066  177420          MOV     DUBASE,KEEPADD  ;SAVE
  883  001566  004767  014726                  JSR     PC,DUADDR
  884  001572  016767  177410  177404          MOV     KEEPADD,BASEADD ;RESTORE FOR ROTATION
  885  001600  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
  886  001602  014774                          MVECTO                          ;MESSAGE
  887  001604  104405                          PARAM                           ;CONVERT STRING
  888  001606  000300                          300                             ;LOW LIMIT
  889  001610  000776                          776                             ;HIGH LIMIT
  890  001612  017174                          DURIV                           ;STORE AT THIS LOCATION
  891  001614     001                  .BYTE   1                               ;MASK
  892  001615     004                  .BYTE   4                               ;HOW MANY TIMES + 2
  893  001616  016767  015052  177370          MOV     DURIV,KEEPIV    ;SAVE
  894  001624  016767  015344  177360          MOV     DURIV,BASEIV    ;SET UP FOR ROTATION
  895  001632  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
  896  001634  015077                          MMULT                           ;MESSAGE
  897  001636  104412                          SETFLG                          ;SET FLAG BASED UPON INPUT STRING
  898  001640  001202                          MULTD                           ;THIS FLAG
  899  001642  105767  177334                  TSTB    MULTD   ;ARE THERE MULTIPLE DEVICES
  900                                                          ;ON THE SYSTEM ?
  901  001646  100406                          BMI     BBB     ;YES,ASK NEXT QUESTION
  902  001650  005067  177342                  CLR     ACTREG
  903  001654  005067  177340                  CLR     ROTADD
  904  001660  000167  000140                  JMP     OUTMUL  ;JUMP AROUND NEXT QUESTION
  905  001664                          BBB:
  906  001664  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
  907  001666  015136                          MLASTD                          ;MESSAGE
  908  001670  104405                          PARAM                           ;CONVERT STRING
  909  001672  160000                          160000                          ;LOW LIMIT
  910  001674  167776                          167776                          ;HIGH LIMIT
  911  001676  001210                          LASTADD                         ;STORE AT THIS LOCATION
  912  001700     001                  .BYTE   1                               ;MASK
  913  001701     001                  .BYTE   1                               ;HOW MANY TIMES + 2
  914                                 ;THE FOLLOWING ROUTINE SETS UP ACTREG FOR THE FIRST TIME
  915  001702  012767  000001  177310  1$:     MOV     #1,ROTADD       ;SET UP POINTER
  916  001710  005067  177302                  CLR     ACTREG  ;CLR ACTIVE REGISTER
  917  001714  056767  177300  177274  2$:     BIS     ROTADD,ACTREG   ;MAKE THIS DEVICE ACTIVE
  918  001722  000241                          CLC
  919  001724  006167  177270                  ROL     ROTADD  ;SET UP POINTER
  920  001730  103421                          BCS     3$      ;ARE YOU OUT OF RANGE ?
  921  001732  062767  000010  177244          ADD     #10,BASEADD     ;SET UP BASE ADDRESS
  922  001740  026767  177244  177236          CMP     LASTADD,BASEADD ;IS THIS THE LAST DEVICE ?
  923  001746  101362                          BHI     2$      ;NO DO IT AGAIN
  924  001750  056767  177244  177240          BIS     ROTADD,ACTREG   ;THIS ASSUMES THAT THERE ARE AT
```

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                                                        ;LEAST TWO DEVICES WHEN YOU ANSWER YES TO
                                                        ;MULTIPLE DEVICE QUESTION
001756  012767  000001  177234  4$:     MOV     #1,ROTADD       ;SET UP FOR LATER USE IN END OF PASS ROUTINE
001764  016767  177216  177212          MOV     KEEPADD,BASEADD ;DITTO
001772  000414                          BR      OUTMUL  ;CONTINUE QUESTIONS
001774  016767  177206  177202  3$:     MOV     KEEPADD,BASEADD ;RESTORE
002002  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
002004  015341                          MRANGE                          ;MESSAGE
002006  104405                          PARAM                           ;CONVERT STRING
002010  160000                          160000                          ;LOW LIMIT
002012  167776                          167776                          ;HIGH LIMIT
002014  001210                          LASTADD                         ;STORE AT THIS LOCATION
002016     001                  .BYTE   1                               ;MASK
002017     001                  .BYTE   1                               ;HOW MANY TIMES + 2
002020  000167  177656                  JMP     1$      ;DO IT AGAIN
002024                          OUTMUL:
002024  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
002026  015625                          MLEVEL                          ;MESSAGE
002030  104405                          PARAM                           ;CONVERT STRING
002032  000004                          4                               ;LOW LIMIT
002034  000007                          7                               ;HIGH LIMIT
002036  016514                          DUPRT                           ;STORE AT THIS LOCATION
002043     000                  .BYTE   0                               ;MASK
002041     001                  .BYTE   1                               ;HOW MANY TIMES + 2
002042  004767  014376                  JSR     PC,DULEV
                                        ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
                                        ;BUFFER TO THE CHARACTERS "1" AND "2".
                                        ;IF THE CHARACTER IS "1" CLEAR THE FLAG
                                        ;IF THE CHARACTER IS "2" SET THE FLAG
002046                          AAA:
002046  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
002050  015652                          MSYNC                           ;MESSAGE
002052  122767  000061  014224  3$:     CMPB    #'1,INBUF               ;IS IT "1" ?
002060  001003                          BNE     1$
002062  105067  177110                  CLRB    SYNCNO                  ;000
002066  000412                          BR      4$
002070  122767  000062  014206  1$:     CMPB    #'2,INBUF               ;IS IT "2" ?
002076  001004                          BNE     2$
002100  112767  177777  177070          MOVB    #-1,SYNCNO                      ;377
002106  000402                          BR      4$
002110  104404                  2$:     INSTER                          ;RETRY
002112  000757                          BR      3$
002114  000240                  4$:     NOP
002116  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
002120  015720                          MWIRE6                          ;MESSAGE
002122  104412                          SETFLG                          ;SET FLAG BASED UPON INPUT STRING
002124  001177                          SEXMIT                          ;THIS FLAG
002126  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
002130  015766                          MWIRE5                          ;MESSAGE
002132  104412                          SETFLG                          ;SET FLAG BASED UPON INPUT STRING
002134  001200                          SEREC                           ;THIS FLAG
002136  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
002140  016033                          MWIRE4                          ;MESSAGE
002142  104412                          SETFLG                          ;SET FLAG BASED UPON INPUT STRING
002144  001201                          OPTCLR                          ;THIS FLAG
002146  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
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   981  002150  016107                          MEXTJ                           ;MESSAGE
   982  002152  104412                          SETFLG                          ;SET FLAG BASED UPON INPUT STRING
   983  002154  001203                          JMRBY                           ;THIS FLAG
   984
   985                                          ;TEST START AND RESTART
   986
   987  002156  012767  000340  175612  .BEGIN: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
   988  002164  012706  001100                  MOV     #STACK,SP               ;SET UP STACK
   989  002170  005737  000042                  TST     @#42                    ;IS PROGRAM UNDER MONITOR CONTROL
   990  002174  001056                          BNE     3$
   991  002176  105767  177000                  TSTB    MULTD   ;DON'T ALLOW LOCK ON TEST IF RUNNING
   992                                          ;MULTIPLE DEVICES
   993  002202  001407                          BEQ     5$                      ;IF NO,TEST FOR LOCK ON TEST
   994  002204  016767  010654  010554          MOV     BRW,TTST                ;RESTORE NORMAL SCOPE LOOP
   995  002212  016767  010650  010550          MOV     BRX,TTST+2              ;DITTO
   996  002220  000444                          BR      3$                      ;JUMP AROUND IF YES
   997  002222  032777  000004  176650  5$:     BIT     #BIT2,@SWR              ;CHECK FOR LOCK ON TEST
   998  002230  001416                          BEQ     1$
   999  002232  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
  1000  002234  015562                          MLOCK                           ;MESSAGE
  1001  002236  104412                          SETFLG                          ;SET FLAG BASED UPON INPUT STRING
  1002  002240  001225                          LOKFLG                          ;THIS FLAG
  1003  002242  105767  176757                  TSTB    LOKFLG                  ;IS LOCK ON TEST OPTION SELECTED
  1004  002246  001407                          BEQ     1$
  1005  002250  012767  000240  010510          MOV     #NOP,TTST
  1006  002256  012767  000240  010504          MOV     #NOP,TTST+2             ;SET UP TO LOCK
  1007  002264  000406                          BR      2$
  1008  002266  016767  010572  010472  1$:     MOV     BRW,TTST
  1009  002274  016767  010566  010466          MOV     BRX,TTST+2              ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
  1010  002302  032777  000002  176570  2$:     BIT     #SW01,@SWR              ;IF SW01=1, GET STARTING PC
  1011  002310  001410                          BEQ     3$
  1012  002312  104403                          INSTR                           ;OUTPUT MESSAGE & GET INPUT STRING
  1013  002314  015547                          MTSTPC                          ;MESSAGE
  1014  002316  104405                          PARAM                           ;CONVERT STRING
  1015  002320  002350                          TST1                            ;LOW LIMIT
  1016  002322  011512                          TLAST                           ;HIGH LIMIT
  1017  002324  001114                          RTRN                            ;STORE AT THIS LOCATION
  1018  002326     001                  .BYTE   1                               ;MASK
  1019  002327     001                  .BYTE   1                               ;HOW MANY TIMES + 2
  1020  002330  000403                          BR      4$
  1021  002332  012767  002350  176554  3$:     MOV     #TST1,RTRN              ;START AT TEST 1
  1022  002340  104402  015543          4$:     TYPE    ,MR                     ;TYPE R
  1023  002344  000177  176544                  JMP     @RTRN                   ;START TESTING
  1024
  1025
```

```
 1026                                   ;;THIS TEST VERIFYS THAT BY SENDING ONLY ONE SYNC
 1027                                   ;;CHARACTER (TWO SELECTED BY STRAPPING ) RECACT =0
 1028                                   ;;THEN SEND ONE ORDINARY CHARACTER (TO BREAK UP THE SEQUENCE)
 1029                                   ;;RECACT =0.............IT WILL TAKE TWO MORE SYNC CHARS
 1030                                   ;;BEFORE RECACT =1
 1031                                   ;;NOTE: THIS TEST WILL ONLY WORK WHEN TWO SYNC CHARS
 1032                                   ;;HAS BEEN BEEN SELECTED ...OTHERWISE JUMP AROUND THIS TEST
 1033                                   ;;MODE:SYNC INTERNAL (SYNINT)
 1034                                   ;;PARITY: NOPAR
 1035                                   ;;LENGTH: EIGHT
 1036                                   ;;
 1037                                   ;;THIS TEST CHECKS ONLY THE RECEIVER SECTION
 1038                                   ;;
 1039  002350  012767  000001  176550  TST1:   MOV     #1,TSTNO        ;SAVE THIS
 1040  002356  012767  002652  176532          MOV     #TST2,NEXT              ;GO TO THIS TEST WHEN THRU
 1041  002364  105767  176606                  TSTB    SYNCNO  ;TEST FOR  # OF SYNC CHARS REQUIRED
 1042  002370  100127                          BPL     4$      ;IF NOT TWO  GET OUT OF TEST
 1043  002372  052777  000400  014564          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1044  002400  012777  030000  014552          MOV     #SYNINT,@PARCSR ;SET THE MODE
 1045  002406  052777  000400  014550          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1046
 1047                                  ;SET MAINT DATA,CLK.BREAK,&MAINTENANCE MODE
 1048  002414  012777  064001  014542          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
 1049
 1050                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
 1051  002422  012777  036026  014530          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
 1052  002430  052777  000020  014512          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
 1053                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
 1054  002436  042777  020000  014520          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1055  002444  052777  020000  014512          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1056                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1057  002452  042777  020000  014504          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1058  002460  052777  020000  014476          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1059  0[illegible]  012767  000010  176444          MOV     #8.,SHIFT       ;# OF SHIFTS
 1060  0[illegible]  012767  000026  176442          MOV     #26,TEMP1       ;SYNC CHAR TO BE SHIFTED IN
 1061  0[illegible]  004767  014146                  JSR     PC,RPOKE        ;SHIFT IN THIS SYNC CHAR
 1062  0[illegible]  032777  004000  014434          BIT     #RECACT,@RXCSR  ;RECACT = 0 ?
 1063  0[illegible]  001401                          BEQ     1$
 1064  0[illegible]  104000                          HLT     ;RECACT SHOULD BE 0
 1065  0[illegible]                          1$:
 1066  0[illegible]  012767  000010  176412          MOV     #8.,SHIFT       ;# OF SHIFTS
 1067  0[illegible]  012767  000025  176410          MOV     #25,TEMP1       ;ANY CHARACTER
 1068  0[illegible]  004767  014114                  JSR     PC,RPOKE        ;SHIFT IN THIS CHARACTER
 1069                                  ;YOU HAVE JUST LOST SYNCRONIZATION.....................
 1070                                  ;POKE THE CLK TWICE TO GET INTO SYNCRONIZATION
 1071                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1072  002540  042777  020000  014416          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1073  002546  052777  020000  014410          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1074                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1075  002554  042777  020000  014402          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1076  0[illegible]  052777  020000  014374          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1077  0[illegible]  012767  000002  176344          MOV     #2,COUNT        ;# OF SYNC CHARS
 1078  0[illegible]  032777  004000  014344  2$:     BIT     #RECACT,@RXCSR  ;RECACT = 0 ?
 1079  0[illegible]  001401                          BEQ     3$
 1080  0[illegible]  104000                          HLT             ;RECACT SHOULD BE  0
 1081  002610                          3$:
```

```
 1082  002610  012767  000010  176322          MOV     #8.,SHIFT       ;# OF SHIFTS
 1083  002616  012767  000026  176320          MOV     #26,TEMP1       ;SYNC CHAR
 1084  002624  004767  014024                  JSR     PC,RPOKE        ;SHIFT IN THIS SYNC CHAR
 1085  002630  005367  176306                  DEC     COUNT
 1086  002634  001360                          BNE     2$      ;IS COUNT = 0 ? NO GO AGAIN
 1087  002636  032777  004000  014304          BIT     #RECACT,@RXCSR  ;RECACT = 1 ?
 1088  002644  001001                          BNE     4$
 1089  002646  104000                          HLT     ;RECACT SHOULD BE ASSERTED
 1090  002650                          4$:
 1091  002650  104400                          SCOPE
```

```
 1092                                   ;;THIS TEST VERIFYS MODE SELECT.....
 1093                                   ;;SYNC EXTERNAL VS. SYNC INTERNAL
 1094                                   ;;
 1095                                   ;BASICALLY THE TEST CHECKS THAT THE RECEIVED
 1096                                   ;DATA FREEZES  IN SYNC INTERNAL
 1097                                   ;IN SYNC EXTERNAL THIS DATA IS TRANSPARENT
 1098                                   ;THIS TEST ONLY APPLIES TO THE RECEIVER SECTION
 1099                                   ;;LENGTH: EIGHT
 1100                                   ;NOTE:SEARCH SYNC IS NOT SET
 1101  002652  012767  000002  176246  TST2:   MOV     #2,TSTNO        ;SAVE THIS
 1102  002660  012767  003250  176230          MOV     #TST3,NEXT              ;GO TO THIS TEST WHEN THRU
 1103  002666  052777  000400  014270          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1104  002674  012777  030000  014256          MOV     #SYNINT,@PARCSR ;SET THE MODE
 1105  002702  052777  000400  014254          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1106
 1107                                   ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
 1108  002710  012777  064001  014246          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
 1109
 1110                                   ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
 1111  002716  012777  036026  014234          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
 1112                                   ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1113  002724  042777  020000  014232          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1114  002732  052777  020000  014224          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1115                                   ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1116  002740  042777  020000  014216          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1117  002746  052777  020000  014210          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1118  002754  012767  000010  176156          MOV     #8.,SHIFT       ;# OF SHIFTS
 1119  002762  012767  000125  176154          MOV     #125,TEMP1      ;DATA CHARACTER
 1120  002770  016703  014160                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
 1121  002774  042777  040000  014162  1$:     BIC     #MTDATA,@TXCSR  ;CLEAR MAINT DATA
 1122  003002  000241                          CLC
 1123  003004  006067  176134                  ROR     TEMP1   ;FORCE CARRY
 1124  003010  103003                          BCC     2$
 1125  003012  052777  040000  014144          BIS     #MTDATA,@TXCSR  ;SET MTDATA
 1126  003020  042777  020000  014136  2$:     BIC     #CLK,@TXCSR     ;POKE CLK
 1127  003026  052777  020000  014130          BIS     #CLK,@TXCSR     ;
 1128  003034  012700  000377                  MOV     #377,R0 ;EXPECTED
 1129  003040  017701  014110                  MOV     @RXDBUF,R1      ;ACTUAL
 1130  003044  020001                          CMP     R0,R1
 1131  003046  001401                          BEQ     3$
 1132  003050  104002                          HLT     2
 1133                                   ;DATA CHARACTER SHOULD COMPARE......
 1134  003052                           3$:
 1135  003052  005367  176062                  DEC     SHIFT   ;IS IT THE LAST SHIFT ?
 1136  003056  001346                          BNE     1$      ;NO ...SHIFT SOME MORE
 1137  003060  052777  000400  014076          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1138  003066  012777  020000  014064          MOV     #SYNEXT,@PARCSR ;SET THE MODE
 1139  003074  052777  000400  014062          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1140
 1141                                   ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
 1142  003102  012777  064001  014054          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
 1143
 1144                                   ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
 1145  003110  012777  026026  014042          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
 1146                                   ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1147  003116  042777  020000  014040          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
```

```
 1148  003124  052777  020000  014032          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1149  003132  012767  000010  176000          MOV     #8.,SHIFT       ;# OF SHIFTS
 1150  003140  012767  000125  175776          MOV     #125,TEMP1      ;DATA CHARACTER
 1151  003146  005067  175774                  CLR     TEMP2
 1152  003152  105167  175770                  COMB    TEMP2   ;MAKE LOW BYTE ALL 1'S
 1153                                          ;TO MATCH RXDBUF'S CONTENTS AFTER A MASTER RESET
 1154  003156  042777  040000  014000  4$:     BIC     #MTDATA,@TXCSR  ;CLR MAINT DATA
 1155  003164  000241                          CLC
 1156  003166  006067  175752                  ROR     TEMP1   ;FORCE CARRY
 1157  003172  103003                          BCC     5$
 1158  003174  052777  040000  013762          BIS     #MTDATA,@TXCSR
 1159  003202  106067  175740          5$:     RORB    TEMP2   ;PICK UP CARRY BIT
 1160  003206  042777  020000  013750          BIC     #CLK,@TXCSR
 1161  003214  052777  020000  013742          BIS     #CLK,@TXCSR
 1162  003222  016700  175720                  MOV     TEMP2,R0        ;EXPECTED
 1163  003226  017701  013722                  MOV     @RXDBUF,R1      ;ACTUAL
 1164  003232  020001                          CMP     R0,R1
 1165  003234  001401                          BEQ     6$
 1166  003236  104002                          HLT     2       ;DATA CHARACTER SHOULD COMPARE...
 1167                                          ;THE DATA CHARACTER SHOULD BE SEEN AS IT
 1168                                          ;SHIFTS ACROSS THE RECEIVER DATA OUTPUT
 1169  003240                          6$:
 1170  003240  005367  175674                  DEC     SHIFT
 1171  003244  001344                          BNE     4$
 1172  003246  104400                          SCOPE
```

```
 1173                                   ;;THIS TEST VERIFYS TX DONE FUNCTION, DONE = 1
 1174                                   ;;ALSO   VERIFYS THAT THE TRANSMITTER CHIP IDLES "SYNC" CHARACTER
 1175                                   ;;WHEN NO NEW CHARACTER IS LOADED INTO TXDBUF("SYNC" = BINARY COUNT PATTERN)
 1176                                   ;;MODE:  SYNC INTERNAL
 1177                                   ;;PARITY:  NO PARITY (NOPAR)
 1178                                   ;;LENGTH:  EIGHT
 1179                                   ;;
 1180  003250  012767  000003  175650  TST3:   MOV     #3,TSTNO        ;SAVE THIS
 1181  003256  012767  003546  175632          MOV     #TST4,NEXT              ;GO TO THIS TEST WHEN THRU
 1182  003264  012767  003450  175626          MOV     #6$,LOCK        ;SET UP FOR SCOPE LOOP
 1183  003272  012704  036000                  MOV     #SYNINT!EIGHT!OPAR!0,R4         ;MODE ETC.
 1184  003276  052777  000400  013660  1$:     BIS     #MPESET,@TXCSR  ;MASTER RESET
 1185  003304  012777  030000  013646          MOV     #SYNINT,@PARCSR ;SET THE MODE
 1186  003312  052777  000400  013644          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1187  003320  012777  004020  013636          MOV     #MINT!SEND,@TXCSR
 1188  003326  010477  013626                  MOV     R4,@PARCSR
 1189  003332  105777  013626                  TSTB    @TXCSR          ;TXDONE?
 1190  003336  100401                          BMI     2$
 1191  003340  104000                          HLT                     ;TXDONE SHOULD BE SET
 1192  003342                          2$:
 1193  003342  112777  000021  013620          MOVB    #21,@TXDBUF     ;LOAD ANY CHAR
 1194                                          ;POKE   CLK TO GET INTO SYNCIRONIZATION
 1195  003350  052777  020000  013606          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1196  003356  042777  020000  013600          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1197  003364  105777  013574                  TSTB    @TXCSR
 1198  003370  100001                          BPL     3$
 1199  003372  104000                          HLT                     ;TXDONE SHOULD BE CLR
 1200  003374                          3$:
 1201  003374  052777  020000  013552          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1202  003402  042777  020000  013554          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1203  003410  105777  013550                  TSTB    @TXCSR
 1204  003414  100401                          BMI     4$
 1205  003416  104000                          HLT                     ;TXDONE SHOULD BE SET
 1206  003420                          4$:
 1207  003420  012767  000007  175512          MOV     #7,SHIFT
 1208  003426                          5$:
 1209  003426  052777  020000  013530          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1210  003434  042777  020000  013522          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1211  003442  005367  175472                  DEC     SHIFT
 1212  003446  001367                          BNE     5$      ;SHIFT OUT THE "21"
 1213  003450  016703  013510          6$:     MOV     TXCSR,R3        ;FOR ERROR MESSAGE
 1214                                                  ;THE BIT WINDOW IS RE GENERATED INTO
 1215                                                  ;A CHARACTER AND LEFT PRESENTED IN R1
 1216                                                  ;FOR THE COMPARE OPERATION. IF YOU WANT TO
 1217                                                  ;LOCK ON A PARTICULAR SYNC CHARACTER...
 1218                                                  ;SET SWR09=1
 1219  003454  005000                          CLR     R0
 1220  003456  150400                          BISB    R4,R0   ;EXPECT "SYNC"
 1221  003460  012767  000010  175452          MOV     #8.,SHIFT       ;# OF SHIFTS
 1222  003466  005001                          CLR     R1
 1223  003470                          7$:
 1224  003470  052777  020000  013466          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1225  003476  042777  020000  013460          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1226  003504  000241                          CLC
 1227  003506  032777  002000  013450          BIT     #BITW,@TXCSR    ;BITW = ?
 1228  003514  001401                          BEQ     8$
```

```
 1229  003516  000261                          SEC     ;SET CARRY
 1230  003520  106001                  8$:     RORB    R1      ;PICK UP CARRY
 1231  003522  005367  175412                  DEC     SHIFT
 1232  003526  001360                          BNE     7$      ;FINISH THAT CHARACTER
 1233  003530  020001                          CMP     R0,R1   ;CMP EXPECTED VS ACTUAL
 1234  003532  001401                          BEQ     9$
 1235  003534  104003                          HLT     3       ;SYNC CHAR IS NOT CORRECT
 1236  003536                          9$:
 1237  003536  104401                          SCOP1
 1238  003540  105204                          INCB    R4      ;SET UP FOR NEXT SYNC HOLDING REG.
 1239  003542  001255                          BNE     1$      ;FINISHED WITH BINARY COUNT PATTERN ?
 1240
 1241  003544  104400                          SCOPE
 1242
```

```
                                        ;;THIS TEST PROVES THAT RXERR FREEZES THE "RECEIVER
                                        ;;RESET" WHILE IN STRIP SYNC MODE
                                        ;;THIS TEST FIRST PROVES THAT AUTOMATIC RESETS OCCUR
                                        ;;WHEN STRIP SYNC IS SET AND SYNC CHARACTERS ARE SENT
                                        ;;BUT IF AN ERROR SHOULD OCCUR...THIS AUTOMATIC RESET
                                        ;;IS DISCOMBOBULATED
                                        ;;IE:  FORCE OVERRUN (OVERRUN) WHILE STRIP SYNC IS SET
                                        ;;BY TRANSMITTING A DATA CHARACTER THEN TRANSMIT A SYNC CHARACTER
                                        ;;AND DON'T READ THAT DATA CHARACTER.  NOTE:  NORMALLY THE LOGIC
                                        ;;RESETS THE RXDONE & ERROR FLAGS PROVIDING THAT ONLY SYNC CHARACTERS ARE
                                        ;;STRIPPED
                                        ;;MODE:  SYNC EXTERNAL (SYNEXT)
                                        ;;LENGTH:  EIGHT
                                        ;;NOTE:  THIS TEST USES BOTH RECEIVER AND TRANSMITTER LOGIC
                                        ;;
003546  012767  000004  175352  TST4:   MOV     #4,TSTNO        ;SAVE THIS
003554  012767  004050  175334          MOV     #TST5,NEXT              ;GO TO THIS TEST WHEN THRU

003562  052777  000400  013374          BIS     #MRESET,@TXCSR  ;MASTER RESET
003570  012777  020000  013362          MOV     #SYNEXT,@PARCSR ;SET THE MODE
003576  052777  000400  013360          BIS     #MRESET,@TXCSR  ;MASTER RESET

                                        ;SET MAINTENANCE MODE & SEND
                                                ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
003604  012777  004020  013352          MOV     #MINT!SEND,@TXCSR

                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
003612  012777  026026  013340          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
003620  112777  000026  013342          MOVB    #26,@TXDBUF     ;LOAD SYNC CHAR
003626  052777  000420  013314          BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SYNC SEARCH & STRIP SYNC
003634  016703  013314                  MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
003640  012767  000003  175274          MOV     #3,COUNT        ;# OF TIMES SYNC WILL BE SENT
003646  052777  020000  013310          BIS     #CLK,@TXCSR     ;POKE CLK UP
003654  042777  020000  013302          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
003662  012767  000010  175250  1$:     MOV     #8.,SHIFT       ;# OF SHIFTS
003670                          2$:
003670  052777  020000  013266          BIS     #CLK,@TXCSR     ;POKE CLK UP
003676  042777  020000  013260          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
003704  005367  175230                  DEC     SHIFT
003710  001367                          BNE     2$
003712  105777  013232                  TSTB    @RXCSR          ;RXDONE?
003716  100001                          BPL     3$
003720  104000                          HLT                     ;RXDONE SHOULD NOT ASSERT
003722                          3$:
003722  005367  175214                  DEC     COUNT
003726  001355                          BNE     1$
003730  012700  000026                  MOV     #26,R0          ;EXPECTED
003734  017701  013214                  MOV     @RXDBUF,R1      ;ACTUAL
003740  020001                          CMP     R0,R1
003742  001401                          BEQ     4$
003744  104002                          HLT     2               ;NOTE THAT OVERRUN SHOULD NOT OCCUR, ALSO
                                                                ;SECOND & 3RD SYNC CHARACTER CAME FROM
                                                                ;SYNC HOLDING REGISTER
003746                          4$:
003746  012767  000003  175166          MOV     #3,COUNT        ;# OF TIMES
```

```
 1299  003754  112777  000025  013206          MOVB    #25,@TXDBUF     ;LOAD ANY CHAR....HOWEVER...
 1300                                                    ;ONE MORE SYNC CHAR WILL BE SENT BEFORE
 1301                                                    ;THE "25" CHAR IS SENT (THE DNA BIT IS
 1302                                                    ;ALREADY UP)
 1303
 1304  003762  012767  000010  175150  5$:     MOV     #8.,SHIFT       ;# OF SHIFTS
 1305
 1306  003770                          6$:
 1307  003770  052777  020000  013166          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1308  003776  042777  020000  013160          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1309  004004  005367  175130                  DEC     SHIFT
 1310  004010  001367                          BNE     6$
 1311  004012  005367  175124                  DEC     COUNT
 1312  004016  001361                          BNE     5$
 1313  004020  105777  013124                  TSTB    @RXCSR  ;RXDONE = 1 ?
 1314  004024  100401                          BMI     7$
 1315  004026  104000                          HLT     ;RXDONE SHOULD BE SET
 1316  004030                          7$:
 1317  004030  012700  140026                  MOV     #RXERR!OVRRUN!26,R0 ;EXPECTED
 1318  004034  017701  013114                  MOV     @RXDBUF,R1      ;ACTUAL
 1319  004040  020001                          CMP     R0,R1
 1320  004042  001401                          BEQ     8$
 1321  004044  104002                          HLT     2               ;NOTE THAT OVRRUN SHOULD OCCUR,
 1322                                                                    ;ALSO SECOND SYNC CHARACTER CAME
 1323                                                                    ;FROM SYNC HOLDING REGISTER
 1324                                                                    ;SUMMARY:  THE OVRRUN STOPPED
 1325                                                                    ;THE AUTOMATIC RESETTING OF
 1326                                                                    ;RXDONE & ERROR FLAGS.....CHECK THIS
 1327  004046                          8$:
 1328  004046  104400                          SCOPE
```

E03


```
 1329                                   ;;THIS TEST VERIFYS THAT EITHER SEQUENCE OF
 1330                                   ;;LOADING TXDBUF AND SETTING SEND
 1331                                   ;;DOES CAUSE TRANSMISSION
 1332                                   ;;MODE:  SYNC EXT
 1333                                   ;;LENGTH:  EIGHT
 1334                                   ;;
 1335  004050  012767  000005  175050  TST5:   MOV     #5,TSTNO        ;SAVE THIS
 1336  004056  012767  004256  175032          MOV     #TST6,NEXT              ;GO TO THIS TEST WHEN THRU
 1337
 1338  004064  052777  000400  013072          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1339  004072  012777  020000  013060          MOV     #SYNEXT,@PARCSR ;SET THE MODE
 1340  004100  052777  000400  013056          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1341
 1342                                   ;SET MAINTENANCE MODE & SEND
 1343                                          ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
 1344  004106  012777  004020  013050          MOV     #MINT!SEND,@TXCSR
 1345
 1346                                   ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
 1347  004114  012777  026026  013036          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
 1348  004122  016703  013036                  MOV     TXCSR,R3        ;SET UP FOR ERROR MESSAGE
 1349  004126  042777  000020  013030          BIC     #SEND,@TXCSR    ;DROP SEND
 1350  004134  012767  000025  175002          MOV     #25,TEMP1
 1351  004142  112777  000025  013020          MOVB    #25,@TXDBUF     ;LOAD CHARACTER
 1352  004150  052777  000020  013006          BIS     #SEND,@TXCSR    ;SET SEND
 1353                                   ;GET INTO SYNCRONIZATION
 1354  004156  052777  020000  013000          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1355  004164  042777  020000  012772          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1356  004172  012767  000010  174740          MOV     #8.,SHIFT       ;# OF SHIFTS
 1357  004200  005000                  1$:     CLR     R0
 1358  004202  006067  174736                  ROR     TEMP1
 1359  004206  103002                          BCC     2$
 1360  004210  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BIT WINDOW
 1361
 1362  004214                          2$:
 1363  004214  052777  020000  012742          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1364  004222  042777  020000  012734          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1365  004230  017701  012730                  MOV     @TXCSR,R1       ;ACTUAL
 1366  004234  042701  075777                  BIC     #075777,R1      ;SAVE BIT WINDOW & DNA
 1367  004240  020001                          CMP     R0,R1
 1368  004242  001401                          BEQ     3$
 1369  004244  104003                          HLT     3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA BIT
 1370                                                                  ;ALSO CHECK DNA
 1371  004246                          3$:
 1372  004246  005367  174666                  DEC     SHIFT
 1373  004252  001352                          BNE     1$
 1374
 1375  004254  104400                          SCOPE
 1376
```

F03


```
1377                                    ;;THIS TEST VERIFYS THAT DROPPING OF SEND IN THE
1378                                    ;;MIDDLE OF TRANSMITTING A CHARACTER DOES INDEED
1379                                    ;;FINISH TRANSMITTING THAT CHARACTER
1380                                    ;;MODE:  SYNC EXT
1381                                    ;;LENGTH:  EIGHT
1382                                    ;;
1383
1384  004256  012767  000006  174642  TST6:   MOV     #6,TSTNO        ;SAVE THIS
1385  004264  012767  004472  174624          MOV     #TST7,NEXT              ;GO TO THIS TEST WHEN THRU
1386
1387  004272  052777  000400  012664          BIS     #MRESET,@TXCSR  ;MASTER RESET
1388  004300  012777  020000  012652          MOV     #SYNEXT,@PARCSR ;SET THE MODE
1389  004306  052777  000400  012650          BIS     #MRESET,@TXCSR  ;MASTER RESET
1390
1391                                    ;SET MAINTENANCE MODE & SEND
1392                                            ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1393  004314  012777  004020  012642          MOV     #MINT!SEND,@TXCSR
1394
1395                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1396  004322  012777  026026  012630          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
1397  004330  016703  012630                  MOV     TXCSR,R3        ;SETUP FOR ERROR MESSAGE
1398  004334  112777  000252  012626          MOVB    #252,@TXDBUF    ;LOAD DATA CHAR.
1399  004342  012767  000252  174574          MOV     #252,TEMP1      ;SHIFTED CHAR
1400  004350  012767  000010  174562          MOV     #8.,SHIFT       ;# OF SHIFTS
1401                                          ;GET INTO SYNCRONIZATION
1402  004356  052777  020000  012600          BIS     #CLK,@TXCSR     ;POKE CLK UP
1403  004364  042777  020000  012572          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1404
1405  004372  005000                  1$:     CLR     R0
1406  004374  006067  174544                  ROR     TEMP1           ;FORCE CARRY
1407  004400  103002                          BCC     2$
1408  004402  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BIT WINDOW
1409
1410  004406                          2$:
1411  004406  052777  020000  012550          BIS     #CLK,@TXCSR     ;POKE CLK UP
1412  004414  042777  020000  012542          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1413  004422  017701  012536                  MOV     @TXCSR,R1       ;ACTUAL
1414  004426  042701  075777                  BIC     #075777,R1      ;SAVE ONLY BIT WINDOW & DNA
1415  004432  020001                          CMP     R0,R1
1416  004434  001401                          BEQ     3$
1417  004436  104003                          HLT     3               ;BIT WINDOW DID NOT MATCH
1418                                                                  ;ACTUAL DATA BIT
1419  004440                          3$:
1420  004440  005367  174474                  DEC     SHIFT
1421  004444  022767  000003  174466          CMP     #3,SHIFT
1422  004452  001003                          BNE     4$
1423  004454  042777  000020  012502          BIC     #SEND,@TXCSR    ;DROP SEND
1424  004462  005767  174452          4$:     TST     SHIFT
1425  004466  001341                          BNE     1$              ;DO IT AGAIN?
1426
1427  004470  104400                          SCOPE
1428
```

```
 1429                                   ;;THIS TEST VERIFYS THAT RXDONE ASSERTS WHEN STRIP SYNC IS SET
 1430                                   ;;MODE: SYNC INTERNAL
 1431                                   ;;LENGTH: EIGHT
 1432                                   ;;
 1433  004472  012767  000007  174426  TST7:   MOV     #7,TSTNO        ;SAVE THIS
 1434  004500  012767  004746  174410          MOV     #TST8,NEXT              ;GO TO THIS TEST WHEN THRU
 1435  004506  052777  000400  012450          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1436  004514  012777  030000  012436          MOV     #SYNINT,@PARCSR ;SET THE MODE
 1437  004522  052777  000400  012434          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1438
 1439                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
 1440  004530  012777  064001  012426          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
 1441
 1442                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
 1443  004536  012777  036026  012414          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
 1444
 1445  004544  052777  000420  012376          BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SYNC SEARCH &
 1446                                                                  ;STRIP SYNC
 1447                                          ;POKE CLK TO GET RECEIVER INTO SYNCRONIZATION.....
 1448  004552  042777  020000  012404          BIC     #CLK,@TXCSR     ;POKE CLK
 1449  004560  052777  020000  012376          BIS     #CLK,@TXCSR     ;
 1450                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1451  004566  042777  020000  012370          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1452  004574  052777  020000  012362          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1453  004602  016703  012346                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
 1454  004606  012767  000002  174326          MOV     #2,COUNT        ;# OF TIMES OF SYNC CHARS.
 1455                                          ;TEST TO SEE HOW MANY SYNC CHARS  NEEDED
 1456  004614  105767  174356                  TSTB    SYNCNO
 1457  004620  100402                          BMI     1$      ;WILL IT BE ONE OR TWO ?
 1458  004622  005367  174314                  DEC     COUNT   ;MAKE IT ONE LESS
 1459  004626  012767  000010  174304  1$:     MOV     #8.,SHIFT       ;#OF SHIFTS
 1460  004634  012767  000026  174302          MOV     #26,TEMP1       ;SYNC CHAR
 1461  004642  004767  012006                  JSR     PC,RPOKE
 1462  004646  005367  174270                  DEC     COUNT   ;IS IT THE LAST SYNC CHAR ?
 1463  004652  001365                          BNE     1$      ;GO AGAIN AND SHIFT IN ANOTHER SYNC CHAR
 1464  004654  032777  004000  012266          BIT     #RECACT,@RXCSR  ;RECACT=1?
 1465  004662  001001                          BNE     2$
 1466  004664  104000                          HLT     ;RECACT SHOULD BE ASSERTED
 1467  004666                          2$:
 1468  004666  105777  012256                  TSTB    @RXCSR          ;RXDONE=0?
 1469  004672  100001                          BPL     3$
 1470  004674  104000                          HLT                     ;RXDONE SHOULD NOT BE ASSERTED
 1471  004676                          3$:
 1472  004676  012767  000010  174234          MOV     #8.,SHIFT       ;#OF SHIFTS
 1473  004704  012767  000025  174232          MOV     #25,TEMP1       ;ANY CHARACTER
 1474  004712  004767  011736                  JSR     PC,RPOKE
 1475  004716  105777  012226                  TSTB    @RXCSR          ;RXDONE=1?
 1476  004722  100401                          BMI     4$
 1477  004724  104000                          HLT                     ;RXDONE SHOULD NOW BE ASSERTED
 1478  004726                          4$:
 1479  004726  012700  000025                  MOV     #25,R0          ;EXPECTED
 1480  004732  017701  012216                  MOV     @RXDBUF,R1      ;ACTUAL
 1481  004736  020001                          CMP     R0,R1
 1482  004740  001401                          BEQ     5$
 1483  004742  104002                          HLT     2               ;CHARACTERS SHOULD BE MATCHED
 1484  004744                          5$:
```

H03


```
  1485  004744  104400                          SCOPE
  1486
```

```
1487                                    ;;THIS TEST VERIFYS THAT BY DROPPING SYNSCN
1488                                    ;;IN THE MIDDLE OF A CHARACTER, SYNC CHARACTER SEQUENCE
1489                                    ;;IS NEEDED BEFORE RECACT, RXDONE ASSERT AGAIN.
1490                                    ;;ALSO NOTE:  SINCE RECACT IS DEPENDENT ON MATCH DETECT,
1491                                    ;;AND IF SYNSCH IS DROPPED IN THE MIDDLE OF
1492                                    ;;A SYNC CHARACTER AND THEN RAISED AGAIN ;RXDONE SHOULD
1493                                    ;;NOT ASSERT UNTIL NEW SYNC CHARACTER SEQUENCE
1494                                    ;;MODE:  SYNC INTERNAL (SYNINT)
1495                                    ;;LENGTH:  EIGHT
1496                                    ;;
1497
1498  004746  012767  000010  174152  TST8:   MOV     #8,TSTNO        ;SAVE THIS
1499  004754  012767  005476  174134          MOV     #TST9,NEXT              ;GO TO THIS TEST WHEN THRU
1500
1501  004762  105767  174210                 TSTB    SYNCNO          ;TWO SYNC CHARACTERS SELECTED  ?
1502  004766  100002                         BPL     1$      ;IF ANSWER WAS NO  DO THIS TEST
1503  004770  000167  000500                 JMP     16$     ;IF ANSWER WAS YES  JUMP OVER THIS TEST
1504  004774                          1$:
1505  004774  052777  000400  012162          BIS     #MRESET,@TXCSR  ;MASTER RESET
1506  005002  012777  030000  012150          MOV     #SYNINT,@PARCSR ;SET THE MODE
1507  005010  052777  000400  012146          BIS     #MRESET,@TXCSR  ;MASTER RESET
1508
1509                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1510  005016  012777  064001  012140          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1511
1512                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1513  005024  012777  036026  012126          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
1514
1515  005032  052777  060020  012110          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
1516                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
1517  005040  042777  020000  012116          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1518  005046  052777  020000  012110          BIS     #CLK,@TXCSR     ;POKE CLK UP
1519                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1520  005054  042777  020000  012102          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1521  005062  052777  020000  012074          BIS     #CLK,@TXCSR     ;POKE CLK UP
1522  005070  012767  000002  174044          MOV     #2,COUNT        ;# OF TIMES
1523  005076  016703  012052                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
1524  005102  012767  000010  174030  2$:     MOV     #8.,SHIFT       ;# OF SHIFTS
1525  005110  012767  000026  174026          MOV     #26,TEMP1       ;SYNC CHAR.
1526  005116  004767  011532                  JSR     PC,RPOKE
1527  005122  005367  174014                  DEC     COUNT
1528  005126  001403                          BEQ     3$
1529                                  ;TEST TO SEE HOW MANY SYNC CHARACTERS NEEDED
1530  005130  105767  174042                  TSTB    SYNCNO
1531  005134  100762                          BMI     2$
1532
1533  005136  032777  004000  012004  3$:     BIT     #RECACT,@RXCSR  ;RECACT=1?
1534  005144  001001                          BNE     4$
1535  005146  104000                          HLT                     ;RECACT SHOULD BE SET
1536  005150                          4$:
1537  005150  012767  000004  173762          MOV     #4,SHIFT        ;# OF SHIFTS
1538  005156  012767  000026  173760          MOV     #26,TEMP1       ;SYNC CHAR.
1539  005164  004767  011464                  JSR     PC,RPOKE
1540  005170  032777  004000  011752          BIT     #RECACT,@RXCSR  ;RECACT=1?
1541  005176  001001                          BNE     5$
1542  005200  104000                          HLT                     ;RECACT SHOULD  STILL BE SET
```

```
1543  005202                                  5$:
1544  005202  042777  000020  011740                BIC     #SYNSCH,@RXCSR  ;DROP SEARCH SYNC
1545  005210  032777  004000  011732                BIT     #RECACT,@RXCSR  ;RECACT=0?
1546  005216  001401                                BEQ     6$
1547  005220  104000                                HLT                     ;RECACT SHOULD NOT BE SET
1548                                  ;NOW SHIFT TWO BITS TO ALLOW SEARCH SYNC =0 TO TAKE
1549                                  ;EFFECT IN THE LOGIC(THIS ALLOWS THE RECEIVER CHIP TO SEE
1550                                  ;THE DROPPING OF SEARCH SYNC)...MATCH DETECT IN THE  REC.CHIP SHOULD ALSO DROP
1551  005222                          6$:
1552  005222  012767  000002  173710            MOV     #2,SHIFT        ;# OF SHIFTS
1553  005230  004767  011420                    JSR     PC,RPOKE
1554  005234  052777  000020  011706            BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
1555  005242  032777  004000  011700            BIT     #RECACT,@RXCSR
1556  005250  001401                            BEQ     7$
1557  005252  104000                            HLT     ;RECACT =0 ?
1558  005254                          7$:
1559  005254  105777  011670                    TSTB    @RXCSR
1560  005260  100001                            BPL     8$
1561  005262  104000                            HLT     ;RXDONE = 0 ?
1562  005264                          8$:
1563  005264  012767  000002  173646            MOV     #2,SHIFT        ;# OF SHIFTS
1564  005272  004767  011356                    JSR     PC,RPOKE
1565  005276  032777  004000  011644            BIT     #RECACT,@RXCSR  ;RECACT=0?
1566  005304  001401                            BEQ     9$
1567  005306  104000                            HLT                     ;RECACT SHOULD NOT BE SET
1568  005310                          9$:
1569  005310  105777  011634                    TSTB    @RXCSR          ;RXDONE=0?
1570  005314  100001                            BPL     10$
1571  005316  104000                            HLT                     ;RXDONE SHOULD NOT BE ASSERTED
1572  005320                          10$:
1573  005320  012700  000026                    MOV     #26,R0          ;EXPECTED
1574  005324  017701  011624                    MOV     @RXDBUF,R1      ;ACTUAL
1575  005330  020001                            CMP     R0,R1
1576  005332  001401                            BEQ     11$
1577  005334  104002                            HLT     2               ;CHARACTERS SHOULD BE MATCHED
1578  005336                          11$:
1579  005336  012767  000002  173576            MOV     #2,COUNT        ;# OF TIMES OF SYNC CHARS.
1580                                  ;TEST TO SEE HOW MANY SYNC CHARS  NEEDED
1581  005344  105767  173626                    TSTB    SYNCNO
1582  005350  100402                            BMI     12$     ;WILL IT BE TWO OR ONE ?
1583  005352  005367  173564                    DEC     COUNT   ;IT WAS ONLY ONE NEEDED
1584  005356  012767  000010  173554  12$:      MOV     #8.,SHIFT       ;#OF SHIFTS
1585  005364  012767  000026  173552            MOV     #26,TEMP1       ;SYNC CHAR
1586  005372  004767  011346                    JSR     PC,RPOKE
1587  005376  005367  173540                    DEC     COUNT   ;IS IT THE LAST SYNC CHAR ?
1588  005402  001365                            BNE     12$     ;GO AGAIN AND SHIFT IN ANOTHER SYNC CHAR
1589  005404  032777  004000  011536            BIT     #RECACT,@RXCSR  ;RECACT=1?
1590  005412  001001                            BNE     13$
1591  005414  104000                            HLT     ;RECACT SHOULD BE ASSERTED
1592  005416                          13$:
1593  005416  105777  011526                    TSTB    @RXCSR          ;RXDONE=0?
1594  005422  100001                            BPL     14$
1595  005424  104000                            HLT                     ;RXDONE SHOULD NOT BE ASSERTED
1596  005426                          14$:
1597  005426  012767  000010  173504            MOV     #8.,SHIFT       ;#OF SHIFTS
1598  005434  012767  000025  173502            MOV     #25,TEMP1       ;ANY CHARACTER
```

```
 1599  005442  004767  011206                  JSR     PC,RPOKE
 1600  005446  105777  011476                  TSTB    @RXCSR          ;RXDONE=1?
 1601  005452  100401                          BMI     15$
 1602  005454  104000                          HLT                     ;RXDONE SHOULD NOW BE ASSERTED
 1603  005456                          15$:
 1604  005456  012700  000025                  MOV     #25,R0          ;EXPECTED
 1605  005462  017701  011466                  MOV     @RXDBUF,R1      ;ACTUAL
 1606  005466  020001                          CMP     R0,R1
 1607  005470  001401                          BEQ     16$
 1608  005472  104002                          HLT     2               ;CHARACTERS SHOULD BE MATCHED
 1609                                  ;IF THIS  FAILS THEN CHECK THAT THE CORRECT
 1610                                  ;RECEIVER CHIP IS BEING USED...WHAT IS
 1611                                  ;HAPPENING IS THAT MATCH DETECT IS ASSERTING
 1612                                  ;BEFORE A NEW SYNC CHARACTER SEQUENCE
 1613                                  ;TRANSPIRES  THUS RXDONE ASSERTS TOO SOON
 1614                                  ;AND OVER RUN OCCURS SINCE THE RECEIVER WAS NOT READ
 1615                                  ;CONCLUSION::: IF OLDER RECEIVER CHIP
 1616                                  ;IS BEING USED THEN REPLACE IT WITH A NEW
 1617                                  ;RECEIVER CHIP IF 1 SYNC CHARACTER SEQUENCE IS DESIRED
 1618  005474                          16$:
 1619  005474  104400                          SCOPE
 1620
```

```
 1621                                           ;;THIS TEST VERIFYS THAT HDX MODE DISQUALIFIES THE
 1622                                           ;;RECEIVER WHEN SEND IS ASSERTED
 1623                                           ;;MODE:  SYNC EXT
 1624                                           ;;LENGTH:  EIGHT
 1625                                           ;;NOTE:  THIS TEST WORKS ONLY IN MAINT. EXTERNAL MODE
 1626                                           ;;THIS TEST USES BOTH RECEIVER & TRANSMITTER LOGIC
 1627  005476  012767  000011  173422  TST9:    MOV     #9,TSTNO        ;SAVE THIS
 1628  005504  012767  006054  173404          MOV     #TSTIO,NEXT             ;GO TO THIS TEST WHEN THRU
 1629  005512  105767  173465                  TSTB    JMRBY
 1630  005516  100155                          BPL     7$              ;GET OUT OF THIS TEST IF "NO"
 1631  005520  016703  011430                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
 1632  005524  052777  000400  011432          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1633  005532  012777  020000  011420          MOV     #SYN_XT,@PARCSR ;SET THE MODE
 1634  005540  052777  000400  011416          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1635
 1636                                          ;SET MAINTENANCE MODE & SEND
 1637                                                  ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
 1638  005546  012777  010020  011410                  MOV     #MEXT!SEND,@TXCSR
 1639
 1640                                          ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
 1641  005554  012777  026026  011376                  MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
 1642  005562  052777  000020  011360                  BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
 1643  005570  112777  000026  011372                  MOVB    #26,@TXDBUF     ;ANY CHARACTER
 1644                                                  ;POKE CLK FOR SYNCRONIZATION
 1645  005576  052777  020000  011360                  BIS     #CLK,@TXCSR     ;POKE CLK UP
 1646                                                  ;WAIT FOR CABLE & DRIVER DELAYS
 1647  005604  016702  173326                          MOV     HOLD,R2 ;WAIT THIS AMT
 1648  005610                                  64$:
 1649  005610  005302                                  DEC     R2      ;WAIT
 1650  005612  001376                                  BNE     64$
 1651                                                  ;EXIT...
 1652  005614  042777  020000  011342                  BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1653                                                  ;WAIT FOR CABLE & DRIVER DELAYS
 1654  005622  016702  173310                          MOV     HOLD,R2 ;WAIT THIS AMT
 1655  005626                                  65$:
 1656  005626  005302                                  DEC     R2      ;WAIT
 1657  005630  001376                                  BNE     65$
 1658                                                  ;EXIT...
 1659  005632  012767  000010  173300                  MOV     #8.,SHIFT       ;# OF SHIFTS
 1660  005640                                  1$:
 1661  005640  052777  020000  011316                  BIS     #CLK,@TXCSR     ;POKE CLK UP
 1662                                                  ;WAIT FOR CABLE & DRIVER DELAYS
 1663  005646  016702  173264                          MOV     HOLD,R2 ;WAIT THIS AMT
 1664  005652                                  66$:
 1665  005652  005302                                  DEC     R2      ;WAIT
 1666  005654  001376                                  BNE     66$
 1667                                                  ;EXIT...
 1668  005656  042777  020000  011300                  BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1669                                                  ;WAIT FOR CABLE & DRIVER DELAYS
 1670  005664  016702  173246                          MOV     HOLD,R2 ;WAIT THIS AMT
 1671  005670                                  67$:
 1672  005670  005302                                  DEC     R2      ;WAIT
 1673  005672  001376                                  BNE     67$
 1674                                                  ;EXIT...
 1675  005674  005367  173240                          DEC     SHIFT   ;# OF SHIFTS
 1676  005700  022767  000003  173232                  CMP     #3,SHIFT        ;IS IT TIME TO LOAD NEXT CHAR ?
```

```
1677  005706  001003                        BNE     2$
1678  005710  112777  000024  011252        MOVB    #24,@TXDBUF     ;LOAD NEXT CHAR.
1679  005716  005767  173216          2$:   TST     SHIFT
1680  005722  001346                        BNE     1$
1681  005724  105777  011220                TSTB    @RXCSR          ;RXDONE=1?
1682  005730  100401                        BMI     3$
1683  005732  104000                        HLT                     ;RXDONE SHOULD BE SET
1684  005734                          3$:
1685  005734  012700  000025                MOV     #25,R0          ;EXPECTED
1686  005740  017701  011210                MOV     @RXDBUF,R1      ;ACTUAL
1687  005744  020001                        CMP     R0,R1
1688  005746  001401                        BEQ     4$
1689  005750  104002                        HLT     2               ;CHARACTERS SHOULD COMPARE
1690  005752                          4$:
1691  005752  052777  000010  011204        BIS     #HDXEN,@TXCSR   ;SET HALF DUPLEX HDX
1692  005760  012767  000010  173152        MOV     #8.,SHIFT       ;# OF SHIFT
1693  005766                          5$:
1694  005766  052777  020000  011170        BIS     #CLK,@TXCSR     ;POKE CLK UP
1695                                        ;WAIT FOR CABLE & DRIVER DELAYS
1696  005774  016702  173136                MOV     HOLD,R2 ;WAIT THIS AMT
1697  006000                          68$:
1698  006000  005302                        DEC     R2      ;WAIT
1699  006002  001376                        BNE     68$
1700                                        ;EXIT...
1701  006004  042777  020000  011152        BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1702                                        ;WAIT FOR CABLE & DRIVER DELAYS
1703  006012  016702  173120                MOV     HOLD,R2 ;WAIT THIS AMT
1704  006016                          69$:
1705  006016  005302                        DEC     R2      ;WAIT
1706  006020  001376                        BNE     69$
1707                                        ;EXIT...
1708  006022  005367  173112                DEC     SHIFT
1709  006026  001357                        BNE     5$
1710  006030  105777  011114                TSTB    @RXCSR          ;RXDONE=0?
1711  006034  100001                        BPL     6$
1712  006036  104000                        HLT                     ;RXDONE SHOULD NOT BE ASSERTED
1713                                                                ;CHECK OUT HDX LOGIC
1714  006040                          6$:
1715  006040  017701  011110                MOV     @RXDBUF,R1      ;ACTUAL
1716  006044  020001                        CMP     R0,R1
1717  006046  001401                        BEQ     7$
1718  006050  104002                        HLT     2               ;CHARACTERS SHOULD COMPARE
1719                                        ;NOTE THAT CHARACTER 25 WILL BE FROZEN
1720                                        ;IN THE RXDBUF EVEN THOUGH CHARACTER 24 WAS
1721                                        ;SENT TO THE RECEIVER
1722  006052                          7$:
1723  006052  104400                        SCOPE
1724
```

```
1725                                    ;;THIS TEST VERIFYS THAT BREAK FORCES A SPACE CONDITION
1726                                    ;;ON THE LINE WHILE TRANSMITTING
1727                                    ;;THIS TEST USES BOTH THE RECEIVER AND TRANSMITTER LOGIC
1728                                    ;;MODE:  SYNC EXT (SYNEXT)
1729                                    ;;LENGTH:  EIGHT
1730                                    ;;
1731
1732  006054  012767  000012  173044  TST10:  MOV     #10,TSTNO       ;SAVE THIS
1733  006062  012767  006312  173026           MOV     #TST11,NEXT             ;GO TO THIS TEST WHEN THRU
1734  006070  052777  000400  011066           BIS     #MRESET,@TXCSR  ;MASTER RESET
1735  006076  012777  020000  011054           MOV     #SYNEXT,@PARCSR ;SET THE MODE
1736  006104  052777  000400  011052           BIS     #MRESET,@TXCSR  ;MASTER RESET
1737
1738                                    ;SET MAINTENANCE MODE & SEND
1739                                            ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1740  006112  012777  004020  011044           MOV     #MINT!SEND,@TXCSR
1741
1742                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1743  006120  012777  026026  011032           MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
1744  006126  052777  000020  011014           BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
1745  006134  016703  011014                   MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
1746  006140  012767  000002  172774           MOV     #2,COUNT        ;# OF TIMES
1747  006146  112777  000025  011014           MOVB    #25,@TXDBUF     ;ANY CHARACTER
1748                                           ;POKE CLK FOR SYNCRONIZATION
1749  006154  052777  020000  011002           BIS     #CLK,@TXCSR     ;POKE CLK UP
1750  006162  042777  020000  010774           BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1751  006170  012700  000025                   MOV     #25,R0          ;EXPECTED
1752  006174  012767  000010  172736  1$:      MOV     #8.,SHIFT       ;# OF SHIFTS
1753
1754  006202                           2$:
1755  006202  052777  020000  010754           BIS     #CLK,@TXCSR     ;POKE CLK UP
1756  006210  042777  020000  010746           BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1757  006216  005367  172716                   DEC     SHIFT
1758  006222  022767  000003  172710           CMP     #3,SHIFT
1759  006230  001003                           BNE     3$
1760  006232  112777  000024  010730           MOVB    #24,@TXDBUF     ;LOAD NEXT CHAR
1761  006240  005767  172674           3$:     TST     SHIFT
1762  006244  001356                           BNE     2$
1763  006246  105777  010676                   TSTB    @RXCSR          ;RXDONE=1?
1764  006252  100401                           BMI     4$
1765  006254  104000                           HLT
1766  006256                           4$:
1767  006256  017701  010672                   MOV     @RXDBUF,R1      ;ACTUAL
1768  006262  020001                           CMP     R0,R1
1769  006264  001401                           BEQ     5$
1770  006266  104003                           HLT     3
1771  006270                           5$:
1772  006270  052777  000001  010666           BIS     #BREAK,@TXCSR   ;SET BREAK
1773  006276  012700  000000                   MOV     #0,R0           ;EXPECTED
1774  006302  005367  172634                   DEC     COUNT
1775  006306  001332                           BNE     1$
1776  006310  104400                           SCOPE
1777
```

```
 1778                                    ;;THIS TEST VERIFYS THAT DSC CAUSES AN INTERRUPT
 1779                                    ;;THIS TEST ONLY WORKS IN MAINT EXTERNAL MODE
 1780                                    ;;INTERRUPT VECTOR:  DURIV
 1781  006312  012767  000313  172606  TST11:  MOV     #11,TSTNO       ;SAVE THIS
 1782  006320  012767  006532  172570          MOV     #TST12,NEXT             ;GO TO THIS TEST WHEN THRU
 1783  006326  105767  172651                  TSTB    JMRBY           ;IN MAINT EXTERNAL?
 1784  006332  100076                          BPL     7$              ;IF ANSWER NO JUMP AROUND TEST
 1785  006334  052777  000400  010622          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1786  006342  105767  172633                  TSTB    OPTCLR  ;IS THE OPTIONAL CLR JUMPER IN ?
 1787  006346  100405                          BMI     1$      ;YES
 1788  006350  012777  000000  010572          MOV     #0,@RXCSR       ;CLR THE UNRESETTABLE BITS
 1789  006356  005777  010566                  TST     @RXCSR  ;GET RID OF DSC BY READING RXCSR
 1790  006362  012777  006406  010604  1$:     MOV     #2$,@DURIV      ;SET UP TRAPCATCHER
 1791  006370  016777  010120  010600          MOV     DUPRT,@DURIS    ;
 1792  006376  016767  010114  171372          MOV     LESS1,PS        ;ALLOW INTERRUPTS
 1793  006404  000423                          BR      4$      ;JUMP AROUND INTERRUPT SVC ROUTINE
 1794                                  ;THE FOLLOWING IS THE INTERRUPT SVC ROUTINE
 1795  006406  012767  000340  171362  2$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
 1796  006414  005777  010530                  TST     @RXCSR          ;DSC=1?
 1797  006420  100401                          BMI     3$
 1798  006422  104000                          HLT                     ;FALSE INTERRUPT
 1799  006424                          3$:
 1800  006424  042777  000040  010516          BIC     #DSINTE,@RXCSR  ;CLEAR INTERRUPT ENABLE
 1801  006432  012716  006522                  MOV     #6$,(SP)        ;SET UP RETURN LOCATION
 1802  006436  016777  010534  010530          MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
 1803  006444  012777  000000  010524          MOV     #0,@DURIS       ;
 1804  006452  000002                          RTI
 1805
 1806  006454  052777  000040  010466  4$:     BIS     #DSINTE,@RXCSR  ;SET INTERRUPT ENABLE
 1807  006462  052777  000002  010460          BIS     #DTR,@RXCSR     ;TRY TO CAUSE INTERRUPT
 1808  006470  005000                          CLR     R0
 1809  006472                          5$:
 1810  006472  005200                          INC     R0              ;WAIT FOR INTERRUPT
 1811  006474  001376                          BNE     5$
 1812  006476  016777  010474  010470          MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
 1813  006504  012777  000000  010464          MOV     #0,@DURIS       ;
 1814
 1815  006512  042777  000040  010430          BIC     #DSINTE,@RXCSR  ;CLEAR INTERRUPT ENABLE
 1816  006520  104000                          HLT                     ;INTERRUPT FAILED TO OCCUR
 1817  006522  012767  000340  171246  6$:     MOV     #LEVEL7,PS
 1818  006530  104400                  7$:     SCOPE
 1819
```

```
 1820                                   ;;THIS TEST VERIFYS THAT RXDONE CAUSES AN INTERRUPT
 1821                                   ;;MODE:  SYNC EXTERNAL
 1822                                   ;;INTERRUPT VECTOR:  DURIV
 1823                                   ;;LENGTH:  EIGHT
 1824
 1825  006532  012767  000014  172366  TST12:  MOV     #12,TSTNO       ;SAVE THIS
 1826  006540  012767  007100  172350           MOV     #TST13,NEXT             ;GO TO THIS TEST WHEN THRU
 1827
 1828  006546  052777  000400  010410           BIS     #MRESET,@TXCSR  ;MASTER RESET
 1829  006554  012777  020000  010376           MOV     #SYNEXT,@PARCSR ;SET THE MODE
 1830  006562  052777  000400  010374           BIS     #MRESET,@TXCSR  ;MASTER RESET
 1831
 1832                                   ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
 1833  006570  012777  054001  010366           MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
 1834
 1835                                   ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
 1836  006576  012777  026026  010354           MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
 1837  006604  052777  000020  010336           BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
 1838                                   ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 1839  006612  042777  020000  010344           BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1840  006620  052777  020000  010336           BIS     #CLK,@TXCSR     ;POKE CLK UP
 1841  006626  012777  006652  010340           MOV     #1$,@DURIV      ;SET UP TRAPCATCHER
 1842  006634  016777  007654  010334           MOV     DUPRT,@DURIS    ;
 1843  006642  016767  007650  171126           MOV     LESS1,PS        ;ALLOW INTERRUPTS
 1844  006650  000425                           BR      3$      ;JUMP AROUND INTERRUPT SVC ROUTINE
 1845                                   ;THE FOLLOWING IS THE INTERRUPT SVC ROUTINE
 1846  006652  012767  000340  171116  1$:      MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
 1847  006660  042777  000100  010262           BIC     #RINTEN,@RXCSR  ;CLEAR INTERRUPT ENABLE
 1848  006666  105777  010256                   TSTB    @RXCSR          ;RXDONE=1?
 1849  006672  100401                           BMI     2$
 1850  006674  104000                           HLT                     ;FALSE INTERRUPT
 1851  006676                           2$:
 1852  006676  012716  007070                   MOV     #8$,(SP)        ;SET UP RETURN LOCATION
 1853  006702  016777  010270  010264           MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
 1854  006710  012777  000000  010260           MOV     #0,@DURIS       ;
 1855  006716  017701  010232                   MOV     @RXDBUF,R1      ;CLEAR INTERRUPT
 1856  006722  000002                           RTI
 1857
 1858  006724  052777  000100  010216  3$:      BIS     #RINTEN,@RXCSR  ;SET INTERRUPT ENABLE
 1859  006732  012767  000010  172200           MOV     #8.,SHIFT       ;# OF SHIFTS
 1860  006740  012767  000025  172176           MOV     #25,TEMP1       ;TO BE SHIFTED CHARACTER
 1861                                   ;THE FOLLOWING POKES THE MAINT DATA BASED UPON THE
 1862                                   ;INFORMATION CONTAINED IN TEMP1 AND IT IS
 1863                                   ;SHIFTED IN BY THE CONTENTS OF SHIFT
 1864  006746  042777  040000  010210  4$:      BIC     #MTDATA,@TXCSR
 1865  006754  000241                           CLC
 1866  006756  006067  172162                   ROR     TEMP1   ;FORCE CARRY
 1867  006762  103003                           BCC     5$
 1868  006764  052777  040000  010172           BIS     #MTDATA,@TXCSR
 1869  006772  042777  020000  010164  5$:      BIC     #CLK,@TXCSR
 1870  007000  052777  020000  010156           BIS     #CLK,@TXCSR
 1871  007006  005367  172126                   DEC     SHIFT
 1872  007012  001355                           BNE     4$
 1873                                   ;INTERRUPT SHOULD NOW OCCUR
 1874  007014  005000                           CLR     R0
 1875  007016                           6$:
```

```
1876  007016  005200                        INC     R0              ;WAIT FOR INTERRUPT
1877  007020  001376                        BNE     6$
1878  007022  016777  010150  010144        MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
1879  007030  012777  000000  010140        MOV     #0,@DURIS       ;
1880  007036  016703  010112                MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
1881  007042  012700  000025                MOV     #25,R0          ;EXPECTED
1882  007046  017701  010102                MOV     @RXDBUF,R1
1883  007052  042777  000100  010070        BIC     #RINTEN,@RXCSR  ;CLR INTR ENABLE
1884  007060  020001                        CMP     R0,R1
1885  007062  001401                        BEQ     7$
1886  007064  104002                        HLT     2               ;CHARACTERS SHOULD COMPARE
1887  007066                          7$:
1888  007066  104000                        HLT                     ;INTERRUPT FAILED TO OCCUR
1889
1890  007070  012767  000340  170700  8$:   MOV     #LEVEL7,PS
1891  007076  104400                        SCOPE
1892
```

```
                                        ;;THIS TEST VERIFYS THAT TWO INTERRUPTS THAT TRAP TO
                                        ;;THE SAME VECTOR ARE BOTH EXECUTED
                                        ;;INTERRUPT VECTOR:  DURIV
                                        ;;THIS TEST ONLY WORKS IN MAINT EXTERNAL MODE

007100  012767  000015  172020  TST13:  MOV     #13,TSTNO       ;SAVE THIS
007106  012767  007556  172002           MOV     #TST14,NEXT             ;GO TO THIS TEST WHEN THRU
007114  105767  172063                   TSTB    JMRBY           ;IN MAINT. EXTERNAL?
007120  100402                           BMI     1$      ;IF ANSWER WAS YES DO THIS TEST
007122  000167  000426                   JMP     15$     ;IF ANSWER WAS NO JUMP AROUND TEST
007126                          1$:
007126  105767  172047                   TSTB    OPTCLR  ;IS THE OPTIONAL CLEAR JUMPER IN ?
007132  100402                           BMI     2$      ;YES
007134  005077  010010                   CLR     @RXCSR  ;NO CLEAR UNRESETTABLE BITS
007140                          2$:
007140  052777  000400  010016           BIS     #MRESET,@TXCSR  ;MASTER RESET
007146  012777  020000  010004           MOV     #SYNEXT,@PARCSR ;SET THE MODE
007154  052777  000400  010002           BIS     #MRESET,@TXCSR  ;MASTER RESET

                                        ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
007162  012777  064001  007774           MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR

                                        ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
007170  012777  026026  007762           MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
007176  052777  000020  007744           BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
                                        ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
007204  042777  020000  007752           BIC     #CLK,@TXCSR     ;POKE CLK DOWN
007212  052777  020000  007744           BIS     #CLK,@TXCSR     ;POKE CLK UP
007220  012777  007244  007746           MOV     #3$,@DURIV      ;SET UP TRAPCATCHER
007226  016777  007262  007742           MOV     DUPRT,@DURIS    ;
007234  016767  007256  170534           MOV     LESS1,PS        ;ALLOW INTERRUPT
007242  000457                           BR      9$      ;JUMP AROUND SVC ROUTINE

                                        ;THE FOLLOWING IS THE 1ST INTERRUPT SVC ROUTINE
007244  012767  000340  170524  3$:      MOV     #LEVEL7,PS      ;DON'T ALLOW ANY MORE INTERRUPTS
007252  105777  007672                   TSTB    @RXCSR          ;RXDONE = 1 ?
007256  100401                           BMI     4$
007260  104000                           HLT                     ;FALSE INTERRUPT
007262                          4$:
007262  012716  007546                   MOV     #14$,(SP)       ;SET UP RETURN LOCATION
007266  012777  007350  007700           MOV     #7$,@DURIV      ;SET UP TRAPCATCHER FOR SECOND
                                                                ;INTERRUPT
007274  052777  000002  007646           BIS     #DTR,@RXCSR     ;TRY TO CAUSE SECOND INTERRUPT
007302  017701  007646                   MOV     @RXDBUF,R1      ;JUST READ RXDBUF TO CLR RXDONE
                                                                ;TO ALLOW SECOND INTERRUPT
007306  016767  007204  170462           MOV     LESS1,PS        ;ALLOW INTERRUPT
007314  005000                           CLR     R0
007316                          5$:
007316  005200                           INC     R0              ;WAIT FOR INTERRUPT
007320  001376                           BNE     5$
007322  042777  000140  007620           BIC     #RINTEN!DSINTE,@RXCSR   ;CLR INTR ENABLES
007330  104000                           HLT                     ;2ND INTERRUPT FAILED TO OCCUR

007332  016777  007640  007634  6$:      MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
007340  012777  000000  007630           MOV     #0,@DURIS       ;
007346  000002                           RTI
```

```
 1949
 1950                                           ;THE FOLLOWING IS THE 2ND INTERRUPT SVC ROUTINE
 1951  007350  012767  000340  170420  7$:      MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
 1952  007356  005777  007566                   TST     @RXCSR          ;DSC = 1 ?
 1953  007362  100401                           BMI     8$
 1954  007364  104000                           HLT                     ;FALSE INTERRUPT
 1955  007366                                 8$:
 1956  007366  042777  000140  007554           BIC     #RINTEN!DSINTE,@RXCSR   ;CLR BOTH INTR ENABLES
 1957  007374  012716  007332                   MOV     #6$,(SP)        ;SET UP RETURN LOCATION
 1958  007400  000002                           RTI
 1959
 1960  007402  052777  000140  007540  9$:      BIS     #RINTEN!DSINTE,@RXCSR ;SET INTERRUPT ENABLES
 1961  007410  012767  000010  171522           MOV     #8.,SHIFT       ;# OF SHIFTS
 1962  007416  012767  000025  171520           MOV     #25,TEMP1
 1963                                           ;THE FOLLOWING POKES THE MAINT DATA BASED UPON THE
 1964                                           ;INFORMATION CONTAINED IN TEMP1 AND IT IS
 1965                                           ;SHIFTED IN BY THE CONTENTS OF SHIFT
 1966  007424  042777  040000  007532  10$:      BIC     #MTDATA,@TXCSR
 1967  007432  000241                           CLC
 1968  007434  006067  171504                   ROR     TEMP1   ;FORCE CARRY
 1969  007440  103003                           BCC     11$
 1970  007442  052777  040000  007514           BIS     #MTDATA,@TXCSR
 1971  007450  042777  020000  007506  11$:     BIC     #CLK,@TXCSR
 1972  007456  052777  020000  007500           BIS     #CLK,@TXCSR
 1973  007464  005367  171450                   DEC     SHIFT
 1974  007470  001355                           BNE     10$
 1975                                           ;1ST INTERRUPT SHOULD NOW OCCUR
 1976  007472  005000                           CLR     R0
 1977  007474                                 12$:
 1978  007474  005200                           INC     R0              ;WAIT FOR INTERRUPT
 1979  007476  001376                           BNE     12$             ;
 1980  007500  016777  007472  007466           MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
 1981  007506  012777  000000  007462           MOV     #0,@DURIS       ;
 1982  007514  016703  007434                   MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
 1983  007520  012700  000025                   MOV     #25,R0          ;EXPECTED
 1984  007524  017701  007424                   MOV     @RXDBUF,R1
 1985  007530  042777  000140  007412           BIC     #RINTEN!DSINTE,@RXCSR   ;CLR INTERRUPT ENABLES
 1986  007536  020001                           CMP     R0,R1
 1987  007540  001401                           BEQ     13$
 1988  007542  104002                           HLT     2               ;CHARACTERS SHOULD COMPARE
 1989  007544                                 13$:
 1990  007544  104000                           HLT                     ;INTERRUPT FAILED TO OCCUR
 1991
 1992  007546  012767  000340  170222  14$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANY MORE INTERRUPTS
 1993  007554  104400                    15$:     SCOPE
 1994
```

```
                                        ;;THIS TEST VERIFYS THAT DNA CAUSES AN INTERRUPT
                                        ;;MODE:  SYNC EXTERNAL
                                        ;;INTERRUPT VECTOR:  DUTIV
007556  012767  000016  171342  TST14:  MOV     #14,TSTNO       ;SAVE THIS
007564  012767  010052  171324           MOV     #TST15,NEXT             ;GO TO THIS TEST WHEN THRU

007572  052777  000400  007364           BIS     #MRESET,@TXCSR  ;MASTER RESET
007600  012777  020000  007352           MOV     #SYNEXT,@PARCSR ;SET THE MODE
007606  052777  000400  007350           BIS     #MRESET,@TXCSR  ;MASTER RESET

                                        ;SET MAINTENANCE MODE & SEND
                                                ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
007614  012777  004020  007342           MOV     #MINT!SEND,@TXCSR

                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
007622  012777  020026  007330           MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
007630  112777  000025  007332           MOVB    #25,@TXDBUF     ;LOAD CHARACTER
007636  012767  000010  171274           MOV     #8.,SHIFT
                                        ;POKE CLK TO GET INTO SYNCRONIZATION
007644  052777  020000  007312           BIS     #CLK,@TXCSR     ;POKE CLK UP
007652  042777  020000  007304           BIC     #CLK,@TXCSR     ;POKE CLK DOWN

007660                                  1$:
007666  052777  020000  007276           BIS     #CLK,@TXCSR     ;POKE CLK UP
007674  042777  020000  007270           BIC     #CLK,@TXCSR     ;POKE CLK DOWN
007700  005367  171240                   DEC     SHIFT           ;LAST SHIFT?
007704  001367                           BNE     1$
007706  012777  007752  007270           MOV     #3$,@OUTIV      ;SET UP TRAPCATCHER
007714  016777  000600  007264           MOV     OUPRT,@OUTIS    ;
007722  016767  000574  170052           MOV     LESS1,PS        ;ALLOW INTERUPTS
007730  052777  000040  007232           BIS     #DNAINTE,@TXCSR ;ENABLE INTERRUPT
                                        ;NOW POKE CLK TO GET DNA
007736  052777  020000  007224           BIS     #CLK,@TXCSR     ;POKE CLK
007744  005000                           CLR     R0
007746                                  2$:
007746  005200                           INC     R0              ;WAIT FOR INTERRUPT
007750  001376                           BNE     2$
007752  104000                           HLT                     ;INTERRUPT FAILED TO OCCUR
007754  000423                           BR      5$      ;JUMP AROUND SVC ROUTINE
                                        ;THE FOLLOWING IS THE INTERRUPT SERVICE ROUTINE
007756  012767  000340  170016  3$:      MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
007764  005777  007200                   TST     @TXCSR          ;DNA?
007770  100401                           BMI     4$
007772  104000                           HLT                     ;FALSE INTERRUPT
007774                                  4$:
007774  042777  000040  007166           BIC     #DNAINTE,@TXCSR ;CLR INTR ENABLE
010000  012716  010042                   MOV     #6$,(SP)        ;SET UP RETURN LOCATION
010004  016777  007174  007170           MOV     OUTIS,@OUTIV    ;RESTORE TRAPCATCHER
010012  012777  000000  007164           MOV     #0,@OUTIS       ;
010020  000002                           RTI

010022  016777  007156  007152  5$:      MOV     OUTIS,@OUTIV    ;RESTORE TRAPCATCHER
010030  012777  000000  007146           MOV     #0,@OUTIS       ;

010036  042777  000040  007122           BIC     #DNAINTE,@TXCSR ;CLR INTERRUPT ENABLE
```

```
  2051  010042  012767  000340  167726  6$:     MOV     #LEVEL7,PS      ;RESTORE NO INTERRUPT STATUS
  2052  010050  104400                          SCOPE
  2053
```

```
2054                                    ;;THIS TEST VERIFYS THAT TXDONE CAUSES AN INTERRUPT
2055                                    ;;INTERRUPT VECTOR:  DUTIV
2056                                    ;;NOTE: TXDONE = 1        AFTER A MASTER RESET
2057                                    ;;
2058  010052  012767  000017  171046  TST15:  MOV     #15,TSTNO       ;SAVE THIS
2059  010060  012767  010236  171030         MOV     #TST16,NEXT             ;GO TO THIS TEST WHEN THRU
2060
2061  010066  052777  000400  007070         BIS     #MRESET,@TXCSR  ;MASTER RESET
2062  010074  012777  010144  007076         MOV     #2$,@DUTIV      ;SET UP TRAPCATCHER
2063  010102  016777  006406  007072         MOV     DUPRT,@DUTIS    ;
2064  010110  016767  006402  167660         MOV     LESS1,PS        ;ALLOW INTERPUTS
2065  010116  052777  000100  007040         BIS     #TXINTE,@TXCSR  ;ENABLE INTERRUPT
2066  010124  005000                         CLR     R0
2067  010126                          1$:
2068  010126  005200                         INC     R0              ;WAIT FOR INTERRUPT
2069  010130  001376                         BNE     1$              ;
2070  010132  042777  000100  007024         BIC     #TXINTE,@TXCSR  ;CLR INTERRUPT ENABLE
2071  010140  104000                         HLT                     ;INTERRUPT FAILED TO OCCUR
2072  010142  000423                         BR      4$      ;JUMP AROUND SVC ROUTINE
2073
2074                                    ;THE FOLLOWING IS THE INTERRUPT SERVICE ROUTINE
2075  010144  012767  000340  167624  2$:    MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
2076  010152  042777  000100  007004         BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLE
2077  010160  105777  007000                 TSTB    @TXCSR          ;TXDONE?
2078  010164  100401                         BMI     3$
2079  010166  104000                         HLT                     ;FALSE INTERRUPT
2080  010170                          3$:
2081  010170  012716  010226                 MOV     #5$,(SP)        ;SET UP RETURN LOCATION
2082  010174  016777  007002  006776         MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2083  010202  012777  000000  006772         MOV     #0,@DUTIS       ;
2084  010210  000002                         RTI
2085
2086  010212  016777  006764  006760  4$:    MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2087  010220  012777  000000  006754         MOV     #0,@DUTIS       ;
2088
2089  010226  012767  000340  167542  5$:    MOV     #LEVEL7,PS      ;RESTORE NO INTERRUPT STATUS
2090  010234  104400                         SCOPE
2091
```

J04


```
                                        ;;THIS TEST VERIFYS THAT TXDONE DOES NOT CAUSE AN INTERRUPT
                                        ;;WHEN PROCESSOR PRIORITY LEVEL IS TOO HIGH
                                        ;;INTERRUPT VECTOR: DUTIV
                                        ;;NOTE: TXDONE = 1 AFTER A MASTER RESET
                                        ;;
010236  012767  000020  170662  TST16:  MOV     #16,TSTNO       ;SAVE THIS
010244  012767  010420  170644          MOV     #TST17,NEXT             ;GO TO THIS TEST WHEN THRU
010252  052777  000400  006704          BIS     #MRESET,@TXCSR  ;MASTER RESET
010260  012777  010350  006712          MOV     #2$,@DUTIV      ;SET UP TRAPCATCHER
010266  016777  006222  006706          MOV     DUPRT,@DUTIS    ;
010274  016767  006214  167474          MOV     DUPRT,PS        ;SET PS LEVEL TOO HIGH
010302  052777  000100  006654          BIS     #TXINTE,@TXCSR  ;ENABLE INTERRRUPT
010310  005000                          CLR     R0      ;WAIT FOR INTERRUPT
010312                          1$:
010312  005200                          INC     R0      ;
010314  001376                          BNE     1$      ;
010316  042777  000100  006640          BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLE
010324  012767  000340  167444          MOV     #LEVEL7,PS      ;DON'T ALLOW INTERRUPTS
010332  016777  006644  006640          MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
010340  012777  000000  006634          MOV     #0,@DUTIS       ;
010346  000423                          BR      4$      ;TEST IS OK....GET OUT OF TEST
                                ;THE FOLLOWING IS THE INTERRUPT SVC ROUTINE
010350  012767  000340  167420  2$:     MOV     #LEVEL7,PS      ;DONT ALLOW ANYMORE INTERRUPTS
010356  042777  000100  006600          BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLE
010364  012716  010406                  MOV     #3$,(SP)        ;SET UP RETURN LOCATION
                                                                ;TO REPORT ERROR
010370  016777  006606  006602          MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
010376  012777  000000  006576          MOV     #0,@DUTIS       ;
010404  000002                          RTI
                                ;END OF INTERRUPT SVC ROUTINE


                                ;YOU SHOULD NOT GET INTO THIS FOLLOWING CODE UNLESS THERE
                                ;WAS AN ERROR
010406  012767  000340  167362  3$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
010414  104000                          HLT     ;INTERRUPT SHOULD NOT OF OCCURED,CHECK
                                                ;THE INTERRUPT LEVEL SELECTED OR CHECK
                                                ;INTERRUPT LOGIC OR BOTH
010416  104400                  4$:     SCOPE
```

```
2134                                    ;;THIS TEST VERIFYS THAT TXDONE CAUSES ONLY ONE INTERRUPT
2135                                    ;;PROVIDING THAT TXCSR IS NOT READ
2136                                    ;;AND TXDBUF IS NOT LOADED (WRITTEN)
2137                                    ;;THIS TEST CHECKS THE ONCE ONLY FLIP/FLOP (V2)
2138                                    ;;OF THE INTERRUPT CONTROL LOGIC
2139                                    ;;INTERRUPT VECTOR: DUTIV
2140                                    ;;NOTE: TXDONE = 1    AFTER A MASTER RESET
2141                                    ;;
2142  010420  012767  000021  170500  TST17:  MOV     #17,TSTNO       ;SAVE THIS
2143  010426  012767  010614  170462          MOV     #TST18,NEXT             ;GO TO THIS TEST WHEN THRU
2144  010434  052777  000400  006522          BIS     #MRESET,@TXCSR  ;MASTER RESET
2145  010442  012777  010504  006530          MOV     #2$,@DUTIV      ;SET UP TRAPCATCHER
2146  010450  016777  006040  006524          MOV     DUPRT,@DUTIS    ;
2147  010456  016767  006034  167312          MOV     LESS1,PS        ;ALLOW INTERRUPTS
2148  010464  052777  000100  006472          BIS     #TXINTE,@TXCSR  ;ENABLE INTR ENABLE
2149  010472  005000                          CLR     R0
2150  010474                          1$:
2151  010474  005200                          INC     R0
2152  010476  001376                          BNE     1$
2153  010500  104000                          HLT     ;INTERRUPT FAILED TO OCCUR
2154  010502  000427                          BR      7$
2155                                  ;THE FOLLOWING IS THE INTR SVC ROUTINE
2156  010504  012767  000340  167264  2$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTR
2157  010512  012716  010554                  MOV     #5$,(SP)        ;SET UP RETURN LOCATION
2158  010516  012777  010526  006454          MOV     #3$,@DUTIV      ;SET UP TRAPCATCHER TO
2159                                                                  ;PROVE THAT THE INTERRUPT DOES NOT OCCUR
2160                                                                  ;TWICE (AFTER RTI 'ING FROM THIS
2161                                                                  ;SVC ROUTINE
2162  010524  000002                          RTI
2163                                  ;THE FOLLOWING INTERRUPT SVC ROUTINE WILL CATCH THE SECOND INTR
2164  010526  012767  000340  167242  3$:     MOV     #LEVEL7,PS      ;DON'T ALLOW INTER
2165  010534  012716  010562                  MOV     #7$,(SP)        ;SET UP RETURN LOCATION
2166  010540  105777  006420                  TSTB    @TXCSR  ;TXDONE = 1?
2167  010544  100401                          BMI     4$
2168  010546  104000                          HLT     ;TXDONE SHOULD BE SET
2169  010550                          4$:
2170  010550  104000                          HLT     ;THE INTERRUPT WAS TAKEN TWICE.....
2171                                                  ;CHECK OUT THE V2 FLIP/FLOP LOGIC
2172                                                  ;IN THE INTERRUPT CONTROL LOGIC
2173  010552  000002                          RTI
2174  010554  005000                  5$:     CLR     R0      ;ALLOW TIME TO CATCH SECOND
2175  010556                          6$:
2176  010556  005200                          INC     R0              ;IF IT WERE TO OCCUR
2177  010560  001376                          BNE     6$      ;
2178  010562  016777  006414  006410  7$:     MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2179  010570  012777  000000  006404          MOV     #0,@DUTIS       ;
2180  010576  042777  000100  006360          BIC     #TXINTE,@TXCSR  ;CLR INTERRUPT ENABLE
2181  010604  012767  000340  167164          MOV     #LEVEL7,PS      ;RESTORE NO INTERRUPT STATUS
2182  010612  104400                          SCOPE
2183
```

```
 2184                                   ;;THIS TEST 'ERIFYS THAT TWO INTERRUPTS THAT TRAP
 2185                                   ;;TO THE SAME VECTOR ARE BOTH EXECUTED
 2186                                   ;;INTERRUPT VECTOR:  DUTIV
 2187                                   ;;MODE:  SYNC EXTERNAL
 2188
 2189  010614  012767  000022  170304  TST18:  MOV     #18,TSTNO       ;SAVE THIS
 2190  010622  012767  011204  170266         MOV     #TST19,NEXT             ;GO TO THIS TEST WHEN THRU
 2191
 2192  010630  052777  000400  006326         BIS     #MRESET,@TXCSR  ;MASTER RESET
 2193  010636  012777  020000  006314         MOV     #SYNEXT,@PARCSR ;SET THE MODE
 2194  010644  052777  000400  006312         BIS     #MRESET,@TXCSR  ;MASTER RESET
 2195
 2196                                   ;SET MAINTENANCE MODE & SEND
 2197                                          ;NOTE:BIT WINDOW3CLK ARE CLEARED (MTDATA=0)
 2198  010652  012777  004020  006304         MOV     #MINT!SEND,@TXCSR
 2199
 2200                                   ;SET MODE, # OF BITS,PARITY SENSE,& LOAD SYNC REG
 2201  010660  012777  026026  006272         MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
 2202  010666  112777  000025  006274         MOVB    #25,@TXDBUF     ;LOAD CHARACTER
 2203  010674  012767  000010  170236         MOV     #8.,SHIFT
 2204                                   ;POKE CLK TO GET INTO SYNCRONIZATION
 2205  010702  052777  020000  006254         BIS     #CLK,@TXCSR     ;POKE CLK UP
 2206  010710  042777  020000  006246         BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2207
 2208  010716                                 1$:
 2209  010716  052777  020000  006240         BIS     #CLK,@TXCSR     ;POKE CLK UP
 2210  010724  042777  020000  006232         BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2211  010732  005367  170202                 DEC     SHIFT           ;LAST SHIFT?
 2212  010736  001367                         BNE     1$
 2213  010740  012777  011002  006232         MOV     #3$,@DUTIV      ;SET UP TRAPCATCHER
 2214  010746  016777  005542  006226         MOV     DUPRT,@DUTIS    ;
 2215  010754  016767  005536  167014         MOV     LESS1,PS        ;ALLOW INTERRUPTS
 2216  010762  052777  000140  006174         BIS     #TXINTE!DNAINTE,@TXCSR  ;ENABLE INTERRUPTS
 2217  010770  005000                         CLR     R0
 2218  010772                                 2$:
 2219  010772  005200                         INC     R0              ;WAIT FOR INTERRUPT
 2220  010774  001376                         BNE     2$              ;
 2221  010776  104000                         HLT                     ;INTERRUPT FAILED TO OCCUR
 2222  011000  000464                         BR      10$     ;JUMP AROUND SVC ROUTINES
 2223
 2224                                   ;THE FOLLOWING IS THE 1ST INTERRUPT SVC ROUTINE
 2225  011002  012767  000340  166766  3$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
 2226  011010  005777  006150                 TST     @TXCSR  ;DNA=0 ?
 2227  011014  100001                         BPL     4$
 2228  011016  104000                         HLT     ;DNA SHOULD NOT BE ASSERTED
 2229  011020                                 4$:
 2230  011020  105777  006140                 TSTB    @TXCSR  ;TXDONE = 1?
 2231  011024  100401                         BMI     5$
 2232  011026  104000                         HLT             ;FALSE INTERRUPT
 2233  011030                                 5$:
 2234  011030  012716  011174                 MOV     #11$,(SP)       ;SET UP RETURN LOCATION
 2235  011034  012777  011120  006136         MOV     #6$,@DUTIV      ;SET UP TRAPCATCHER
 2236                                         ;NOW POKE CLK TO BRING UP DNA
 2237  011042  052777  020000  006114         BIS     #CLK,@TXCSR     ;POKE CLK
 2238  011050  112777  000025  006112         MOVB    #25,@TXDBUF     ;JUST LOAD ANY CHAR TO CLR
 2239                                                 ;TXDONE TO ALLOW SECOND INTERRUPT
```

```
2240  011056  016767  005421  166712          MOV     LESS1,PS        ;ALLOW INTERRUPTS
2241  011064  005000                          CLR     R0
2242  011066                          6$:
2243  011066  005200                          INC     R0              ;WAIT FOR INTERRUPT
2244  011070  001376                          BNE     6$
2245  011072  042777  000140  006064          BIC     #DNAINTE!TXINTE,@TXCSR  ;CLR INTR ENABLES
2246  011100  104000                          HLT                     ;2ND INTERRUPT FAILED TO OCCUR
2247
2248  011102  016777  006074  006070  7$:     MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2249  011110  012777  000000  006064          MOV     #0,@DUTIS       ;
2250  011116  000002                          RTI
2251
2252                                  ;THE FOLLOWING IS THE 2ND INTERRUPT SVC ROUTINE
2253  011120  012767  000340  166650  8$:     MOV     #LEVEL7,PS
2254  011126  005777  006032                  TST     @TXCSR          ;DNA
2255  011132  100401                          BMI     9$
2256  011134  104000                          HLT                     ;FALSE INTERRUPT
2257  011136                          9$:
2258  011136  042777  000140  006020          BIC     #DNAINTE!TXINTE,@TXCSR  ;CLR BOTH INTR ENABLES
2259  011144  012716  011102                  MOV     #7$,(SP)                ;SETUP RETURN LOCATION
2260  011150  000002                          RTI
2261
2262  011152  016777  006024  006020  10$:    MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2263  011160  012777  000000  006014          MOV     #0,@DUTIS
2264
2265  011166  042777  000140  005770          BIC     #DNAINTE!TXINTE,@TXCSR ;CLR BOTH INTERRUPT
2266                                                                  ;ENABLES
2267  011174  012767  000340  166574  11$:     MOV     #LEVEL7,PS      ;RESTORE NO INTERRUPT STATUS
2268
2269  011202  104400                          SCOPE
2270
```

```
2271                                    ;;THIS TEST VERIFYS CTP MODE (IE SYSTS1 MODE)
2272                                    ;;IT BASICALLY CHECKS THE EXISTANCE OF
2273                                    ;;THE FREE RUNNING OSCILLATOR
2274                                    ;;MODE:  ISOCRONOUS (ISYMOD)
2275                                    ;;LENGTH:  EIGHT
2276                                    ;;THIS TEST USES BOTH THE RECEIVER & TRANSMITTER LOGIC
2277
2278  011204  012767  000023  167714  TST19:  MOV     #19,TSTNO       ;SAVE THIS
2279  011212  012767  011512  167676           MOV     #TST20,NEXT             ;GO TO THIS TEST WHEN THRU
2280  011220  052777  000400  007736           BIS     #MRESET,@TXCSR  ;MASTER RESET
2281  011226  012777  000000  005724           MOV     #ISYMOD,@PARCSR ;LOAD THE MODE
2282  011234  052777  000400  005722           BIS     #MRESET,@TXCSR  ;MASTER RESET
2283  011242  012777  006026  005710           MOV     #ISYMOD!EIGHT!NOPAR!26,@PARCSR  ;LOAD THE MODE,
2284                                           ;# OF BITS PER CHAR,PARITY SENSE(NO PARITY),
2285                                           ;&SYNC CHARACTER (26)
2286  011250  112777  000025  005712           MOVB    #25,@TXDBUF     ;LOAD THE CHAR
2287  011256  012777  011356  005710           MOV     #3$,@DURIV      ;SET UP TRAPCATCHER
2288  011264  016777  005224  005704           MOV     DUPRT,@DURIS    ;
2289  011272  016767  005220  166476           MOV     LESS1,PS        ;ALLOW INTERRUPTS
2290  011300  016703  005650                   MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
2291  011304  012700  000025                   MOV     #25,R0          ;EXPECTED
2292  011310  012777  014020  005646           MOV     #SYSTST!SEND,@TXCSR     ;OK  NOW LOAD SEND &
2293                                                                   ;INT. MODE
2294  011316  052777  000120  005624           BIS     #SYNSCH!RINTEN,@RXCSR   ;SET SEARCH SYNC &
2295                                                                   ;RECEIVER INTERRUPT
2296                                                                   ;ENABLE & WAIT FOR INTERRUPT
2297  011324  005067  167624                   CLR     TEMP5
2298  011330  005002                   1$:     CLR     R2
2299  011332                           2$:
2300  011332  005202                           INC     R2              ;WAIT FOR INTERRUPT
2301  011334  001376                           BNE     2$
2302  011336  005067  167612                   INC     TEMP5
2303  011342  026767  000003  167604           CMP     #3,TEMP5
2304  011350  002367                           BGE     1$
2305  011352  104000                           HLT                     ;INTERRUPT DID NOT OCCUR
2306  011354  000423                           BR      4$
2307
2308                                    ;THE FOLLOWING IS THE INTERRUPT SVC ROUTINE
2309  011356  012767  000340  166412  3$:      MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2310  011364  017704  005560                   MOV     @RXCSR,R4       ;SAVE
2311  011370  017701  005560                   MOV     @RXDBUF,R1      ;ACTUAL
2312  011374  016777  005576  005572           MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2313  011402  012777  000000  005566           MOV     #0,@DURIS       ;
2314  011410  012716  011456                   MOV     #5$,(SP)        ;SET UP RETURN
2315  011414  042777  000100  005526           BIC     #RINTEN,@RXCSR  ;CLR INTERRUPT ENABLE
2316  011422  000002                           RTI
2317
2318  011424  042777  000100  005516  4$:      BIC     #RINTEN,@RXCSR  ;CLR INTERRUPT ENABLE
2319  011432  012767  000340  166336           MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2320  011440  016777  005532  005526           MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2321  011446  012777  000000  005522           MOV     #0,@DURIS       ;
2322  011454  000415                           BR      7$
2323
2324  011456  020001                   5$:     CMP     R0,R1
2325  011460  001401                           BEQ     6$
2326  011462  104002                           HLT     2               ;CHARACTERS DID NOT MATCH
```

```
 2327  011464                          5$:
 2328  011464  016703  005460                MOV     RXCSR,R3        ;SETUP FOR ERROR MESSAGE
 2329  011470  012700  000200                MOV     #200,R0         ;EXPECTED
 2330  011474  010401                        MOV     R4,R1           ;ACTUAL
 2331  011476  042701  177577                BIC     #177577,R1      ;SAVE ONLY RXDONE
 2332  011502  020001                        CMP     R0,R1
 2333  011504  001401                        BEQ     .$
 2334  011506  104001                        HLT     1       ;FALSE INTERRUPT
 2335  011510                          7$:
 2336  011510  104400                        SCOPE
```

```
 2337                                   ;;THIS TEST VERIFYS CTP MODE (IE SYSTST MODE)
 2338                                   ;;IT BASICALLY CHECKS THE EXISTANCE OF
 2339                                   ;;THE FREE RUNNING OSCILLATOR
 2340                                   ;;MODE: SYNINT
 2341                                   ;;LENGTH: EIGHT
 2342                                   ;;THIS TEST USES BOTH THE RECEIVER & TRANSMITTER LOGIC
 2343                                   ;;
 2344  011512  012767  000024  167406  TST20:  MOV     #20,TSTNO       ;SAVE THIS
 2345  011520  012767  012354  167370          MOV     #.EOP,NEXT              ;GO TO THIS TEST WHEN THRU
 2346  011526  052777  000400  005430          BIS     #MRESET,@TXCSR  ;MASTER RESET
 2347  011534  012777  030000  005416          MOV     #SYNINT,@PARCSR ;SET THE MODE
 2348  011542  052777  000400  005414          BIS     #MRESET,@TXCSR  ;MASTER RESET
 2349
 2350                                   ;SET MAINTENANCE MODE & SEND
 2351                                           ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
 2352  011550  012777  014020  005406          MOV     #SYSTST!SEND,@TXCSR
 2353
 2354                                   ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
 2355  011556  012777  036026  005374          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
 2356  011564  052777  000420  005356          BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SEARCH SYNC &
 2357                                           ;STRIP SYNC SO THAT RXDONE ASSERTS
 2358                                           ;WHEN CHAR "25" ARRIVES AND NOT BEFORE...
 2359                                           ; ...,THEREFORE,SET STRIP SYNC
 2360                                   ;.............WAIT FOR SYNSCH TO BE
 2361                                   ;CLOCKED IN BY SYSTST CLK
 2362  011572  005067  167356                  CLR     TEMPS
 2363  011576                          1$:
 2364  011576  005002                  CLR     R2
 2365  011600                          2$:
 2366  011600  005202                  INC     R2      ;WAIT
 2367  011602  001376                  BNE     2$
 2368  011604  005267  167344          INC     TEMPS
 2369  011610  022767  000003  167336  CMP     #3,TEMPS
 2370  011616  002367                  BGE     1$      ;GO BACK TO CLR R2 AND WAIT SOME MORE
 2371  011620  012777  012040  005346  MOV     #7$,@OURIV      ;SET UP TRAPCATCHER
 2372  011626  016777  004662  005342  MOV     OUPRT,@OURIS    ;
 2373  011634  012777  012134  005336  MOV     #8$,@OUTIV      ;
 2374  011642  016777  004646  005332  MOV     OUPRT,@OUTIS    ;
 2375  011650  016767  004642  166120  MOV     LESS1,PS        ;ALLOW INTERRUPTS
 2376  011656  016703  005272          MOV     RXDBUF,R3       ;SET UP FOR ERROR MSG
 2377  011662  012700  000025          MOV     #25,R0  ;EXPECTED CHAR
 2378  011666  012767  000002  167246  MOV     #2,COUNT        ;# OF SYNC CHARS TO GET INTO
 2379                                   ;SYNCRONIZATION
 2380  011674  105767  167276          TSTB    SYNCNO  ;TEST TO SEE HOW MANY SYNC CHARS NEEDED
 2381  011700  100402                  BMI     3$
 2382  011702  005367  167234          DEC     COUNT   ;MAKE IT ONE LESS
 2383  011706  052777  000100  005234  3$:     BIS     #RINTEN,@RXCSR  ;SET INTERRUPT ENABLES
 2384  011714  052777  000100  005242          BIS     #TXINTE,@TXCSR  ;
 2385  011722  000167  000012                  JMP     5$      ;THE FIRST XMIT INTERRUPT SHCULD COME
 2386                                           ;FROM TXDONE = 1 AFTER A MASTER RESET
 2387  011726  112777  000026  005234  4$:     MOVB    #26,@TXDBUF     ;LOAD SYNC CHAR
 2388  011734  005067  167214          CLR     TEMPS
 2389  011740  005002                  5$:     CLR     R2      ;WAIT FOR INTERRUPT
 2390  011742                          6$:
 2391  011742  005202                  INC     R2
 2392  011744  001376                  BNE     6$      ;
```

```
2393  011746  005267  167202                INC     TEMPS
2394  011752  022767  000003  167174        CMP     #3,TEMPS
2395  011760  002367                        BGE     5$
2396  011762  012767  000340  166006        MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2397  011770  042777  000100  005166        BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLES
2398  011776  042777  000100  005144        BIC     #RINTEN,@RXCSR  ;
2399  012004  016777  005166  005162        MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2400  012012  012777  000000  005156        MOV     #0,@DURIS       ;
2401  012020  016777  005156  005152        MOV     DUTIS,@DUTIV    ;
2402  012026  012777  000000  005146        MOV     #0,@DUTIS       ;
2403  012034  104000                        HLT     ;TXDONE INTERRUPT FAILED TO OCCUR
2404                                                ;WATCH OUT HERE::: THIS FAILURE MAY
2405                                                ;ALSO BE CAUSED BY TRANSMIT DATA NOT
2406                                                ;BEING CLOCKED OUT.  I.E.  TXDONE
2407                                                ;NOT RE-ASCERTING SO THAT THE 2ND
2408                                                ;SYNC CHARACTER CAN BE LOADED
2409
2410  012036  000542                        BR      17$     ;GET OUT OF THE TEST
2411
2412                                ;THE FOLLOWING IS THE RECEIVER INTERRUPT SVC ROUTINE
2413  012040  012767  000340  165730  7$:   MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2414  012046  017704  005076                MOV     @RXCSR,R4       ;SAVE
2415  012052  017701  005076                MOV     @RXDBUF,R1      ;ACTUAL
2416  012056  016777  005114  005110        MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2417  012064  012777  000000  005104        MOV     #0,@DURIS       ;
2418  012072  016777  005104  005100        MOV     DUTIS,@DUTIV    ;
2419  012100  012777  000000  005074        MOV     #0,@DUTIS       ;
2420  012106  012716  012270                MOV     #13$,(SP)       ;SET UP RETURN LOCATION
2421  012112  042777  000100  005030        BIC     #RINTEN,@RXCSR  ;CLR INTERRUPT ENABLES
2422  012120  042777  000100  005036        BIC     #TXINTE,@TXCSR  ;
2423  012126  016705  167010                MOV     COUNT,R5        ;SAVE COUNT
2424  012132  000002                        RTI
2425                                ;END OF RECEIVER INTERRUPT SVC ROUTINE
2426                                ;.....THE FOLLOWING IS THE XMITTER INTERRUPT SVC ROUTINE
2427  012134  005367  167002        8$:     DEC     COUNT
2428  012140  100403                        BMI     9$
2429  012142  012716  011726                MOV     #4$,(SP)        ;SET UP RETURN LOCATION
2430                                                ;(LOAD SYNC CHARACTER AGAIN)
2431  012146  000002                        RTI
2432  012150  012716  012156        9$:     MOV     #10$,(SP)       ;SET UP RETURN LOCATION
2433  012154  000002                        RTI
2434                                ;END OF XMITTER INTERRUPT SVC ROUTINE
2435  012156  112777  000025  005004  10$:   MOVB    #25,@TXDBUF     ;LOAD CHARACTER
2436  012164  042777  000100  004772        BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLE
2437  012172  005067  166756                CLR     TEMPS
2438  012176  005002                11$:    CLR     R2      ;WAIT FOR INTERRUPT(RECEIVER)
2439  012200                        12$:
2440  012200  005202                        INC     R2
2441  012202  001376                        BNE     12$     ;
2442  012204  005267  166744                INC     TEMPS
2443  012210  022767  000003  166736        CMP     #3,TEMPS
2444  012216  002367                        BGE     11$
2445  012220  012767  000340  165550        MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2446  012226  042777  000100  004714        BIC     #RINTEN,@RXCSR  ;CLR INTR ENABLE
2447  012234  016777  004736  004732        MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2448  012242  012777  000000  004725        MOV     #0,@DURIS       ;
```

```
2449  012250  016777  004726  004722          MOV     DUTIS,@DUTIV    ;
2450  012256  012777  000000  004716          MOV     #0,@DUTIS       ;
2451  012264  104000                          HLT     ;RECEIVER INTR FAILED TO OCCUR
2452  012266  000426                          BR      17$     ;GET OUT OF TEST
2453  012270  020001                  13$:    CMP     R0,R1
2454  012272  001401                          BEQ     14$
2455  012274  104002                          HLT     2       ;CHARACTERS DID NOT MATCH
2456  012276                          14$:
2457  012276  016703  004646                  MOV     RXCSR,R3        ;SET UP FOR ERROR MSG
2458  012302  012700  000200                  MOV     #200,R0 ;EXPECTED RXDONE
2459  012306  010401                          MOV     R4,R1   ;ACTUAL
2460  012310  042701  177577                  BIC     #177577,R1      ;SAVE ONLY RXDONE
2461  012314  020001                          CMP     R0,R1
2462  012316  001401                          BEQ     15$
2463  012320  104001                          HLT     1       ;FALSE INTERRUPT
2464  012322                          15$:
2465  012322  020527  177777                  CMP     R5,#-1  ;WAS COUNT =-1   WHEN RECEIVER
2466                                                          ;INTERRUPTED ?
2467  012326  001401                          BEQ     16$
2468  012330  104000                          HLT     ;IF R5 IS GREATER THAN -1.........
2469                                          ;THEN EITHER THE # OF SYNC STRAP IS WRONG
2470                                          ;OR RXDONE IS OCCURING TOO SOON
2471  012332                          16$:
2472  012332  026727  166604  177777          CMP     COUNT,#-1
2473  012340  001401                          BEQ     17$
2474  012342  104000                          HLT     ;IF THIS TEST FAILS,BUT THE ABOVE TEST
2475                                          ;DOESN'T.....IT MAY BE THAT CLEARING
2476                                          ;TXINTE IN THE RECEIVER SVC ROUTINE
2477                                          ;IS NOT STOPPING TXDONE INTERRUPTS
2478  012344                          17$:
2479  012344  012767  000340  165424          MOV     #LEVEL7,PS      ;INHIBIT INTERRUPTS
2480  012352  104400                          SCOPE
```

```
2481
2482                                        ;END OF PASS
2483                                        ;TYPE NAME OF TEST
2484                                        ;UPDATE PASS COUNT
2485                                        ;CHECK FOR EXIT TO ACT-11
2486                                        ;RESTART TEST
2487
2488  012354  104402                .EOP:   TYPE                            ;TYPE NAME OF TEST
2489  012356  015516                        MEPASS
2490  012360  104410  012612               CONVRT  ,OUTCRY
2491  012364  104402  015237               TYPE    ,DEVICE
2492  012370  105767  166606               TSTB    MULTD                   ;ARE YOU RUNNING MULTIPLE DEVICES ?
2493  012374  001411                       BEQ     CCC                     ;NO,JUMP AROUND
2494  012376  005767  166614               TST     ACTREG                  ;ARE ANY DEVICES ACTIVE ?
2495  012402  001007                       BNE     RUNIT                   ;YES
2496  012404  104402  015251               TYPE    ,MCOW                   ;NO
2497  012410  016700  166602               MOV     ACTREG,R0               ;DISPLAY ACTREG
2498  012414  000000                       HALT                            ;SELECT SOMETHING TO RUN @ ACTREG:
2499                                        ;SELECT SWITCHES & HIT CONTINUE (PUT SW00 =1)
2500  012416  000167  166636               JMP     .START                  ;START OVER AGAIN.....YOU DESELECTED EVERYTHING
2501  012422  062767  000010  166554 RUNIT: ADD     #10,BASEADD             ;NEXT BLOCK (ADDRESSES)
2502  012430  062767  000010  166554 ZERO:  ADD     #10,BASEIV              ;NEXT BLOCK (VECTORS)
2503  012436  000241                       CLC
2504  012440  006167  166554               ROL     ROTADD                  ;UP DATE ROTATING POINTER
2505  012444  103410                       BCS     2$                      ;IS IT THE LAST DEVICE
2506                                                                        ;TO BE TESTED IN THIS PASS ?
2507  012446  036767  166546  166542       BIT     ROTADD,ACTREG           ;TEST THIS DEVICE FOR ACTIVE STATUS
2508  012454  001762                       BEQ     RUNIT                   ;IF NOT ACTIVE, TRY NEXT ADDRESS
2509  012456  004767  000034               JSR     PC,REPLAY               ;CALCULATE NEW PARAMETERS
2510  012462  000167  000174               JMP     RESTRT                  ;YES IT WAS ACTIVE,TEST THIS DEVICE
2511  012466  012767  000001  166524 2$:    MOV     #1,ROTADD               ;OK!,NOW SET UP  ROTATING
2512                                                                        ;POINTER FOR NEXT MULTIPLE PASS
2513  012474  016767  166506  166502       MOV     KEEPADD,BASEADD         ;RESTORE BASE ADDRESS
2514  012502  016767  166476  166502       MOV     KEEPIV,BASEIV           ;RESTORE BASE INTERRUPT VECTORS
2515  012510  004767  000002               JSR     PC,REPLAY               ;CALC NEW PARAMETERS
2516  012514  000441                       BR      CCC                     ;JUMP AROUND REPLAY
2517  012516  016767  166462  004126 REPLAY: MOV     BASEADD,DUBASE          ;SET UP FOR NEW ADDRESSES
2518  012524  004767  003770               JSR     PC,DUADDR               ;CREATE NEW ADDRESSES
2519  012530  016767  166476  004476       MOV     BASEIV,DURIV            ;CREATE DURIV
2520  012536  062767  000002  166446       ADD     #2,BASEIV
2521  012544  016767  166442  004424       MOV     BASEIV,DURIS            ;CREATE DURIS
2522  012552  062767  000002  166432       ADD     #2,BASEIV
2523  012560  016767  166426  004412       MOV     BASEIV,DUTIV            ;CREATE DUTIV
2524  012566  062767  000002  166416       ADD     #2,BASEIV
2525  012574  016767  166412  004400       MOV     BASEIV,DUTIS            ;CREATE DUTIS
2526  012602  016767  004366  166402       MOV     DURIV,BASEIV            ;RESTORE
2527  012610  000207                       RTS     PC
2528
2529  012612  000001               OUTCRY: 1
2530  012614      006     002               .BYTE   6,2
2531  012616  017150                       RXCSR
2532
2533  012620                         CCC:
2534  012622  005067  166310               CLR     LSTERR                  ;CLEAR LAST ERROR PC
2535  012626  005067  166374               CLR     ERRFLG                  ;CLEAR ERROR FLAG
2536  012632  005267  166274               INC     PASCNT                  ;UPDATE PASS COUNT
```

```
 2537  012634  016777  166270  166240          MOV     PASCNT,@LIGHTS          ;DISPLAY PASS COUNT
 2538  012642  013701  000042                  MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
 2539  012646  001405                          BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
 2540  012650  000005                          RESET
 2541  012652  004711                  LOGICAL:        JSR     PC,(R1)
 2542  012654  000240                          NOP
 2543  012656  000240                          NOP
 2544  012660  000240                          NOP
 2545  012662  012767  000340  165106  RESTRT: MOV     #340,PS                 ;PREVENT INTERRUPTS (PRIO: 7)
 2546  012670  104413                          CKSWR                           ;CHECK FOR ↑G
 2547  012672  012767  002350  166214          MOV     #TST1,RTRN
 2548  012700  000167  167444                  JMP     TST1
 2549
 2550                                          ;SCOPE LOOP AND INTERATION HANDLER
 2551
 2552  012704                          .SCOPE:
 2553                                  ;**** START OF CODE FOR THE X OR TESTER ******
 2554  012704  000424                          BR      4$                      ;IF RUNNING ON THE X OR TESTER CHANGE
 2555                                                                          ;THIS INSTRUCTION TO A "NOP"(NOP=240)
 2556  012706  013746  000004                  MOV     @#4,-(SP)               ;SAVE CONTENTS OF ERROR VECTOR
 2557  012712  012737  012732  000004          MOV     #1$,@#4                 ;SET FOR TIME OUT
 2558  012720  005737  177060                  TST     @#177060                ;TIME OUT ON  X OR ?
 2559  012724  012637  000004                  MOV     (SP)+,@#4               ;RESTORE ERROR VECTOR
 2560  012730  000404                          BR      2$                      ;GO TO NEXT TEST
 2561  012732  022626                  1$:     CMP     (SP)+,(SP)+             ;CLEAR THE STACK AFTER A TIMEOUT
 2562  012734  012637  000004                  MOV     (SP)+,@#4               ;RESTORE ERROR VECTOR
 2563  012740  000403                          BR      3$                      ;LOOP ON PRESENT TEST
 2564  012742  012767  166150  166144  2$:     MOV     NEXT,RTRN               ;SET UP NEXT TEST IN RTRN
 2565  012750  016716  166140          3$:     MOV     RTRN,(SP)               ;SET UP STACK FOR RTI
 2566  012754  000002                          RTI
 2567  012756                          4$:     ;**** END OF CODE FOR THE  X OR TESTER ******
 2568  012756  104413                          CKSWR                           ;CHECK FOR ↑G
 2569  012760  032777  040000  166112          BIT     #SW14,@SWR              ;LOOP ON CURRENT TEST ?
 2570  012766  001407                  TTST:   BEQ     1$
 2571  012770  000432                          BR      3$
 2572  012772  105777  166106                  TSTB    @TKCSR                  ;TEST TTY FLAG
 2573  012776  100027                          BPL     3$
 2574  013000  017700  166102                  MOV     @TKDBR,R0               ;CLR DONE BIT
 2575  013004  000412                          BR      2$                      ;IF A TTY KEY IS STRUCK GO TO NEXT TST
 2576  013006  032777  004000  166064  1$:     BIT     #SW11,@SWR              ;INHIBIT ITERATIONS ?
 2577  013014  001006                          BNE     2$
 2578  013016  005267  166102                  INC     LPCNT
 2579  013022  026767  166076  166072          CMP     LPCNT,ICOUNT            ;CHECK FOR ITERATION CNT FINISH
 2580  013030  101412                          BLOS    3$
 2581  013032  105067  166166          2$:     CLRB    ERRFLG
 2582  013036  005067  166052                  CLR     LPCNT
 2583  013042  012767  000005  166052          MOV     #5,ICOUNT               ;SET UP ITERATION COUNT
 2584  013050  016767  166042  166036          MOV     NEXT,RTRN               ;SET UP NEXT TEST IN RTRN
 2585  013056  016716  166032          3$:     MOV     RTRN,(SP)               ;SET UP STACK FOR RTI
 2586  013062  000002                          RTI
 2587  013064  001407                  BRW:    1407                            ;RESTORE "BEQ 1$" INSTRUCTION
 2588  013066  000432                  BRX:    432                             ;RESTORE "BR 3$" INSTRUCTION
 2589
 2590                                          ;CHECK FOR FREEZE ON CURRENT DATA
 2591
 2592  013070  104413                  .SCOP1: CKSWR                           ;CHECK  FOR ↑G
```

H05


```
2593  013072  032777  001000  166000          BIT     #SW09,@SWR
2594  013100  001402                          BEQ     1$
2595  013102  016716  166012                  MOV     LOCK,(SP)
2596  013106  000002                  1$:     RTI
2597
2598                                          ;TELETYPE OUTPUT ROUTINE
2599
2600  013110  010546                  .TYPE:  MOV     R5,-(SP)
2601  013112  017605  000002                  MOV     @2(SP),R5
2602  013116  062766  000002  000002          ADD     #2,2(SP)
2603  013124  105715                  1$:     TSTB    (R5)                    ;LOOK FOR "0"
2604  013126  001406                          BEQ     3$
2605  013130  105777  165754          2$:     TSTB    @TPCSR                  ;TEST DONE BIT
2606  013134  100375                          BPL     2$
2607  013136  112577  165750                  MOVB    (R5)+,@TPDBR            ;TYPE CHAR
2608  013142  000770                          BR      1$                      ;DO IT AGAIN UNTIL "0" IS SEEN
2609  013144  012605                  3$:     MOV     (SP)+,R5
2610  013146  000002                          RTI
2611
2612                                          ;ASCII STRING INPUT ROUTINE
2613
2614  013150  010346                  .INSTR: MOV     R3,-(SP)
2615  013152  010446                          MOV     R4,-(SP)
2616  013154  017667  000004  000010          MOV     @4(SP),.MSG
2617  013162  062766  000002  000004          ADD     #2,4(SP)
2618  013170  104402                  .INST1: TYPE
2619  013172  000000                  .MSG:   0
2620  013174  012704  016304                  MOV     #INBUF,R4
2621  013200  012703  000007                  MOV     #7,R3
2622  013204  105777  165674          1$:     TSTB    @TKCSR
2623  013210  100375                          BPL     1$
2624  013212  117714  165670                  MOVB    @TKDBR,(R4)
2625  013216  142714  000200                  BICB    #200,(R4)
2626  013222  121427  000025                  CMPB    (R4),#25                ;IS IT <^U>
2627  013226  001003                          BNE     200$
2628  013230  104402  015426                  TYPE,MCRLF
2629  013234  000755                          BR      .INST1
2630  013236  122427  000015          200$:   CMPB    (R4)+,#15
2631  013242  001403                          BEQ     INSTR2
2632  013244  117777  165636  165640          MOVB    @TKDBR,@TPDBR
2633  013252  105777  165632          2$:     TSTB    @TPCSR
2634  013256  100375                          BPL     2$
2635  013260  005303                          DEC     R3
2636  013262  001352                          BNE     1$
2637  013264  000402                          BR      .INSTG
2638  013266  010346                  .INSTE: MOV     R3,-(SP)
2639  013270  010446                          MOV     R4,-(SP)
2640  013272  104402                  .INSTG: TYPE
2641  013274  015426                          MOM
2642  013276  005737  014564                  TST     @#ROSW
2643  013302  001402                          BEQ     400$
2644  013304  104402  015426                  TYPE,MCRLF
2645  013310  000727                  400$:   BR      .INST1
2646  013312  012604                  INSTR2: MOV     (SP)+,R4
2647  013314  012603                          MOV     (SP)+,R3
2648  013316  000002                          RTI
```

```
2649
2650                                        ;CONVERT ASCII STRING TO OCTAL
2651
2652  013320  010546              .PARAM:   MOV     R5,-(SP)
2653  013322  010446                        MOV     R4,-(SP)
2654  013324  016605  000004               MOV     4(SP),R5
2655  013330  012567  000170               MOV     (R5)+,LOLIM
2656  013334  012567  000166               MOV     (R5)+,HILIM
2657  013340  012567  000164               MOV     (R5)+,DEVADR
2658  013344  112567  000162               MOVB    (R5)+,LOBITS
2659  013350  112567  000157               MOVB    (R5)+,ADRCNT
2660  013354  010566  000004               MOV     R5,4(SP)
2661  013360  005005              PARAM1:   CLR     R5
2662  013362  012704  016304               MOV     #INBUF,R4
2663  013366  122714  000015               CMPB    #15,(R4)
2664  013372  001420                        BEQ     PARERR
2665  013374  121427  000060       1$:     CMPB    (R4),#60
2666  013400  002415                        BLT     PARERR
2667  013402  121427  000067               CMPB    (R4),#67
2668  013406  003012                        BGT     PARERR
2669  013410  142714  000060               BICB    #60,(R4)
2670  013414  152405                        BISB    (R4)+,R5
2671  013416  122714  000015               CMPB    #15,(R4)
2672  013422  001414                        BEQ     LIMITS
2673  013424  006305                        ASL     R5
2674  013426  006305                        ASL     R5
2675  013430  006305                        ASL     R5
2676  013432  000760                        BR      1$
2677  013434  122714  000015       PARERR:  CMPB    #15,(R4)              ;IS FIRST CHARACTER A <CR>
2678  013440  001003                        BNE     120$
2679  013442  005737  014564               TST     @#RDSW                ;IS CKSWR ROUTINE BEING USED
2680  013446  001023                        BNE     PARTI
2681  013450  104404              120$:     INSTER
2682  013452  000742                        BR      PARAM1
2683
2684                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
2685
2686  013454  020567  000046       LIMITS:  CMP     R5,HILIM
2687  013460  101365                        BHI     PARERR
2688  013462  020567  000036               CMP     R5,LOLIM
2689  013466  103762                        BLO     PARERR
2690  013470  136705  000036               BITB    LOBITS,R5
2691  013474  001357                        BNE     PARERR
2692
2693                                        ;STORE NUMBER AT SPECIFIED ADDRESS
2694
2695  013476  016704  000026               MOV     DEVADR,R4
2696  013502  010524              1$:       MOV     R5,(R4)+
2697  013504  062705  000002               ADD     #2,R5
2698  013510  105367  000017               DECB    ADRCNT
2699  013514  001372                        BNE     1$
2700  013516  012604              PARTI:    MOV     (SP)+,R4
2701  013520  012605                        MOV     (SP)+,R5
2702  013522  000002                        RTI
2703  013524  000000              LOLIM:    0
2704  013526  000000              HILIM:    0
```

```
 2705  013530  000000                  DEVADR: 0
 2706  013532  000000                  LOBITS: 0
 2707          013533                  ADRCNT=LOBITS+1
 2708
 2709                                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
 2710
 2711  013534  016667  000004  165432  .SAV05: MOV     4(SP),SAVPC
 2712
 2713                                          ;SAVE R0-R5
 2714
 2715  013542  010567  165422          SV05:   MOV     R5,SAVR5
 2716  013546  010467  165414                  MOV     R4,SAVR4
 2717  013552  010367  165406                  MOV     R3,SAVR3
 2718  013556  010267  165400                  MOV     R2,SAVR2
 2719  013562  010167  165372                  MOV     R1,SAVR1
 2720  013566  010067  165364                  MOV     R0,SAVR0
 2721  013572  000002                          RTI
 2722
 2723                                          ;RESTORE R0-R5
 2724
 2725  013574  016700  165356          .RES05: MOV     SAVR0,R0
 2726  013600  016701  165354                  MOV     SAVR1,R1
 2727  013604  016702  165352                  MOV     SAVR2,R2
 2728  013610  016703  165350                  MOV     SAVR3,R3
 2729  013614  016704  165346                  MOV     SAVR4,R4
 2730  013620  016705  165344                  MOV     SAVR5,R5
 2731  013624  000002                          RTI
 2732
 2733                                          ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
 2734
 2735  013626  104402                  .CONVR: TYPE
 2736  013630  015426                          MCRLF
 2737  013632  010046                  .CNVRT: MOV     R0,-(SP)
 2738  013634  010146                          MOV     R1,-(SP)
 2739  013636  010346                          MOV     R3,-(SP)
 2740  013640  010446                          MOV     R4,-(SP)
 2741  013642  010546                          MOV     R5,-(SP)
 2742  013644  017601  000012                  MOV     @12(SP),R1
 2743  013650  016767  002470  165272          MOV     TEMP,TEMP3
 2744  013656  062766  000002  000012          ADD     #2,12(SP)
 2745  013664  012167  000154                  MOV     (R1)+,WRDCNT
 2746  013670  112167  000152          1$:     MOVB    (R1)+,CHRCNT
 2747  013674  112167  000147                  MOVB    (R1)+,SPRCNT
 2748  013700  013167  000144                  MOV     @(R1)+,BINWRD
 2749  013704  016704  000140          2$:     MOV     BINWRD,R4
 2750  013710  116705  000132                  MOVB    CHRCNT,R5
 2751  013714  012700  016344                  MOV     #TEMP,R0
 2752  013720  010403                  3$:     MOV     R4,R3
 2753  013722  042703  177770                  BIC     #177770,R3
 2754  013726  062703  000060                  ADD     #060,R3
 2755  013732  110320                          MOVB    R3,(R0)+
 2756  013734  006204                          ASR     R4                      ;SHIFT FOR NEXT #
 2757  013736  042704  100000                  BIC     #100000,R4              ;CLUGE TO STOP BIT 15 PROPAGATING.
 2758  013742  006204                          ASR     R4                      ;DITTO
 2759  013744  006204                          ASR     R4                      ;DITTO
 2760  013746  005305                          DEC     R5
```

```
2761  013750  001363                          BNE     3$
2762  013752  012703  016404                  MOV     #MDATA,R3
2763  013756  114023                  4$:     MOVB    -(R0),(R3)+
2764  013760  105367  000062                  DECB    CHRCNT
2765  013764  001374                          BNE     4$
2766  013766  105767  000055                  TSTB    SPACNT
2767  013772  001405                          BEQ     6$
2768  013774  112723  000040          5$:     MOVB    #040,(R3)+
2769  014000  105367  000043                  DECB    SPACNT
2770  014004  001373                          BNE     5$
2771  014006  105013                  6$:     CLRB    (R3)
2772  014010  104402                          TYPE
2773  014012  016404                          MDATA
2774  014014  005367  000024                  DEC     WRDCNT
2775  014020  001323                          BNE     1$
2776  014022  016767  165122  002314          MOV     TEMP3,TEMP
2777  014030  012605                          MOV     (SP)+,R5
2778  014032  012604                          MOV     (SP)+,R4
2779  014034  012603                          MOV     (SP)+,R3
2780  014036  012601                          MOV     (SP)+,R1
2781  014040  012600                          MOV     (SP)+,R0
2782  014042  000002                          RTI
2783  014044  000000                  WRDCNT: 0
2784  014046  000000                  CHRCNT: 0
2785          014047                  SPACNT=CHRCNT+1
2786  014050  000000                  BINWRD: 0
2787
2788                                          ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
2789                                          ;BUFFER TO THE CHARACTERS "N" AND "Y".
2790                                          ;IF THE CHARACTER IS "N" CLEAR THE FLAG
2791                                          ;IF THE CHARACTER IS "Y" SET THE FLAG
2792
2793  014052  017605  000000          .SETFLG:MOV     @(SP),R5
2794  014056  122767  000116  002220          CMPB    #'N,INBUF       ;IS IT "N" ?
2795  014064  001002                          BNE     1$
2796  014066  105015                          CLRB    (R5)    ;000
2797  014070  000406                          BR      2$
2798  014072  122767  000131  002204  1$:     CMPB    #'Y,INBUF               ;IS IT "Y" ?
2799  014100  001005                          BNE     3$
2800  014102  112715  177777                  MOVB    #-1,(R5)                ;377
2801  014106  062716  000002          2$:     ADD     #2,(SP)
2802  014112  000002                          RTI
2803  014114  104404                  3$:     INSTER                          ;RETRY
2804  014116  000755                          BR      .SETFLG
2805                                          ;TRAP DISPATCH SERVICE
2806                                          ;ARGUMENT OF TRAP IS EXTRACTED
2807                                          ;AND USED AS OFFSET TO OBTAIN POINTER
2808                                          ;TO SELECTED SUBROUTINE
2809
2810  014120  011646                  .TRPSR: MOV     (SP),-(SP)              ;GET PC OF RETURN
2811  014122  162716  000002                  SUB     #2,(SP)                 ;=PC OF TRAP
2812  014126  017616  000000                  MOV     @(SP),(SP)              ;GET TRP
2813  014132  006316                  TRPOK:  ASL     (SP)                    ;MULTIPLY TRAP ARG BY 2
2814  014134  042716  177001                  BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
2815  014140  062716  001226                  ADD     #.TRPTAB,(SP)           ;POINTER TO SUBROUTINE ADDRESS
2816  014144  017616  000000                  MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
```

```
2817  014150  000136                          JMP     @(SP)+                  ;GO TO SUBROUTINE
2818
2819                                          ;ERROR HANDLER
2820
2821  014152  104413                  .HLT:   CKSWR                           ;CHECK FOR ^G
2822  014154  032777  020000  164716          BIT     #SW13,@SWR              ;INHIBIT ERROR TYPE OUT ?
2823  014162  001061                          BNE     HALTS
2824  014164  021667  164744                  CMP     (SP),LSTERR
2825  014170  001404                          BEQ     1$
2826  014172  011667  164736                  MOV     (SP),LSTERR
2827  014176  105067  165022                  CLRB    ERRFLG
2828  014202  104406                  1$:     SAVOS
2829  014204  011605                          MOV     (SP),R5
2830  014206  162705  000002                  SUB     #2,R5
2831  014212  011504                          MOV     (R5),R4
2832  014214  006304                          ASL     R4
2833  014216  061504                          ADD     (R5),R4
2834  014220  006304                          ASL     R4
2835  014222  042704  177001                  BIC     #177001,R4
2836  014226  062704  017120                  ADD     #.ERRTAB,R4
2837  014232  012467  000040                  MOV     (R4)+,ERRMSG
2838  014236  012467  000046                  MOV     (R4)+,DATAHD
2839  014242  011467  000054                  MOV     (R4),DATABP
2840  014246  105767  164752                  TSTB    ERRFLG
2841  014252  001403                          BEQ     TYPMSG
2842  014254  005767  000042                  TST     DATABP
2843  014260  001014                          BNE     TYPDAT
2844  014262  104410                  TYPMSG: CONVRT
2845  014264  014414                          ERTABO
2846  014266  112767  177777  164730          MOVB    #-1,ERRFLG
2847  014274  104402                          TYPE
2848  014276  000000                  ERRMSG: 0
2849  014300  005767  000004                  TST     DATAHD
2850  014304  001402                          BEQ     TYPDAT
2851  014306  104402                          TYPE
2852  014310  000000                  DATAHD: 0
2853  014312  005767  000004          TYPDAT: TST     DATABP
2854  014316  001402                          BEQ     RESREG
2855  014320  104410                          CONVRT
2856  014322  000000                  DATABP: 0
2857  014324  104407                  RESREG: RESOS
2858  014326  005777  164546          HALTS:  TST     @SWR
2859  014332  100005                          BPL     EXITER
2860  014334  010046                          PUSHRO
2861  014336  016600  000002                  MOV     2(SP),RO
2862  014342  000000                          HALT
2863  014344  012600                          POPRO
2864  014346  104413                  EXITER: CKSWR                           ;CHECK FOR ^G
2865  014350  005267  164556                  INC     ERRCNT
2866  014354  032777  000400  164516          BIT     #SW08,@SWR              ;LOOP ON ERROR ?
2867  014362  001007                          BNE     1$
2868  014364  032777  002000  164506          BIT     #SW10,@SWR              ;ESCAPE TO NEXT ON ERROR ?
2869  014372  001407                          BEQ     2$
2870  014374  016767  164516  164512          MOV     NEXT,RTRN               ;SET UP FOR NEXT TEST
2871  014402  012706  001100          1$:     MOV     #STACK,SP               ;REINITIALIZE SP
2872  014406  000177  164502                  JMP     @RTRN
```

```
 2873  014412  000002                  2$:     RTI
 2874  014414  000001                  ERTABO: 1
 2875  014416     006     002                  .BYTE   6,2
 2876  014420  001174                          SAVPC
 2877                                          ;ENTER HERE ON POWER FAILURE
 2878
 2879
 2880  014422  010046                  .PFAIL: MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
 2881  014424  010146                          MOV     R1,-(SP)
 2882  014426  010246                          MOV     R2,-(SP)
 2883  014430  010346                          MOV     R3,-(SP)
 2884  014432  010446                          MOV     R4,-(SP)
 2885  014434  010546                          MOV     R5,-(SP)
 2886  014436  016746  163362                  MOV     24,-(SP)
 2887  014442  010667  164524                  MOV     SP,SAVSP                ;SAVE STACK POINTER
 2888  014446  012767  014460  163350          MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
 2889  014454  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
 2890  014456  000777                  1$:     BR      1$
 2891
 2892                                          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
 2893
 2894  014460  016706  164506          RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
 2895  014464  012605                          MOV     (SP)+,R5                ;RESTORE R0-R5
 2896  014466  012604                          MOV     (SP)+,R4
 2897  014470  012603                          MOV     (SP)+,R3
 2898  014472  012602                          MOV     (SP)+,R2
 2899  014474  012601                          MOV     (SP)+,R1
 2900  014476  012600                          MOV     (SP)+,R0
 2901  014500  012767  014422  163316          MOV     #.PFAIL,24              ;SET UP FOR POWER FAILURE
 2902  014506  012767  000340  163262          MOV     #340,PS
 2903  014514  012706  001100                  MOV     #STACK,SP
 2904  014520  005067  001620                  CLR     TEMP
 2905  014524  005267  001614          1$:     INC     TEMP
 2906  014530  001375                          BNE     1$
 2907  014532  104410                          CONVRT
 2908  014534  014556                          PFTAB
 2909  014536  104402                          TYPE
 2910  014540  015431                          MPFAIL
 2911  014542  005067  164456                  CLR     ERRFLG
 2912  014546  005067  164362                  CLR     LSTERR
 2913  014552  000177  164336                  JMP     @RTRN
 2914  014556  000001                  PFTAB:  1
 2915  014560     006     002                  .BYTE   6,2
 2916  014562  001114                          RTRN
 2917
 2918
 2919                                          ;CHECK SWITCH REGISTER ROUTINE. CHECKS FOR ↑G TO ALLOW CHANGING
 2920                                          ;OF LOC.176.
 2921                                          ;LOCATIONS USED:
 2922  014564  000000                  RDSW:   .WORD   0
 2923
 2924
 2925  014566  005737  000042          .CKSWR: TST     @#42
 2926  014572  001042                          BNE     OUT
 2927  014574  022767  000176  164276          CMP     #SWREG,SWR              ;SOFTWARE SWITCH REGISTER PRESENT
 2928  014602  001036                          BNE     OUT                     ;NO, GET OUT
```

```
 2929  014604  105777  164274                  TSTB    @TKCSR          ;YES,WAIT FOR
 2930  014610  100033                          BPL     OUT             ;READY, GET CHARACTER
 2931  014612  017767  164270  176352          MOV     @TKDBR,.MSG     ;AND STRIP OFF
 2932  014620  042767  177600  176344          BIC     #177600,.MSG    ;THE GARBAGE
 2933  014626  122767  000007  176336          CMPB    #7,.MSG         ;IS IT A <^G>
 2934  014634  001021                          BNE     OUT
 2935  014636  104402  014714                  TYPE,$CNTG
 2936  014642  005137  014564          .CNTLU: COM     @#RDSW
 2937  014646  104402  014721                  TYPE,$MSWR
 2938  014652  104411  014706                  CNVRT,SWREGC
 2939  014656  104403  014731                  INSTR,$MNEW
 2940  014662  104405                          PARAM
 2941  014664  000000                          0
 2942  014666  177777                          177777
 2943  014670  000176                          SWREG
 2944  014672     000     001          .BYTE           0,1
 2945  014674  104402  015426                  TYPE,MCRLF
 2946  014700  005037  014564          OUT:    CLR     @#RDSW
 2947  014704  000002                          RTI
 2948  014706  000001                  SWREGC: 1
 2949  014710     006     002          .BYTE   6,2
 2950  014712  000176                          SWREG
 2951  014714  005015  043536     000  $CNTG:  .ASCIZ  <15><12>/^G/
 2952  014721     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR= /
 2953  014726  020075     000
 2954  014731     040  047040  053505  $MNEW:  .ASCIZ  /  NEW= /
 2955  014736  020075     000
 2956          014742                  .EVEN
 2957  014742  005015  042012  030525  MTITLE: .ASCIZ  <15><12><12>/DU11 DZDUE-C TAPE E /<15><12>
 2958  014750  020061  055104  052504
 2959  014756  026505  020103  040524
 2960  014764  042520  042440  006440
 2961  014772  000012
 2962  014774  005015  042526  052103  MVECTO: .ASCIZ  <15><12>/VECTOR ADDRESS-/
 2963  015002  051117  040440  042104
 2964  015010  042522  051523  000055
 2965  015016  005015  051461  020124  MREGAD: .ASCIZ  <15><12>/1ST DEVICE: RECEIVER CONTROL REGISTER ADDRESS-/
 2966  015024  042504  044526  042503
 2967  015032  020072  042522  042503
 2968  015040  053111  051105  041440
 2969  015046  047117  051124  046117
 2970  015054  051040  043505  051511
 2971  015062  042524  020122  042101
 2972  015070  051104  051505  026523
 2973  015076     000
 2974  015077     015  040412  042522  MMULT:  .ASCIZ  <15><12>/ARE YOU RUNNING MULTIPLE DEVICES ? (Y OR N)-/
 2975  015104  054440  052517  051040
 2976  015112  047125  044516  042516
 2977  015120  046440  046125  044524
 2978  015126  046120  020105  042504
 2979  015134  044526  042503  020123
 2980  015142  020077  054450  047440
 2981  015150  020122  024516  000055
 2982  015156  005015  040514  052123  MLASTD: .ASCIZ  <15><12>/LAST DEVICE:RECEIVER CONTROL REGISTER ADDRESS-/
 2983  015164  042040  053105  042511
 2984  015172  035105  042522  042503
```

```
 2985  015200  053111  051105  041440
 2986  015206  047117  051124  046117
 2987  015214  051040  043505  051511
 2988  015222  042524  020122  042101
 2989  015230  051104  051505  026523
 2990  015236     000
 2991  015237     075  042504  044526  DEVICE: .ASCIZ  /=DEVICE  /
 2992  015244  042503  020040     000
 2993  015251     015  044012  053517  MCOW:   .ASCIZ  <15><12>/HOW NOW BROWN COW? ...SELECT SOMETHING TO RUN @ACTREG/
 2994  015256  047040  053517  041040
 2995  015264  047522  047127  041440
 2996  015272  053517  020077  027056
 2997  015300  051456  046105  041505
 2998  015306  020124  047523  042515
 2999  015314  044124  047111  020107
 3000  015322  047524  051040  047125
 3001  015330  040040  041501  051124
 3002  015336  043505     000
 3003  015341     015  047412  052125  MRANGE: .ASCIZ  <15><12>/OUT OF RANGE:RETYPE LAST DEVICE RXCSR ADDRESS-/
 3004  015346  047440  020106  040522
 3005  015354  043516  035105  042522
 3006  015362  054524  042520  046040
 3007  015370  051501  020124  042504
 3008  015376  044526  042503  051040
 3009  015404  041530  051123  040440
 3010  015412  042104  042522  051523
 3011  015420  000055
 3012  015422  020040  000077          MQM:    .ASCIZ  /  ?/
 3013  015426  005015     000          MCRLF:  .ASCIZ  <15><12>
 3014  015431     040  050040  053517  MPFAIL: .ASCIZ  /  POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS/
 3015  015436  051105  043040  044501
 3016  015444  052514  042522  020054
 3017  015452  051120  043517  040522
 3018  015460  020115  042522  052123
 3019  015466  051101  020124  052101
 3020  015474  052040  051505  020124
 3021  015502  047111  050040  047522
 3022  015510  051107  051505  000123
 3023  015516  005015  047105  020104  MEPASS: .ASCIZ  <15><12>/END OF PASS TAPE E/
 3024  015524  043117  050040  051501
 3025  015532  020123  040524  042520
 3026  015540  042440     000
 3027  015543     015  051012     000  MR:     .ASCIZ  <15><12>/R/
 3028  015547     015  052012  051505  MTSTPC: .ASCIZ  <15><12>/TEST PC-/
 3029  015554  020124  041520  000055
 3030  015562  005015  047514  045503  MLOCK:  .ASCIZ  <15><12>/LOCK ON SELECTED TEST? (Y OR N)-/
 3031  015570  047440  020116  042523
 3032  015576  042514  052103  042105
 3033  015604  052040  051505  037524
 3034  015612  024040  020131  051117
 3035  015620  047040  026451     000
 3036  015625     015  042012  020125  MLEVEL: .ASCIZ  <15><12>/DU PRIORITY LEVEL-/
 3037  015632  051120  047511  044522
 3038  015640  054524  046040  053105
 3039  015646  046105  000055
 3040  015652  005015  020043  043117  MSYNC:  .ASCIZ  <15><12>/# OF SYNC CHARS SELECTED ( 1 OR 2)-/
```

```
 3041  015660  051440  047131  020103
 3042  015666  044103  051101  020123
 3043  015674  042523  042514  052103
 3044  015702  042105  024040  030440
 3045  015710  047440  020122  024462
 3046  015716  000055
 3047  015720  005015  051511  051440  MWIRE6: .ASCIZ  <15><12>/IS SEC XMIT JUMPER #6 IN? (Y OR N)-/
 3048  015726  041505  054040  044515
 3049  015734  020124  052512  050115
 3050  015742  051105  021440  030066
 3051  015750  047111  020077  054450
 3052  015756  047440  020122  024516
 3053  015764  000055
 3054  015766  005015  051511  051440  MWIRE5: .ASCIZ  <15><12>/IS SEC REC JUMPER #5 IN? (Y OR N)-/
 3055  015774  041505  051040  041505
 3056  016002  045040  046525  042520
 3057  016010  020122  032443  044440
 3058  016016  037516  024040  020131
 3059  016024  051117  047040  026451
 3060  016032     000
 3061  016033     015  044412  020123  MWIRE4: .ASCIZ  <15><12>/IS OPT CLR ENABLE JUMPER #4 IN? (Y OR N)-/
 3062  016040  050117  020124  046103
 3063  016046  020122  047105  041101
 3064  016054  042514  045040  046525
 3065  016062  042520  020122  032043
 3066  016070  044440  037516  024040
 3067  016076  020131  051117  047040
 3068  016104  026451     000
 3069  016107     015  040412  042522  MEXTJ:  .ASCII  <15><12>/ARE YOU RUNNING IN MAINT MODE EXTERNAL?/
 3070  016114  054440  052517  051040
 3071  016122  047125  044516  043516
 3072  016130  044440  020116  040515
 3073  016136  047111  020124  047515
 3074  016144  042504  042440  052130
 3075  016152  051105  040516  037514
 3076  016160  005015  040401  042116          .ASCII  <15><12><1>/AND ..... DO YOU HAVE THE EXTERNAL MODEM BYPASS/
 3077  016166  027040  027056  027056
 3078  016174  042040  020117  047531
 3079  016202  020125  040510  042526
 3080  016210  052040  042510  042440
 3081  016216  052130  051105  040516
 3082  016224  020114  047515  042504
 3083  016232  020115  054502  040520
 3084  016240  051523
 3085  016242  005015  045001  046525          .ASCIZ  <15><12><1>/JUMPER CONNECTOR ON ?(Y OR N)-/
 3086  016250  042520  020122  047503
 3087  016256  047116  041505  047524
 3088  016264  020122  047117  037440
 3089  016272  054450  047440  020122
 3090  016300  024516  000055
 3091                                  .EVEN
 3092
 3093                                  ;BUFFERS FOR INPUT-OUTPUT
 3094
 3095  016304  000040                  INBUF:  .BLKB   40
 3096  016344  000040                  TEMP:   .BLKB   40
```

```
 3097  016404  000040                    MDATA:  .BLKB   40
 3098                                    ;*****************************************************************
 3099                                            ;UTILITIES
 3100                                    ;*****************************************************************
 3101
 3102                                    ;THIS UTILITY CALCULATES PRIORITY LEVEL
 3103  016444  006367  000044           DULEV:  ASL     DUPRT   ;SHIFT LEFT
 3104  016450  006367  000040                   ASL     DUPRT   ;
 3105  016454  006367  000034                   ASL     DUPRT   ;
 3106  016460  006367  000030                   ASL     DUPRT   ;
 3107  016464  006367  000024                   ASL     DUPRT   ;
 3108  016470  016767  000020  000020          MOV     DUPRT,LESS1     ;MOVE THIS TO LESS1
 3109  016476  162767  000001  000012          SUB     #1,LESS1        ;CREATE LESS1
 3110  016504  042767  000037  000004          BIC     #37,LESS1       ;CLEAR TNZVC
 3111  016512  000207                          RTS     PC
 3112  016514  000240                  DUPRT:  LEVEL5
 3113  016516  000200                  LESS1:  LEVEL4  ;LEVEL TO ALLOW INTERRUPTS
 3114
 3115                                          ;NEW DU ADDRESSES
 3116  016520  016767  000126  000422  DUADDR: MOV     DUBASE,RXCSR    ;XXX0
 3117  016526  005267  000120                  INC     DUBASE
 3118  016532  016767  000114  000412          MOV     DUBASE,HRXCSR   ;XXX1
 3119  016540  005267  000106                  INC     DUBASE
 3120  016544  016767  000102  000402          MOV     DUBASE,RXDBUF   ;XXX2
 3121  016552  016767  000074  000400          MOV     DUBASE,PARCSR   ;XXX2
 3122  016560  005267  000066                  INC     DUBASE
 3123  016564  016767  000062  000364          MOV     DUBASE,HRXDBUF  ;XXX3
 3124  016572  016767  000054  000362          MOV     DUBASE,HPARCSR  ;XXX3
 3125  016600  005267  000046                  INC     DUBASE
 3126  016604  016767  000042  000352          MOV     DUBASE,TXCSR    ;XXX4
 3127  016612  005267  000034                  INC     DUBASE
 3128  016616  016767  000030  000342          MOV     DUBASE,HTXCSR   ;XXX5
 3129  016624  005267  000022                  INC     DUBASE
 3130  016630  016767  000016  000332          MOV     DUBASE,TXDBUF   ;XXX6
 3131  016636  005267  000010                  INC     DUBASE
 3132  016642  016767  000004  000322          MOV     DUBASE,HTXDBUF  ;XXX7
 3133  016650  000207                          RTS     PC
 3134  016652  000000                  DUBASE: 0
 3135
 3136                                    ;THIS UTILITY POKES THE MAINT DATA BASED UPON THE
 3137                                    ;INFORMATION CONTAINED IN TEMP1 AND IT IS
 3138                                    ;SHIFTED IN BY THE CONTENTS OF SHIFT
 3139  016654  042777  040000  000302  RPOKE:  BIC     #MTDATA,@TXCSR,
 3140  016662  005067  162260                  CLR     TEMP2
 3141  016666  006067  162252                  ROR     TEMP1   ;FORCE CARRY
 3142  016672  006067  162250                  ROR     TEMP2   ;PICK UP CARRY IN BIT 15
 3143  016676  006267  162244                  ASR     TEMP2   ;SHIFT INTO BIT 14
 3144  016702  042767  100000  162236          BIC     #BIT15,TEMP2    ;CLR BIT 15
 3145  016710  056777  162232  000246          BIS     TEMP2,@TXCSR    ;POKE MAINT DATA
 3146  016716  042777  020000  000240          BIC     #CLK,@TXCSR     ;POKE CLK
 3147  016724  052777  020000  000232          BIS     #CLK,@TXCSR     ;
 3148  016732  005367  162202                  DEC     SHIFT
 3149  016736  001346                          BNE     RPOKE
 3150  016740  000207                          RTS     PC
 3151
 3152                                    ;THIS ROUTINE CALCULATES ODD PARITY FOR AN 8 BIT CHAR
```

```
3153  016742  016767  162176  162176  ODD8:   MOV     TEMP1,TEMP2     ;SAVE TEMP1
3154  016750  005067  162174                  CLR     TEMP3
3155  016754  012727  000010                  MOV     #8.,(PC)+
3156  016760  000000                  1$:     0
3157  016762  006067  162160          2$:     ROR     TEMP2
3158  016766  005567  162156                  ADC     TEMP3
3159  016772  005367  177762                  DEC     1$
3160  016776  001371                          BNE     2$
3161  017000  006067  162144                  ROR     TEMP3
3162  017004  103404                          BCS     3$
3163  017006  052767  000400  162130          BIS     #BIT8,TEMP1     ;SET ODD PARITY
3164  017014  000403                          BR      4$
3165  017016  042767  000400  162120  3$:     BIC     #BIT8,TEMP1     ;CLR EVEN PARITY
3166                                          ;TEMP1 NOW HAS ODD PARITY CHARACTER
3167  017024  000207                  4$:     RTS     PC
3168
3169                                  ;THIS ROUTINE CALCULATES EVEN PARITY FOR AN 8 BIT CHARACTER
3170  017026  016767  162112  16211'  EVEN8:  MOV     TEMP1,TEMP2     ;SAVE TEMP1
3171  017034  005067  162110                  CLR     TEMP3
3172  017040  012727  000010                  MOV     #8.,(PC)+
3173  017044  000000                  1$:     0
3174  017046  006067  162074          2$:     ROR     TEMP2
3175  017052  005567  162072                  ADC     TEMP3
3176  017056  005367  177762                  DEC     1$
3177  017062  001371                          BNE     2$
3178  017064  006067  162060                  ROR     TEMP3
3179  017070  103004                          BCC     3$
3180  017072  052767  000400  162044          BIS     #BIT8,TEMP1     ;SET EVEN PARITY
3181  017100  000403                          BR      4$
3182  017102  042767  000400  162034  3$:     BIC     #BIT8,TEMP1     ;CLR ODD PARITY
3183                                          ;TEMP1 NOW HAS EVEN PARITY CHARACTER
3184  017110  000207                  4$:     RTS     PC
3185  017112  062716  000002          TRPREG: ADD     #2,(SP) ;ALLOW IT TO "CRUNCH" INTO HLT BACK
3186                                          ;IN MAIN PART OF THE PROGRAM
3187  017116  000002                          RTI
3188                                  ;ERROR HLT TABLE
3189  017120  017204                  .ERRTAB:        EM0     ;HLT 0  BIT ERROR (GENERAL)
3190  017122  000000                          0
3191  017124  000000                          0
3192  017126  017220                          EM1     ;HLT 1  REGISTER ERROR
3193  017130  017371                          DH1
3194  017132  017412                          DT1
3195  017134  017262                          EM2     ;HLT 2  RECEIVER ERROR
3196  017136  017371                          DH1
3197  017140  017412                          DT1
3198  017142  017324                          EM3     ;HLT 3  TRANSMITTER ERROR
3199  017144  017371                          DH1
3200  017146  017412                          DT1
3201                                  ;DEFAULT DU ADDRESSES
3202  017150  160040                  RXCSR:  160040
3203  017152  160041                  HRXCSR: 160041
3204  017154  160042                  RXDBUF: 160042
3205  017156  160043                  HRXDBUF:        160043
3206  017160  160042                  PARCSR: 160042
3207  017162  160043                  HPARCSR:        160043
3208  017164  160044                  TXCSR:  160044
```

```
 3209  017166  160045                    HTXCSR: 160045
 3210  017170  160046                    TXDBUF: 160046
 3211  017172  160047                    HTXDBUF:        160047
 3212                                            ;DEFAULT DU VECTORS
 3213  017174  000770                    DURIV:  770     ;REC INTR VECTOR
 3214  017176  000772                    DURIS:  772     ;REC INTR STATUS
 3215  017200  000774                    DUTIV:  774     ;XMIT INTR VECTOR
 3216  017202  000776                    DUTIS:  776     ;XMIT INTR STATUS
 3217                                            ;ERROR MESSAGES
 3218  017204  036440  042440  051122    EM0:    .ASCIZ  / # ERROR PC/
 3219  017212  051117  050040  000103
 3220  017220  036440  051040  043505    EM1:    .ASCIZ  / = REGISTER ERROR PC/<15><12><1>/REGISTER  /
 3221  017226  051511  042524  020122
 3222  017234  051105  047522  020122
 3223  017242  041520  005015  051001
 3224  017250  043505  051511  042524
 3225  017256  020122  000040
 3226  017262  036440  051040  041505    EM2:    .ASCIZ  / = RECEIVER ERROR PC/<15><12><1>/REGISTER  /
 3227  017270  044505  042526  020122
 3228  017276  051105  047522  020122
 3229  017304  041520  005015  051001
 3230  017312  043505  051511  042524
 3231  017320  020122  000040
 3232  017324  036440  052040  040522    EM3:    .ASCIZ  / = TRANSMITTER ERROR PC/<15><12><1>/REGISTER  /
 3233  017332  051516  044515  052124
 3234  017340  051105  042440  051122
 3235  017346  051117  050040  006503
 3236  017354  000412  042522  044507
 3237  017362  052123  051105  020040
 3238  017370     000
 3239                                    ;DATA HEADERS FOR ERROR MESSAGES
 3240  017371     105  050130  041505    DH1:    .ASCIZ  /EXPECTED  ACTUAL/
 3241  017376  042524  020104  040440
 3242  017404  052103  040525  000114
 3243                            .EVEN
 3244                                    ;DATA TABLES FOR ERROR MESSAGES
 3245  017412  000003                    DT1:    3
 3246  017414     006     004                    .BYTE   6,4
 3247  017416  001164                            SAVR3   ;REGISTER
 3248  017420     006     004                    .BYTE   6,4
 3249  017422  001156                            SAVR0   ;EXPECTED DATA
 3250  017424     006     002                    .BYTE   6,2
 3251  017426  001160                            SAVR1   ;ACTUAL DATA
 3252     000001                         .END
```

```
AAA      002046            954#
ACTREG   001216            772#    902*    916*    917*    924*   2494    2497    2507
ADRCNT=  013533           2659*   2698*   2707#
BASEAD   001204            767#    884*    921*    922     928*    930*   2501*   2513*   2517
BASEIV   001212            770#    894*   2502*   2514*   2519    2520*   2521    2522*   2523    2524*   2525    2526*
BBB      001664            901     905#
BINWRD   014050           2748*   2749    2786#
BITW   = 002000            682#   1227    1360    1408
BIT0   = 000001            630#    658     689
BIT1   = 000002            629#    657
BIT10  = 002000            620#    648     682
BIT11  = 004000            619#    647
BIT12  = 010000            618#    646     663
BIT13  = 020000            617#    645     662     681
BIT14  = 040000            616#    644     661     680
BIT15  = 100000            615#    643     660     679    3144
BIT2   = 000004            628#    656     997
BIT3   = 000010            627#    655     688
BIT4   = 000020            626#    654     687
BIT5   = 000040            625#    653     686
BIT6   = 000100            624#    652     685
BIT7   = 000200            623#    651     684
BIT8   = 000400            622#    650     666     683    3163    3165    3180    3182
BIT9   = 001000            621#    649     665
BREAK  = 000001            689#   1048    3108    1142    1440    1510    1772    1833    1913
BRW      013064            995    1008    2587#
BRX      013066            995    1009    2588#
CARDET=  010000            646#
CCC      012620           2493    2516    2533#
CHRCNT   014046           2746*   2750    2764*   2784#   2785
CKSWR  = 104413            814#   2546    2568    2592    2821    2864
CLK    = 020000            681#   1048    1054    1055    1057    1058    1072    1073    1075    1076    1108    1113    1114
                          1116    1117    1126    1127    1142    1147    1148    1160    1161    1195    1196    1201    1202
                          1207    1210    1224    1225    1276    1277    1280    1281    1307    1308    1354    1355    1363
                          1364    1402    1403    1411    1412    1440    1448    1449    1451    1452    1510    1517    1518
                          1520    1521    1645    1652    1661    1668    1694    1701    1749    1750    1755    1756    1833
                          1839    1840    1869    1870    1913    1919    1920    1971    1972    2015    2016    2019    2020
                          2028    2205    2206    2209    2210    2237    3146    3147
CNTLU  = 104414            816#    861
CNVRT  = 104411            810#   2938
CONVRT=  104410            808#   2490    2844    2855    2907
COUNT    001142            743#   1077*   1085*   1275*   1288*   1298*   1311*   1454*   1458*   1462*   1522*   1527*   1579*
                          1583*   1587*   1746*   1774*   2378*   2382*   2423    2427*   2472
CTS    = 020000            645#
DATABP   014322           2839*   2842    2853    2856#
DATAHD   014310           2838*   2849    2852#
DEVADR   013530           2657*   2695    2705#
DEVICE   015237           2491    2991#
DH1      017371           3193    3196    3199    3240#
DISPRE   000174            710#    854
DLIGHT=  177570            600#    845
DMA    = 100000            679#
DMAINT=  000040            686#   2026    2041    2050    2216    2245    2258    2265
DSC    = 100000            643#
DSINTE=  000040            653#   1800    1806    1815    1943    1956    1960    1985
DSR    = 001000            649#
```

```
DSWR  = 177570          599#   844
DTR   = 000002          657#  1807  1935
DTI     017412         3194   3197  3200  3245#
DUADDR  016520          883   2518  3116#
DUBASE  016E52          879    882  2517*  3116  3117*  3118  3119*  3120  3121  3122*  3123  3124  3125*
                       3126   3127* 3128   3129* 3130   3131* 3132   3134#
DULEV   016444          949   3103#
DUPRT   016514          946   1791  1842  1922  2024  2063  2101  2102  2146  2214  2288  2372  2374
                       3103*  3104* 3105* 3106* 3107* 3108  3112#
DURIS   017176         1791*  1802  1803* 1812  1813* 1842* 1853  1854* 1878  1879* 1922* 1946  1947*
                       1980   1981* 2288* 2312  2313* 2320  2321* 2372* 2399  2400* 2416  2417* 2447
                       2448*  2521* 3214#
DURIV   017174          890    893   894  1790* 1802* 1812* 1841* 1853* 1878* 1921* 1933* 1946* 1980*
                       2287*  2312* 2320* 2371* 2399* 2416* 2447* 2519* 2526  3213#
DUTIS   017202         2024*  2043  2044* 2047  2048* 2063* 2082  2083* 2086  2087* 2101* 2110  2111*
                       2118   2119* 2146* 2178  2179* 2214* 2248  2249* 2262  2263* 2374* 2401  2402*
                       2418   2419* 2449  2450* 2525* 3216#
DUTIV   017200         2023*  2043* 2047* 2062* 2082* 2086* 2100* 2110* 2118* 2145* 2158* 2178* 2213*
                       2235*  2248* 2262* 2373* 2401* 2418* 2449* 2523* 3215#
EIGHT = 006000          674#  1051  1111  1145  1183  1271  1347  1396  1443  1513  1641  1743  1836
                       1916   2011  2201  2283  2355
EM0     017204         3189   3218#
EM1     017220         3192   3220#
EM2     017262         3195   3226#
EM3     017324         3198   3232#
ERRCNT  001132          736#   835* 2865*
ERRFLG  001224          782#   834* 2535*  2581*  2827*  2840  2846*  2911*
ERRMSG  014276         2837*  2848#
ERTABO  014414         2845   2874#
EVEN8   017026         3170#
EVEPAR= 001400          677#
EVPAR = 000400          666#
EXITER  014346         2859   2864#
FIVE  = 000000          671#
FRMERR= 020000          662#
HALTS   014326         2823   2858#
HDXEN = 000010          688#  1691
HILIM   013526         2656*  2686  2704#
HOLD    001136          741#  1647  1654   1663   1670   1696   1703
HPARCS  017162         3124*  3207#
HRXCSR  017152         3118*  3203#
HRXDBU  017156         3123*  3205#
HTXCSR  017166         3128*  3209#
HTXDBU  017172         3132*  3211#
ICOUNT  001122          732#  2579  2583*
INBUF   016304          957    961  2620  2662  2794  2798  3095#
INIFLG  001222          780#   840   843*
INSTER= 104404          800#   965  2681  2803
INSTR = 104403          798#   874   885   895   906   931   941   955   968   972   976   980   999
                       1012   2939
INSTR2  013312         2631   2646#
ISYMOD= 000000          670#  2281  2283
JMPBY   001203          763#   983  1629  1783  1900
KEEPAD  001206          768#   882*  884   928   930  2513
KEEPIV  001214          771#   893* 2514
LASTAD  001210          769#   911   922   936
```

```
LESS1   016516          1792   1843   1923   1938   2025   2064   2147   2215   2240   2289   2375   3108*  3109*
                        3110*  3113*
LEVEL0= 000000           640*
LEVEL1= 000040           639*
LEVEL2= 000100           638*
LEVEL3= 000140           637*
LEVEL4= 000200           636*  3113
LEVEL5= 000240           635*  3112
LEVEL6= 000300           634*
LEVEL7= 000340           633*  1795   1817   1846   1890   1927   1951   1992   2036   2051   2075   2089   2109
                        2114   2127   2156   2164   2181   2225   2253   2267   2309   2319   2396   2413   2445
                        2479
LIGHTS  001102           721*   845*   854*  2537*
LIMITS  013454          2672   2686*
LOBITS  013532          2658*  2690   2706*  2707
LOCK    001120           731*  1182*  2595
LOGICA  012652          2541*
LOKFLG  001225           783*  1002   1003
LOLIM   013524          2655*  2688   2703*
LPCNT   001124           733*   831*  2578*  2579   2582*
LSTERR  001134           737*   836*  2534*  2824   2826*  2912*
MCOM    015251          2496   2993*
MCRLF   015426          2628   2644   2736   2945   3013*
MDATA   016404          2762   2773   3097*
MEPASS  015516          2489   3023*
MEXT  = 010000           693*  1638
MEXTJ   016107           981   3069*
MINT  = 004000           692*  1048   1108   1142   1187   1268   1344   1393   1440   1510   1740   1833   1913
                        2008   2198
MLASTD  015156           907   2982*
MLEVEL  015625           942   3036*
MLOCK   015562          1000   3030*
MMULT   015077           896   2974*
MPFAIL  015431          2910   3014*
MOM     015422          2641   3012*
MR      015543          1022   3027*
MRANGE  015341           932   3003*
MREGAD  015016           875   2965*
MRESET= 000400           683*  1043   1045   1103   1105   1137   1139   1184   1186   1262   1264   1338   1340
                        1387   1389   1435   1437   1505   1507   1632   1634   1734   1736   1785   1828   1830
                        1908   1910   2002   2004   2061   2099   2144   2192   2194   2280   2282   2346   2348
MSYNC   015652           956   3040*
MTDATA= 040000           680*  1048   1108   1121   1125   1142   1154   1158   1440   1510   1833   1864   1868
                        1913   1966   1970   3139
MTITLE  014742           842   2957*
MTSTPC  015547          1013   3028*
MULTD   001202           762*   898    899    991   2492
MVECTO  014774           886   2962*
MWIPE4  016033           977   3061*
MWIPE5  015766           973   3054*
MWIPE6  015720           969   3047*
NEXT    001116           730*  1040*  1102*  1181*  1260*  1336*  1385*  1434*  1499*  1628*  1733*  1782*  1826*
                        1899*  2000*  2059*  2098*  2143*  2190*  2279*  2345*  2564   2584   2870
NOPAR = 000000           675*  1051   1111   1145   1183   1271   1347   1396   1443   1513   1641   1743   1836
                        1916   2011   2201   2283   2355
OOOPAR= 001000           676*
```

```
ODD8     016742          3153#
ONCE     001362           841     844#
OPTCLR   001201           761#    979     1786    1904
OUT      014700          2926    2928     2930    2934    2946#
OUTCRY   012612          2490    2529#
OUTMUL   002024           904     929      940#
OVRRUN=  040000           661#   1317
PARAM =  104405           802#    876      887     908     933     943     1014    2940
PARAM1   013360          2661#   2682
PARCSR   017160          1044*   1051*    1104*   1111*   1138*   1145*   1185*   1188*   1263*   1271*   1339*   1347*   1388*
                         1396*   1436*    1443*   1506*   1513*   1633*   1641*   1735*   1743*   1829*   1836*   1909*   1916*
                         2003*   2011*    2193*   2201*   2281*   2283*   2347*   2355*   3121*   3206#
PAREN =  001000           665#
PARER =  010000           663#
PARERR   013434          2664    2666     2668    2677#   2687    2689    2691
PARTI    013516          2680    2700#
PASCNT   001130           735#    833*    2536*   2537
PFTAB    014556          2908    2914#
POPRO =  012600           609#    2863
POP1SP=  005726           607#
POP2SP=  022636           611#
PS       177776           601#    828*     987*   1792*   1795*   1817*   1843*   1846*   1890*   1923*   1927*   1938*   1951*
                         1992*   2025*    2036*   2051*   2064*   2075*   2089*   2102*   2109*   2114*   2127*   2147*   2156*
                         2164*   2181*    2215*   2225*   2240*   2253*   2267*   2289*   2309*   2319*   2375*   2396*   2413*
                         2445*   2479*    2545*   2902*
PUSHRO=  010046           608#    2860
PUSH1S=  005746           606#
PUSH2S=  024646           610#
ROSW     014564          2642    2679     2922#   2936*   2946*
RECACT=  004000           647#    1062     1078    1087    1464    1533    1540    1545    1555    1565    1589
REPLAY   012516          2509    2515     2517#
RESREG   014324          2854    2857#
RESTAR   014460          2888    2894#
RESTRT   012662          2510    2539     2545#
RESOS =  104407           806#    2857
RING  =  040000           644#
RINTEN=  000100           652#    1847     1858    1883    1943    1956    1960    1985    2294    2315    2318    2383    2398
                         2421    2446
ROTADO   001220           775#    903*     915*    917     919*    924     927*    2504*   2507    2511*
RPOKE    016654          1061    1068     1084    1461    1474    1526    1539    1553    1564    1586    1599    3139#   3149
RTRN     001114           729#    838*    1017    1021*   1023    2547*   2564*   2565    2584*   2585    2870*   2872    2913
                         2916
RTS   =  000004           656#
RUNA  =  ****** U            1      33       45     108     546
RUNB  =  ****** U            1      33       45     108     546
RUNC  =  ****** U            1      33       45     108     546
RUND  =  ****** U            1      33       45     108     546
RUNE  =  ****** U            1      33       45     108     546
RUNF  =  ****** U            1      33       45     108     546
RUNIT    012422          2495    2501#    2508
RXCSR    017150          1052*   1062     1078    1087    1273*   1284    1313    1445*   1464    1468    1475    1515*   1533
                         1540    1544*    1545    1554*   1555    1559    1565    1569    1589    1593    1600    1642*   1601
                         1710    1744*    1763    1788*   1789    1796    1800*   1806*   1807*   1815*   1837*   1847*   1848
                         1858*   1883*    1906*   1917*   1928    1935*   1943*   1952    1956*   1960*   1985*   2294*   2310
                         2315*   2318*    2328    2356*   2383*   2398*   2414    2421*   2446*   2457    2531    3116*   3202#
RXDBUF   017154          1120    1129     1163    1274    1291    1318    1453    1480    1523    1574    1605    1631    1686
```

```
                    1715    1745    1767    1855    1880    1882    1936    1982    1984    2290    2311    2376    2415
                    3120*   3204*
RXDONE= 000200       651#
RXERR = 100000       660#    1317
SAVPC   001174       756#    2711*   2876
SAVR0   001156       749#    2720*   2725    3249
SAVR1   001160       750#    2719*   2726    3251
SAVR2   001162       751#    2718*   2727
SAVR3   001164       752#    2717*   2728    3247
SAVR4   001166       753#    2716*   2729
SAVR5   001170       754#    2715*   2730
SAVSP   001172       755#    2887*   2894
SAVOS = 104406       804#    2828
SCOPE = 104400       792#    1091    1172    1241    1328    1375    1427    1485    1619    1723    1776    1818    1891
                    1993    2052    2090    2131    2182    2269    2336    2480
SCOP1 = 104401       794#    1237
SEND  = 000020       687#    1187    1268    1344    1349    1352    1393    1423    1638    1740    2008    2198    2292
                    2352
SEREC   001200       760#    975
SETFLG= 104412       812#    897     973     974     978     982     1001
SEVEN = 004000       673#
SEXMIT  001177       759#    971
SHIFT   001140       742#    1059*   1066*   1082*   1118*   1135*   1149*   1170*   1207*   1211*   1221*   1231*   1278*
                    1282*   1304*   1309*   1356*   1372*   1400*   1420*   1421    1424    1459*   1472*   1524*   1537*
                    1552*   1563*   1584*   1597*   1659*   1675*   1676    1679    1692*   1708*   1752*   1757*   1758
                    1761    1859*   1871*   1961*   1973*   2013*   2021*   2203*   2211*   3148*
SIX   = 002000       672#
SPACNT= 014047      2747*   2765    2769*   2785#
SRD   = 002000       648#
STACK = 001100       602#    829     988     2871    2903
STD   = 000010       655#
STFLG   001223       781#    834#
STPSYN= 000400       650#    1273    1445    2356
SVOS    013542      2715#
SWR     001100       720#    844*    849     853*    859     862     997     1010    2569    2576    2593    2822    2858
                    2866    2868    2927
SWREG   000176       711#    853     859     2927    2943    2950
SWREGC  014706      2938    2948#
SW00  = 000001       582#    862
SW01  = 000002       581#    1010
SW02  = 000004       580#
SW03  = 000010       579#
SW04  = 000020       578#
SW05  = 000040       577#
SW06  = 000100       576#
SW08  = 000400       575#    2866
SW09  = 001000       574#    2593
SW10  = 002000       573#    2868
SW11  = 004000       572#    2576
SW12  = 010000       571#
SW13  = 020000       570#    2822
SW14  = 040000       569#    2569
SW15  = 100000       568#
SYNCMD  001176       758#    959*    963*    1041    1456    1501    1530    1581    2380
SYNEXT= 020000       669#    1138    1145    1263    1271    1339    1347    1388    1396    1633    1641    1735    1743
                    1829    1836    1909    1916    2003    2011    2193    2201
```

```
SYNINT= 030000            668#  1044  1051  1104  1111  1183  1185  1436  1443  1506  1513  2347  2355
SYNSCH= 000020            654#  1052  1273  1445  1515  1544  1554  1642  1744  1837  1917  2294  2356
SYSTST= 014000            694#  2292  2352
TEMP    016344           2743   2751  2776#  2904#  2905#  3096#
TEMP1   001144            744#  1060#  1067#  1083#  1119#  1123#  1150#  1156#  1350#  1358#  1399#  1406#  1460#
                         1473#  1525#  1538#  1585#  1598#  1860#  1866#  1962#  1968#  3141#  3153   3163#  3165#
                         3170   3180#  3182#
TEMP2   001146            745#  1151#  1152#  1159#  1162   3140#  3142#  3143#  3144#  3145   3153#  3157#  3170#
                         3174#
TEMP3   001150            746#  2743#  2776   3154#  3158#  3161#  3171#  3175#  3178#
TEMP4   001152            747#
TEMP5   001154            748#  2297#  2302#  2303   2362#  2368#  2369   2388#  2393#  2394   2437#  2442#  2443
TKCSR   001104            722#  2572   2623   2929
TKDBR   001106            723#  2574   2624   2632   2931
TLAST = 011512           1016   2407#
TPCSR   001110            724#  2603   2633
TPDBR   001112            725#  2607#  2632#
TRPOK   014132           2813#
TRPREG  017112           3185#
TSTNO   001126            734#   837#  1039#  1101#  1180#  1259#  1335#  1384#  1433#  1498#  1627#  1732#  1781#
                         1825#  1898#  1999#  2058#  2097#  2142#  2189#  2278#  2344#
TST1    002350           1015   1021   1039#  2547   2548
TST10   006054           1628   1732#
TST11   006312           1733   1781#
TST12   006532           1782   1825#
TST13   007100           1826   1898#
TST14   007556           1899   1999#
TST15   010052           2000   2058#
TST16   010236           2059   2097#
TST17   010420           2098   2142#
TST18   010614           2143   2189#
TST19   011204           2190   2278#
TST2    002652           1040   1101#
TST20   011512           2279   2344#  2482
TST21 = ****** U         2345
TST3    003250           1102   1180#
TST4    003546           1181   1259#
TST5    004050           1260   1335#
TST6    004256           1336   1384#
TST7    004472           1385   1433#
TST8    004746           1434   1498#
TST9    005476           1499   1627#
TTST    012766            994#   995#  1005#  1006#  1008#  1009#  2570#
TXCSR   017164           1043#  1045#  1048#  1054#  1055#  1057#  1058#  1072#  1073#  1075#  1076#  1103#  1105#
                         1108#  1113#  1114#  1116#  1117#  1121#  1125#  1126#  1127#  1137#  1139#  1142#  1147#
                         1148#  1154#  1158#  1160#  1161#  1184#  1186#  1187#  1189   1195#  1196#  1197   1201#
                         1202#  1203   1209#  1210#  1213   1224#  1225#  1227   1262#  1264#  1268#  1276#  1277#
                         1280#  1281#  1307#  1308#  1338#  1340#  1344#  1348   1349#  1352#  1354#  1355#  1363#
                         1364#  1365   1387#  1389#  1393#  1397   1402#  1403#  1411#  1412#  1413#  1423#  1435#
                         1437#  1440#  1448#  1449#  1451#  1452#  1505#  1507#  1510#  1517#  1518#  1520#  1521#
                         1632#  1634#  1638#  1645#  1652#  1661#  1668#  1691#  1694#  1701#  1734#  1736#  1740#
                         1749#  1750#  1755#  1756#  1772#  1785#  1828#  1830#  1833#  1839#  1840#  1864#  1868#
                         1869#  1870#  1908#  1910#  1913#  1919#  1920#  1966#  1970#  1971#  1972#  2002#  2004#
                         2008#  2015#  2016#  2019#  2020#  2026#  2028#  2037   2041#  2050#  2061#  2065#  2070#
                         2076#  2077   2099#  2103#  2108#  2115#  2144#  2148#  2166   2180#  2192#  2194#  2198#
                         2205#  2206#  2209#  2210#  2216#  2226   2230   2237#  2245#  2254   2258#  2265#  2280#
```

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                    2282*  2292*  2346*  2348*  2352*  2384*  2397*  2422*  2436*  3126*  3139*  3145*  3146*
                    3147*  3208#
TXDBUF  017170      1193*  1272*  1299*  1351*  1398*  1643*  1678*  1747*  1760*  2012*  2202*  2238*  2286*
                    2387*  2435*  3130*  3210#
TXDONE= 000200       684#
TXINTE= 000100       685#  2065   2070   2076   2103   2108   2115   2148   2180   2216   2245   2258   2265
                    2384   2397   2422   2436
TYPDAT  014312      2843   2850   2853#
TYPE  = 104402       796#   842   1022   2488   2491   2496   2618   2628   2640   2644   2735   2772   2847
                    2851   2909   2935   2937   2945
TYPMSG  014262      2841   2844#
USER  = 000000       691#
VOID  = 000001       658#
WRDCNT  014044      2745*  2774*  2783#
ZERO    012430      2502#
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                    1434   1435#  1499   1500#  1628   1629#  1733   1734#  1782   1783#  1826   1827#  1899
                    1900#  2000   2001#  2059   2060#  2098   2099#  2143   2144#  2190   2191#  2279   2280#
                    2345   2346#
$MNEW   014731      2939   2954#
$MSWR   014721      2937   2952#
$N    = 000024       552#  1039   1041#  1101   1103#  1180   1183#  1259   1261#  1335   1337#  1384   1386#
                    1433   1435#  1498   1500#  1627   1629#  1732   1734#  1781   1783#  1825   1827#  1898
                    1900#  1999   2001#  2058   2060#  2097   2099#  2142   2144#  2189   2191#  2278   2280#
                    2344   2346#  2482#
$Y    = 000015       784#   792    794#   796#   798#   800#   802#   804#   806#   808#   810#   812#   814#
                    816#   818#
.     = 017430       696#   699#   709#   716#  2956#  3095#  3096#  3097#
.BEGIN  002156       864    987#
.CKSWR  014566       815   2925#
.CNTLU  014642       817   2936#
.CNVRT  013632       811   2737#
.CONVR  013626       809   2735#
.EOP    012354      2345   2488#
.ERRTA  017120      2836   3189#
.HLT    014152       702   2821#
.INSTE  013266       801   2638#
.INSTG  013272      2637   2640#
.INSTR  013150       799   2614#
.INST1  013170      2618#  2629   2645
.MSG    013172      2616*  2619#  2931*  2932*  2933
.PARAM  013320       803   2652#
.PFAIL  014422       700    830   2880#  2901
.RESOS  013574       807   2725#
.SAVOS  013534       805   2711#
.SCOPE  012704       793   2552#
.SCOP1  013070       795   2592#
.SETFL  014052       813   2793#  2804
.START  001260       712    828#   838   2500
.TRPSR  014120       704   2810#
.TRPTA  001226       789#  2815
.TYPE   013110       797   2600#
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HLT       612#  1064  1080  1089  1132  1166  1191  1199  1205  1235  1286  1294  1315  1321  1369
         1417   1466  1470  1477  1483  1535  1542  1547  1557  1561  1567  1571  1577  1591  1595
         1602   1608  1683  1689  1712  1718  1765  1770  1798  1816  1850  1886  1888  1930  1944
         1954   1988  1990  2033  2039  2071  2079  2128  2153  2168  2170  2221  2228  2232  2246
         2256   2305  2326  2334  2403  2451  2455  2463  2468  2474
PRGEND    552#  2481
PRGFRT    552#   553
PUSSYF    552#  1645  1660  1693
RSETUP    552#  1043  1103  1137  1435  1505  1828  1908
TSETUP    552#  1262  1338  1387  1632  1734  2002  2192  2246
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$BINAR    552#
$BUFFE    552#  3092
$CABLE    552#
$CATCH    552#   695
$CURVE    552#   844
$CONVR    552#  2732
$DNA      552#
$EOP      552#  2481
$GETFL    552#   895   968   972   976   980   999
$GETPA    552#   874   885   905   931   940  1012
$GETSY    552#   950
$HEADE    552#   553
$HLT      552#  2818
$INSTR    552#  2611
$ISOB     552#
$MATCH    552#
$MRR      552#
$MRRW     552#
$MRW      552#
$MSG      552#  2957
$PARAM    552#  2649
$PFAIL    552#  2877
$POKE     552#  1195  1201  1208  1223  1276  1279  1306  1354  1362  1402  1410  1749  1754  2015
         2018   2205  2208
$POKER    552#  1056  1071  1074  1112  1115  1146  1450  1519  1838  1915
$RCNET    552#
$RECAC    552#
$REG      552#  2708
$RESET    552#  1043  1045  1103  1105  1137  1139  1262  1264  1338  1340  1387  1389  1435  1437
         1505   1507  1632  1634  1734  1736  1785  1828  1830  1908  1910  2002  2004  2061  2099
         2144   2192  2194  2280  2282  2346  2348
$RXACT    552#
$SCOPE    552#  2549
$SCOPI    552#  2589
$SETFL    552#  2787
$SETVE    552#   696
$START    552#   8c8
$STRIP    552#
$SYMBO    552#   565
$SYNCR    552#  1052  1515
$TRAPS    552#   784
$TRPAR    552#
$TRPDE    552#   792   794   796   798   800   802   804   806   808   810   812   814   816
$TRPSR    552#  2805
$TSTNO    552#  1039  1101  1180  1259  1335  1384  1433  1498  1627  1732  1781  1825  1898  1999
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DZDUE-C MACY11 27.1006)  31-DEC-76  09:42  PAGE 84
DZDUEC.P11    05-AUG-76 00:00          CROSS REFERENCE TABLE -- MACRO NAMES                                    SEQ 0079

          2058    2097    2142    2189    2278    2344
$TYPE      552#   2597
$UNIBU     552#
$VARIA     552#    715
$WORDF     552#
$WORDO     552#
$WORDP     552#


. ABS.  017430     000


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

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 RUN-TIME:  19 30 3 SECONDS
 RUN-TIME RATIO: 172/53=3.2
 CORE USED:  18K  (35 PAGES)
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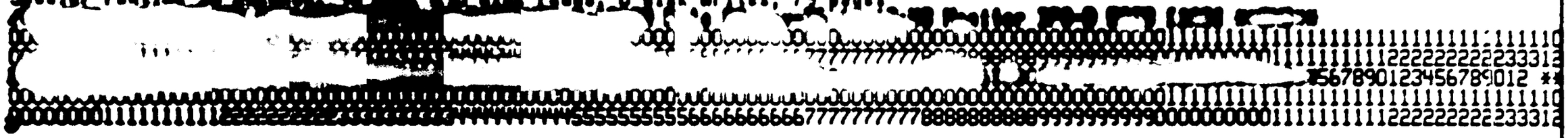
C07


Spooler runtime 10 Seconds, 35 MCS, 250 disk reads, 0 disk writes, 79 pages
3456789012345678901234567890123456789012 **