DU11

COMBINED EXERCISER

MD-11-DDDUA-A

EP-DDDUA-A-DL-A

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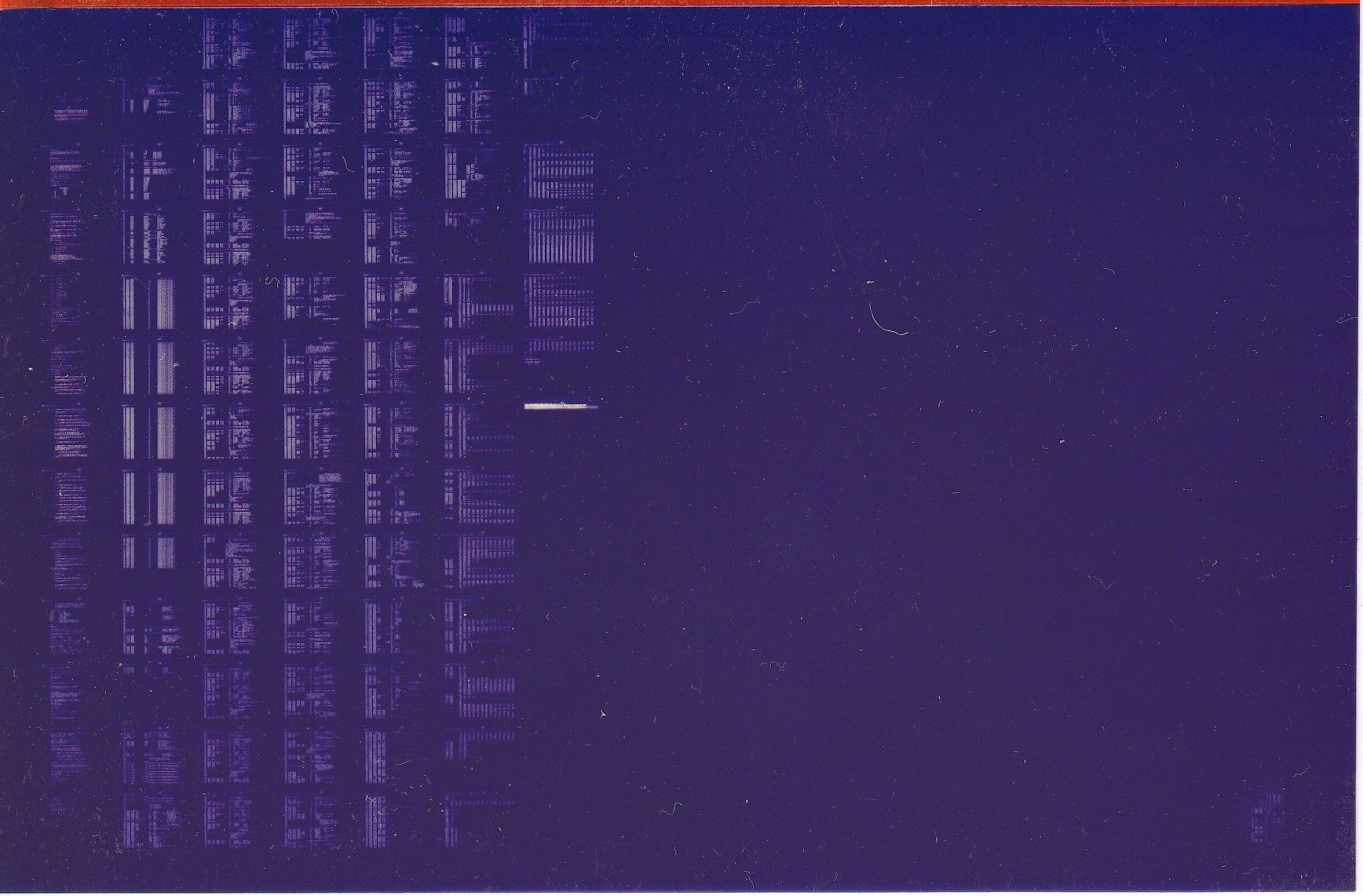

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DDDUA-A-D
PRODUCT NAME:	DU11 OFFLINE COMBINED EXERCISER
DATE RELEASED:	21 DECEMBER 1975
MAINTAINER:	DIAGNOSTIC GROUP

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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.

THIS DIAGNOSTIC CAN BE RUN WITH OR WITHOUT A
CONSOLE TELETYPE.

THE AUTOSIZER PROGRAM MUST BE RUN PRIOR TO THIS DIAGNOSTIC

TO MAKE SURE THAT THE DEVICE EXISTS IN THE SYSTEM.

1. THE DU11 OFFLINE COMBINED EXERCIZER FOR PRODUCTION TESTS
THAT THE TRANSMITTER AND RECEIVER CHIPS WORK PROPERLY,PERFORM
TESTING OF THE ASSOCIATED LOGIC ON THE OPTION,AND CHECK THE
OPERATION OF THE INTERRUPT LOGIC. IT CAN BE USED ON THE
"XOR" ,DDP,ACT 11,AND THE "CHIP TESTER".
TO USE ON THE "XOR" TESTER ,THE BRANCH AROUND THE "XOR"
CODE MUST BE PATCHED TO A "NOP". (SEE LISTINGS FOR DETAILS)

2. REQUIREMENTS

PDP-11 FAMILY STANDARD COMPUTER WITH MINIMUM 4K MEMORY

DU11 SYNCRONOUS/ISOCRONOUS OPTION

ONE CONSOLE TELETYPE OR EQUIVALENT --- OPTIONAL.

2.2 STORAGE
THE PROGRAM LOADS INTO 4K OF MEMORY WITH BOOTSTRAP

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

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 AND ONLY IF THERE IS A TTY, THAT
IS, THERE CAN BE CONVERSATION BETWEEN TTY AND THE SYSTEM)
SW01=1

4.1.4 TO LOCK ON SELECTED TEST AFTER A PROGRAM RESTART
(ONLY IN SINGLE DEVICE TESTS AND ONLY IF THERE IS A TTY)

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

EITHER A) ONLY IF THERE IS NO TTY ---

4.3.1.1 LOAD PROGRAM INTO MEMORY WITH ABSOLUTE LOADER

4.3.1.2 PATCH THE TAGS TPCSR AND TPDBR WITH 177570

4.3.1.3 LOAD ADDRESS 000200

4.3.1.4 CLEAR CONSOLE SWITCHES

4.3.1.5 SET SW15=1, SW07=1, SW06=1

4.3.1.6 PRESS START

IF THERE ARE NO ERRORS,PROGRAM WILL RUN
FOR ABOUT 22 SECONDS,AT THE END OF WHICH THERE
WILL BE "5" ON THE DISPLAY LIGHTS FOR COUPLE
OF SECONDS AND THEN PROGRAM WILL HALT AT ADDRESS
252 FOR END OF PASS. PRESS CONTINUE TO CONTINUE THE PROGRAM.
IF ANY ERROR ENCOUNTERED, PROGRAM WILL HALT AT ADDRESS 14340

TO DETERMINE TYPE OF ERROR:

4.3.1.7 LOAD ADDRESS 017400

4.3.1.8 PRESS EXAMINE

CONTENT OF THIS LOCATION IS -- - RECEIVER ERROR PC

4.3.1.9 PRESS EXAMINE

CONTENT IS --- ADDRESS OF REGISTER

4.3.1.10 PRESS EXAMINE

CONTENT IS --- EXPECTED VALUE

4.3.1.11 PRESS EXAMINE

CONTENT IS --- ACTUAL VALUE

TO TEST IF THERE IS ANY MORE ERROR IN ANY OTHER TEST

4.3.1.12 LOAD ADDRESS 000200

4.3.1.13 CLEAR CONSOLE SWITCHES

4.3.1.14 SET SW15 = 1

4.3.1.15 SET SW11 = 1

4.3.1.16 SET SW07 = 1

4.3.1.17 SET SW06 = 1

4.3.1.18 PRESS START

PROGRAM WILL HALT FOR THE FIRST ERROR THAT WAS JUST OBSERVED

4.3.1.19 PRESS CONTINUE (SW15 = 1, SW11 = 1, SW07 = 1)

IF THE PROGRAM HALTS AT ADDRESS 014340:

4.3.1.20 LOAD ADDRESS 017400

4.3.1.21 PRESS EXAMINE

CONTENT IS THE NEW RECEIVER ERROR PC FOR THE 2ND ERROR.

NEXT THREE LOCATIONS CONTAIN

ADDRESS OF THE REGISTER,EXPECTED VALUE,AND ACTUAL VALUE

TESTS 4.3.1.12 THRU 4.3.1.21 CAN BE REPEATED FOR ANY

FURTHER ERROR.

OR B) IF THERE IS A TTY ---

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

4.3.1.5 THE PROGRAM WILL TYPE "DU11 DDDUA-A TAPE COMBINED EXERCIZER" (ONCE ONLY)
4.3.1.6 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT IS ABOUT
TO START TESTING ,AND THEN TESTING WILL BEGIN

IF THE SYSTEM DOES NOT HAVE A TTY DO NOT

PERFORM THE FOLLOWING STEPS :

4.3.2, 4.3.3, 4.3.4, 4.3.5

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

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 IN ? (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

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
†HAT 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

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

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                    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

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
        SW09 =1         LOOP ON ERROR
        SW06 =1         HALT ON END OF PASS
        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

5.1.1   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 CLR 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

9.1 THIS PROGRAM PERFORMS THE OFFLINE COMBINED (TRANSMITTER & RECEIVER)
TIMING & INTERRUPT TESTING OF THE DEVICE
SEE LISTING FOR DETAILS

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

11. LISTINGS

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                                .LIST   LOC,BIN,SEQ
                                .ENABLE ABS

                                .ENABLE AMA
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                                .ENABLE ABS

                                ;DU11 DDDUA-A TAPE COMBINED EXERCIZER
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                                        ;STARTING PROCEDURE
                                        ;LOAD PROGRAM
                                        ;LOAD ADDRESS 000200
                                        ;PRESS START
                                        ;PROGRAM WILL TYPE "DU11 DDDUA-A TAPE COMBINED EXERCIZER"
                                        ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                        ;AT THE END OF A PASS, PROGRAM WILL TYPE "END OF PASS TAPE DDDUA-A"
                                        ;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                          SWR=177570      ;CONSOLE SWITCH REGISTER
177570                          LIGHTS=177570   ;PDP-11/45 DISPLAY REGISTER
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
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```
000000                  LEVEL0=000
                        ;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                  STPSYN=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                  DNAINTE=BIT5            ;DNA INTR ENAB
000020                  SEND=BIT4               ;SEND
000010                  HDXEN=BIT3              ;HDX/FDX
000001                  BREAK=BIT0              ;BREAK
                                ;TXCSR WRD DEFINITIONS
000000                  USER=0                  ;USER MODE
004000                  MINT=4000               ;MAINT INT MODE
010000                  MEXT=10000              ;MAINT EXT MODE
014000                  SYSTST=14000            ;SYSTEM TEST MODE
```

```
                                                ;TRAPCATCHER FOR ILLEGAL INTERRUPTS
                        000000          .=0
000000  000002                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000002  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000004  000006                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000006  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000010  000012                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000012  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000014  000016                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000016  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000020  000022                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000022  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000024  000026                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000026  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000030  000032                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000032  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000034  000036                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000036  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000040  000042                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000042  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000044  000046                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000046  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000050  000052                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000052  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000054  000056                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000056  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000060  000062                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000062  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000064  000066                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000066  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000070  000072                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000072  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000074  000076                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000076  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000100  000102                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000102  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000104  000106                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000106  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000110  000112                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000112  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000114  000116                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000116  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000120  000122                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000122  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000124  000126                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000126  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000130  000132                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000132  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000134  000136                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000136  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000140  000142                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000142  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000144  000146                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000146  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
000150  000152                  .+2           ;UNEXPECTED TRAP TO THIS LOCATION
000152  000000                  HALT          ;EXAMINE STACK TO FIND CAUSE
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834  000154  000156                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
835  000156  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
836  000160  000162                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
837  000162  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
838  000164  000166                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
839  000166  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
840  000170  000172                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
841  000172  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
842  000174  000176                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
843  000176  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
844  000200  000202                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
845  000202  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
846  000204  000206                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
847  000206  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
848  000210  000212                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
849  000212  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
850  000214  000216                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
851  000216  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
852  000220  000222                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
853  000222  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
854  000224  000226                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
855  000226  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
856  000230  000232                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
857  000232  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
858  000234  000236                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
859  000236  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
860  000240  000242                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
861  000242  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
862  000244  000246                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
863  000246  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
864  000250  000252                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
865  000252  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
866  000254  000256                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
867  000256  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
868  000260  000262                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
869  000262  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
870  000264  000266                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
871  000266  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
872  000270  000272                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
873  000272  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
874  000274  000276                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
875  000276  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
876  000300  000302                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
877  000302  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
878  000304  000306                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
879  000306  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
880  000310  000312                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
881  000312  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
882  000314  000316                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
883  000316  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
884  000320  000322                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
885  000322  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
886  000324  000326                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
887  000326  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
888  000330  000332                  .+2             ;UNEXPECTED TRAP TO THIS LOCATION
889  000332  000000                  HALT            ;EXAMINE STACK TO FIND CAUSE
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  890  000334  000336                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  891  000336  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  892  000340  000342                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  893  000342  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  894  000344  000346                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  895  000346  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  896  000350  000352                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  897  000352  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  898  000354  000356                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  899  000356  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  900  000360  000362                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  901  000362  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  902  000364  000366                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  903  000366  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  904  000370  000372                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  905  000372  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  906  000374  000376                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  907  000376  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  908  000400  000402                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  909  000402  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  910  000404  000406                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  911  000406  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  912  000410  000412                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  913  000412  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  914  000414  000416                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  915  000416  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  916  000420  000422                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  917  000422  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  918  000424  000426                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  919  000426  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  920  000430  000432                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  921  000432  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  922  000434  000436                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  923  000436  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  924  000440  000442                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  925  000442  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  926  000444  000446                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  927  000446  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  928  000450  000452                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  929  000452  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  930  000454  000456                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  931  000456  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  932  000460  000462                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  933  000462  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  934  000464  000466                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  935  000466  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  936  000470  000472                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  937  000472  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  938  000474  000476                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  939  000476  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  940  000500  000502                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  941  000502  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  942  000504  000506                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  943  000506  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  944  000510  000512                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  945  000512  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
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  946  000514  000516                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  947  000516  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  948  000520  000522                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  949  000522  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  950  000524  000526                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  951  000526  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  952  000530  000532                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  953  000532  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  954  000534  000536                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  955  000536  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  956  000540  000542                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  957  000542  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  958  000544  000546                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  959  000546  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  960  000550  000552                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  961  000552  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  962  000554  000556                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  963  000556  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  964  000560  000562                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  965  000562  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  966  000564  000566                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  967  000566  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  968  000570  000572                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  969  000572  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  970  000574  000576                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  971  000576  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  972  000600  000602                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  973  000602  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  974  000604  000606                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  975  000606  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  976  000610  000612                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  977  000612  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  978  000614  000616                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  979  000616  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  980  000620  000622                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  981  000622  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  982  000624  000626                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  983  000626  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  984  000630  000632                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  985  000632  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  986  000634  000636                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  987  000636  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  988  000640  000642                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  989  000642  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  990  000644  000646                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  991  000646  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  992  000650  000652                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  993  000652  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  994  000654  000656                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  995  000656  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  996  000660  000662                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  997  000662  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
  998  000664  000666                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
  999  000666  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
 1000  000670  000672                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
 1001  000672  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
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1002  000674  000676                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1003  000676  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1004  000700  000702                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1005  000702  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1006  000704  000706                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1007  000706  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1008  000710  000712                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1009  000712  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1010  000714  000716                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1011  000716  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1012  000720  000722                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1013  000722  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1014  000724  000726                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1015  000726  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1016  000730  000732                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1017  000732  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1018  000734  000736                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1019  000736  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1020  000740  000742                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1021  000742  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1022  000744  000746                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1023  000746  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1024  000750  000752                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1025  000752  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1026  000754  000756                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1027  000756  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1028  000760  000762                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1029  000762  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1030  000764  000766                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1031  000766  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1032  000770  000772                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1033  000772  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
1034  000774  000776                .+2             ;UNEXPECTED TRAP TO THIS LOCATION
1035  000776  000000                HALT            ;EXAMINE STACK TO FIND CAUSE
```

```
                                        ;STANDARD INTERRUPT VECTORS


                    000024              .=24
000024  014414                          .PFAIL              ;POWER FAIL HANDLER
000026  000340                          340                 ;SERVICE AT LEVEL 7
000030  014122                          .HLT                ;ERROR HANDLER
000032  000340                          340                 ;SERVICE AT LEVEL 7
000034  014070                          .TRPSRV             ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                          340                 ;SERVICE AT LEVEL 7
                    000200              .=200
000200  000137  001246                  JMP     .START      ;GO TO START OF PROGRAM

                    000250              .=250
000250  000000                  EOPHLT: HALT                ;THIS IS AN END OF PASS HALT,
                                                            ;NOT AN ERROR HALT.
                                                            ;THIS HAPPENS ONLY IF SW6
                                                            ;IS UP.PRESS CONTINUE
                                                            ;TO RESUME PROGRAM

000252  000207                          RTS     PC


                    001100              .=1100

                                        ;INDIRECT POINTERS TO TELETYPE VECTORS AND REGISTERS

001100  177560              TKCSR:     177560              ;TELETYPE KEYBOARD CONTROL REGISTER
001102  177562              TKDBR:     177562              ;TELETYPE KEYBOARD DATA BUFFER
001104  177564              TPCSR:     177564              ;TELEPRINTER CONTROL REGISTER
001106  177566              TPDBR:     177566              ;TELEPRINTER DATA BUFFER

                                        ;PROGRAM CONTROL PARAMETERS

001110  000000              RETURN:    0                   ;SCOPE ADDRESS FOR LOOP ON TEST
001112  000000              NEXT:      0                   ;ADDRESS OF NEXT TEST TO BE EXECUTED
001114  000000              LOCK:      0                   ;ADDRESS FOR LOCK ON CURRENT DATA
001116  000000              ICOUNT:    0       ;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE EXECUTED
001120  000000              LPCNT:     0                   ;NUMBER OF ITEREATIONS COMPLETED
001122  000000              TSTNO:     0                   ;NUMBER OF TEST IN PROGRESS
001124  000000              PASCNT:    0                   ;NUMBER OF PASSES COMPLETED
001126  000000              ERRCNT:    0                   ;TOTAL NUMBER OF ERRORS
001130  000000              LSTERR:    0                   ;PC OF LAST ERROR CALL

                                        ;PROGRAM VARIABLES

001132  000020              HOLD:      20          ;TEMPORARY STORAGE=DELAY TIME FOR CABLES
001134  000000              SHIFT:     0           ;TEMPORARY STORAGE= # OF SHIFTS PER CHAR
001136  000000              COUNT:     0           ;TEMPORARY STORAGE= # OF TIMES A CHAR WILL BE SENT
001140  000000              TEMP1:     0                   ;TEMPORARY STORAGE
001142  000000              TEMP2:     0                   ;TEMPORARY STORAGE
001144  000000              TEMP3:     0                   ;TEMPORARY STORAGE
001146  000000              TEMP4:     0                   ;TEMPORARY STORAGE
001150  000000              TEMP5:     0                   ;TEMPORARY STORAGE
001152  000000              SAVR0:     0                   ;R0 STORAGE
```

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 1092  001154  000000                SAVR1:  0                       ;R1 STORAGE
 1093  001156  000000                SAVR2:  0                       ;R2 STORAGE
 1094  001160  000000                SAVR3:  0                       ;R3 STORAGE
 1095  001162  000000                SAVR4:  0                       ;R4 STORAGE
 1096  001164  000000                SAVR5:  0                       ;R5 STORAGE
 1097  001166  000000                SAVSP:  0                       ;STACK POINTER STORAGE
 1098  001170  000000                SAVPC:  0                       ;PROGRAM COUNTER STORAGE
```

```
1099                                    ;PROGRAM CONVERSATIONAL PARAMETERS
1100  001172    377           SYNCNO: .BYTE   377     ;# OF SYNC CHARS REQ'D FOR SYNC'ZATION
1101  001173    377           SEXMIT: .BYTE   377     ;SEC XMIT JUMPER "IN"
1102  001174    377           SEREC:  .BYTE   377     ;SEC REC JUMPER "IN"
1103  001175    377           OPTCLR: .BYTE   377     ;OPTIONAL JUMPER CLR "IN"
1104  001176    000           MULTD:  .BYTE   0       ;NO MULTIPLE DEVICE FLAG
1105  001177    377           JMRBY:  .BYTE   377     ;EXTERNAL MODEM BYPASS JUMPER "IN"
1106                                    .EVEN
1107
1108                                    ;PROGRAM MULTIPLE DEVICE PARAMETERS
1109  001200  000000           BASEADD:        0       ;PROG CONTROLLED 1ST DEVICE ADDR
1110  001202  000000           KEEPADD:        0       ;SAVED 1ST DEVICE ADDR
1111  001204  000000           LASTADD:        0       ;LAST DEVICE RXCSR ADDR
1112  001206  000000           BASEIV:         0       ;PROG CONTROLLED IV
1113  001210  000000           KEEPIV:         0       ;SAVED INTR VECTOR
1114  001212  000000           ACTREG:         0       ;ACTIVE REGISTER ,,,MODIFY THIS
                                                       ;LOCATION TO DISQUALIFY OR QUALIFY
1115                                                   ;DEVICES (1= RUN,,,0= DON'T RUN)
1116
1117  001214  000000           ROTADD:         0       ;ROTATING POINTER FOR ACTREG..POINTS
                                    ;TO DEVICE PRESENTLY UNDER TEST WHEN RUNNING MULTIPLE DEVICES
1118
1119
1120                                    ;PROGRAM CONTROL FLAGS
1121
1122  001216    000           INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
1123  001217    000           STFLG:  .BYTE   0               ;TEST START FLAG
1124  001220    000           ERRFLG: .BYTE   0               ;ERROR OCCURED FLAG
1125  001221    000           LOKFLG: .BYTE   0               ;LOCK ON CURRENT TEST FLAG
1126
1127                                    ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
1128                                    ;POINTERS TO SUBROUTINES CAN BE FOUND
1129                                    ;IN THE TABLE IMMEDIATLY FOLLOWING THE DEFINITIONS
1130
1131  001222                    .TRPTAB:
1132                            ;*******************************************************************************
1133          104400                    SCOPE=TRAP+0    ;CALL TO SCOPE LOOP AND ITERATION HANDLER
1134  001222  013032            .SCOPE
1135                            ;*******************************************************************************
1136          104401                    SCOP1=TRAP+1    ;CALL TO LOOP ON CURRENT DATA HANDLER
1137  001224  013214            .SCOP1
1138                            ;*******************************************************************************
1139          104402                    TYPE=TRAP+2     ;CALL TO TELETYPE OUTPUT ROUTINE
1140  001226  013232            .TYPE
1141                            ;*******************************************************************************
1142          104403                    INSTR=TRAP+3    ;CALL TO ASCII STRING INPUT ROUTINE
1143  001230  013264            .INSTR
1144                            ;*******************************************************************************
1145          104404                    INSTER=TRAP+4   ;CALL TO INPUT ERROR HANDLER
1146  001232  013356            .INSTER
1147                            ;*******************************************************************************
1148          104405                    PARAM=TRAP+5    ;CALL TO NUMERICAL DATA INPUT ROUTINE
1149  001234  013366            .PARAM
1150                            ;*******************************************************************************
1151          104406                    SAV05=TRAP+6    ;CALL TO REGISTER SAVE ROUTINE
1152  001236  013552            .SAV05
1153                            ;*******************************************************************************
1154          104407                    RES05=TRAP+7    ;CALL TO REGISTER RESTORE ROUTINE
```

```
                                .RESO5
                                ;*************************************************************************
                                        CONVRT=TRAP+10  ;CALL TO DATA OUTPUT ROUTINE
                                .CONVRT
                                ;*************************************************************************
                                        SETFLG=TRAP+11  ;CALL TO FLAG SET ROUTINE
                                .SETFLG

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

001246  012737  000340  177776  .START: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
001254  012706  001100          MOV     #STACK,SP               ;SET UP STACK
001260  012737  014414  000024  MOV     #.PFAIL,@#24            ;SET UP POWER FAIL VECTOR
001266  005037  001120          CLR     LPCNT   ;CLEAR # OF ITERATION COMPLETED LOCATION
001272  105037  001217          CLRB    STFLG                   ;CLEAR START FLAG
001276  005037  001124          CLR     PASCNT                  ;CLEAR PASS COUNT
001302  105037  001220          CLRB    ERRFLG                  ;CLEAR ERROR FLAG
001306  005037  001126          CLR     ERRCNT                  ;CLEAR ERROR COUNT
001312  005037  001130          CLR     LSTERR                  ;CLEAR LAST ERROR POINTER
001316  012737  000001  001122  MOV     #1,TSTNO                ;SET UP FOR TEST 1
001324  012737  001246  001110  MOV     #.START,RETURN          ;SET UP FOR POWER FAIL BEFORE
                                                                ;TESTING STARTS
001332  105737  001216          TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED
001336  001004                  BNE     ONCE
001340  104402  014556          TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
001344  105137  001216          COMB    INIFLG                  ;IF NOT SET FLAG AND DO
001350  032737  000001  177570  ONCE:   BIT     #SW00,SWR       ;RESELECT VECTOR & CONTROL REG?
001356  001002                  BNE     1$
001360  000137  002032          JMP     .BEGIN
001364  012700  000300          1$:     MOV     #300,R0 ;RESTORE VECTOR AREA TO TRAPCATCHER
001370  012701  000302          MOV     #302,R1 ;START AT LOCATION 300
001374  012702  000004          MOV     #4,R2
001400  010110                  2$:     MOV     R1,(R0)
001402  005011                  CLR     (R1)
001404  060200                  ADD     R2,R0
001406  060201                  ADD     R2,R1
001410  022701  001000          CMP     #1000,R1        ;END AT LOCATION 776
001414  002771                  BLT     2$
001416  104403                  INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
001420  014653                  MREGAD  ;MESSAGE
001422  104405                  PARAM   ;CONVERT STRING
001424  160000                  160000  ;LOW LIMIT
001426  167776                  167776  ;HIGH LIMIT
001430  016524                  DUBASE  ;STORE AT THIS LOCATION
001432     001          .BYTE   1       ;MASK
001433     001          .BYTE   1       ;HOW MANY TIMES + 2
001434  013737  016524  001202  MOV     DUBASE,KEEPADD  ;SAVE
001442  004737  016372          JSR     PC,DUADDR
001446  013737  001202  001200  MOV     KEEPADD,BASEADD ;RESTORE FOR ROTATION
001454  104403                  INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
001456  014631                  MVECTO  ;MESSAGE
```

```
1211  001460  104405                          PARAM   ;CONVERT STRING
1212  001462  000300                          300     ;LOW LIMIT
1213  001464  000776                          776     ;HIGH LIMIT
1214  001466  017046                          DURIV   ;STORE AT THIS LOCATION
1215  001470     001                  .BYTE    1       ;MASK
1216  001471     004                  .BYTE    4       ;HOW MANY TIMES + 2
1217  001472  013737  017046  001210          MOV     DURIV,KEEPIV    ;SAVE
1218  001500  013737  017046  001206          MOV     DURIV,BASEIV    ;SET UP FOR ROTATION
1219  001506  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1220  001510  014734                          MMULT   ;MESSAGE
1221  001512  104411                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1222  001514  001176                          MULTD   ;THIS FLAG
1223  001516  105737  001176                  TSTB    MULTD   ;ARE THERE MULTIPLE DEVICES
1224                                                          ;ON THE SYSTEM ?
1225  001522  100406                          BMI     BBB     ;YES,ASK NEXT QUESTION
1226  001524  005037  001212                  CLR     ACTREG
1227  001530  005037  001214                  CLR     ROTADD
1228  001534  000137  001700                  JMP     OUTMUL  ;JUMP AROUND NEXT QUESTION
1229  001540                          BBB:
1230  001540  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1231  001542  015013                          MLASTD  ;MESSAGE
1232  001544  104405                          PARAM   ;CONVERT STRING
1233  001546  160000                          160000  ;LOW LIMIT
1234  001550  167776                          167776  ;HIGH LIMIT
1235  001552  001204                          LASTADD ;STORE AT THIS LOCATION
1236  001554     001                  .BYTE    1       ;MASK
1237  001555     001                  .BYTE    1       ;HOW MANY TIMES + 2
1238                                  ;THE FOLLOWING ROUTINE SETS UP ACTREG FOR THE FIRST TIME
1239  001556  012737  000001  001214  1$:     MOV     #1,ROTADD       ;SET UP POINTER
1240  001564  005037  001212                  CLR     ACTREG  ;CLR ACTIVE REGISTER
1241  001570  053737  001214  001212  2$:     BIS     ROTADD,ACTREG   ;MAKE THIS DEVICE ACTIVE
1242  001576  000241                          CLC
1243  001600  006137  001214                  ROL     ROTADD  ;SET UP POINTER
1244  001604  103421                          BCS     3$      ;ARE YOU OUT OF RANGE ?
1245  001606  062737  000010  001200          ADD     #10,BASEADD     ;SET UP BASE ADDRESS
1246  001614  023737  001204  001200          CMP     LASTADD,BASEADD ;IS THIS THE LAST DEVICE ?
1247  001622  101362                          BHI     2$      ;NO DO IT AGAIN
1248  001624  053737  001214  001212          BIS     ROTADD,ACTREG   ;THIS ASSUMES THAT THERE ARE AT
1249                                                          ;LEAST TWO DEVICES WHEN YOU ANSWER YES TO
1250                                                          ;MULTIPLE DEVICE QUESTION
1251  001632  012737  000001  001214  4$:     MOV     #1,ROTADD       ;SET UP FOR LATER USE IN END OF PASS ROUTINE
1252  001640  013737  001202  001200          MOV     KEEPADD,BASEADD ;DITTO
1253  001646  000414                          BR      OUTMUL  ;CONTINUE QUESTIONS
1254  001650  013737  001202  001200  3$:     MOV     KEEPADD,BASEADD ;RESTORE
1255  001656  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1256  001660  015176                          MRANGE  ;MESSAGE
1257  001662  104405                          PARAM   ;CONVERT STRING
1258  001664  160000                          160000  ;LOW LIMIT
1259  001666  167776                          167776  ;HIGH LIMIT
1260  001670  001204                          LASTADD ;STORE AT THIS LOCATION
1261  001672     001                  .BYTE    1       ;MASK
1262  001673     001                  .BYTE    1       ;HOW MANY TIMES + 2
1263  001674  000137  001556                  JMP     1$      ;DO IT AGAIN
1264  001700                          OUTMUL:
1265  001700  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1266  001702  015470                          MLEVEL  ;MESSAGE
```

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1267  001704  104405                          PWRAM   ;CONVERT STRING
1268  001706  000004                          4       ;LOW LIMIT
1269  001710  000007                          7       ;HIGH LIMIT
1270  001712  016366                          DUPRT   ;STORE AT THIS LOCATION
1271  001714     000                  .BYTE    0       ;MASK
1272  001715     001                  .BYTE    1       ;HOW MANY TIMES + 2
1273  001716  004737  016316                  JSR     PC,DULEV
1274                                          ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
1275                                          ;BUFFER TO THE CHARACTERS "1" AND "2".
1276                                          ;IF THE CHARACTER IS "1" CLEAR THE FLAG
1277                                          ;IF THE CHARACTER IS "2" SET THE FLAG
1278  001722                          AAA:
1279  001722  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1280  001724  015515                          MSYNC   ;MESSAGE
1281  001726  122737  000061  016150  3$:     CMPB    #'1,INBUF       ;IS IT "1" ?
1282  001734  001003                          BNE     1$
1283  001736  105037  001172                  CLRB    SYNCNO  ;000
1284  001742  000412                          BR      4$
1285  001744  122737  000062  016150  1$:     CMPB    #'2,INBUF       ;IS IT "2" ?
1286  001752  001004                          BNE     2$
1287  001754  112737  177777  001172          MOVB    #-1,SYNCNO      ;377
1288  001762  000402                          BR      4$
1289  001764  104404                  2$:     INSTER  ;RETRY
1290  001766  000757                          BR      3$
1291  001770  000240                  4$:     NOP
1292  001772  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1293  001774  015563                          MWIRE6  ;MESSAGE
1294  001776  104411                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1295  002000  001173                          SEXMIT  ;THIS FLAG
1296  002002  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1297  002004  015631                          MWIRE5  ;MESSAGE
1298  002006  104411                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1299  002010  001174                          SEREC   ;THIS FLAG
1300  002012  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1301  002014  015676                          MWIRE4  ;MESSAGE
1302  002016  104411                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1303  002020  001175                          OPTCLR  ;THIS FLAG
1304  002022  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1305  002024  015752                          MEXTJ   ;MESSAGE
1306  002026  104411                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1307  002030  001177                          JMRBY   ;THIS FLAG
1308
1309                                          ;TEST START AND RESTART
1310
1311  002032  012737  000340  177776  .BEGIN: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
1312  002040  012706  001100                  MOV     #STACK,SP               ;SET UP STACK
1313  002044  005737  000042                  TST     @#42                    ;IS PROGRAM UNDER MONITOR CONTROL
1314  002050  001056                          BNE     3$
1315  002052  105737  001176                  TSTB    MULTD   ;DON'T ALLOW LOCK ON TEST IF RUNNING
1316                                                  ;MULTIPLE DEVICES
1317  002056  001407                          BEQ     5$      ;IF NO,TEST FOR LOCK ON TEST
1318  002060  013737  013210  013112          MOV     BRW,TTST        ;RESTORE NORMAL SCOPE LOOP
1319  002066  013737  013212  013114          MOV     BRX,TTST+2      ;DITTO
1320  002074  000444                          BR      3$              ;JUMP AROUND IF YES
1321  002076  032737  000004  177570  5$:     BIT     #BIT2,SWR               ;CHECK FOR LOCK ON TEST
1322  002104  001416                          BEQ     1$
```

```
1323  002106  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1324  002110  015425                          MLOCK   ;MESSAGE
1325  002112  104411                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1326  002114  001221                          LOKFLG  ;THIS FLAG
1327  002116  105737  001221                  TSTB    @LOKFLG                 ;IS LOCK ON TEST OPTION SELECTED
1328  002122  001407                          BEQ     1$
1329  002124  012737  000240  013112          MOV     #NOP,@TTST
1330  002132  012737  000240  013114          MOV     #NOP,@TTST+2            ;SET UP TO LOCK
1331  002140  000406                          BR      2$
1332  002142  013737  013210  013112  1$:     MOV     @BRW,@TTST
1333  002150  013737  013212  013114          MOV     @BRX,@TTST+2            ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
1334  002156  032737  000002  177570  2$:     BIT     #SW01,@SWR              ;IF SW01=1, GET STARTING PC
1335  002164  001410                          BEQ     3$
1336  002166  104403                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1337  002170  015412                          MTSTPC  ;MESSAGE
1338  002172  104405                          PARAM   ;CONVERT STRING
1339  002174  002224                          TST1    ;LOW LIMIT
1340  002176  012176                          TLAST   ;HIGH LIMIT
1341  002200  000207                          RETURN  ;STORE AT THIS LOCATION
1342  002202     001                  .BYTE   1       ;MASK
1343  002203     001                  .BYTE   1       ;HOW MANY TIMES + 2
1344  002204  000403                          BR      4$
1345  002206  012737  002224  001110  3$:     MOV     #TST1,@RETURN           ;START AT TEST 1
1346  002214  104402  015406          4$:     TYPE    ,MR                     ;TYPE R
1347  002220  000177  176664                  JMP     @RETURN                 ;START TESTING
1348
1349                                          ;;THIS TEST VERIFYS WORD LENGTH SELECT OF THE
1350                                          ;;RECEIVER SECTION,IT USES THE ERROR FLAGS
1351                                          ;;TO DETERMINE THAT IT WAS SELECTED CORRECTLY
1352                                          ;;(OVRRUN,RXERR)
1353                                          ;;MODE:ISYMOD
1354                                          ;;LENGTH:EIGHT
1355                                          ;;CHAR:125
1356                                          ;;
1357  002224  012737  000001  001122  TST1:   MOV     #1,@TSTNO               ;SAVE THIS
1358  002232  012737  002466  001112          MOV     #TST2,@NEXT             ;GO TO THIS TEST WHEN THRU
1359  002240  052777  000400  014570          BIS     #MRESET,@TXCSR          ;MASTER RESET
1360  002246  012777  000000  014556          MOV     #ISYMOD,@PARCSR         ;SET THE MODE
1361  002254  052777  000400  014554          BIS     #MRESET,@TXCSR          ;MASTER RESET
1362
1363                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1364  002262  012777  064001  014546          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1365
1366                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1367  002270  012777  006000  014534          MOV     #ISYMOD!EIGHT!NOPAR!0,@PARCSR
1368  002276  052777  000020  014516          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
1369                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
1370  002304  042777  020000  014524          BIC     #CLK,@TXCSR             ;POKE CLK DOWN
1371  002312  052777  020000  014516          BIS     #CLK,@TXCSR             ;POKE CLK UP
1372                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1373  002320  042777  020000  014510          BIC     #CLK,@TXCSR             ;POKE CLK DOWN
1374  002326  052777  020000  014502          BIS     #CLK,@TXCSR             ;POKE CLK UP
1375  002334  013703  017026                  MOV     @RXDBUF,R3              ;SET UP FOR ERROR MESSAGE
1376  002340  012700  000125                  MOV     #125,R0 ;EXPECTED
1377  002344  012737  000012  001134          MOV     #10.,@SHIFT             ;# OF SHIFTS
1378  002352  012737  001252  001140          MOV     #1252,@TEMP1            ;DATA CHAR
```

```
1379  002360  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1380  002364  105777  014432                  TSTB    @RXCSR  ;RXDONE ?
1381  002370  100401                          BMI     .+4
1382  002372  104000                          HLT     ;RXDONE SHOULD BE SET
1383  002374  017701  014426                  MOV     @RXDBUF,R1      ;ACTUAL
1384  002400  020001                          CMP     R0,R1   ;COMPARE EXPECTED VS. ACTUAL
1385  002402  001401                          BEQ     .+4
1386  002404  104002                          HLT     2               ;RECEIVED DATA DID NOT MATCH
1387                                                                  ;EXPECTED DATA - CHECK MAINT DATA
1388                                                                  ;OR RECEIVER LOGIC
1389  002406  012737  000012  001134          MOV     #10.,SHIFT      ;# OF SHIFTS
1390  002414  012737  001252  001140          MOV     #1252,TEMP1     ;DATA CHAR
1391  002422  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1392                          ;NOW SHIFT IN A SECOND CHARACTER WITHOUT READING RXDBUF
1393  002426  012737  000012  001134          MOV     #10.,SHIFT      ;# OF SHIFTS
1394  002434  012737  001252  001140          MOV     #1252,TEMP1     ;DATA CHAR
1395  002442  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1396  002446  012700  140125                  MOV     #140000!125,R0  ;EXPECTED DATA PLUS
1397                                                                  ;RXERR & OVRRUN
1398  002452  017701  014350                  MOV     @RXDBUF,R1      ;ACTUAL
1399  002456  020001                          CMP     R0,R1   ;COMPARE EXP VS. ACT
1400  002460  001401                          BEQ     .+4
1401  002462  104002                          HLT     2               ;SPECIFICALLY LOOK AT RXERR &
1402                                                                  ;OVRRUN BITS...THEY BOTH SHOULD BE SET
1403  002464  104400                          SCOPE
1404                                          ;;THIS TEST VERIFYS WORD LENGTH SELECT OF THE
1405                                          ;;RECEIVER SECTION,IT USES THE ERROR FLAGS
1406                                          ;;TO DETERMINE THAT IT WAS SELECTED CORRECTLY
1407                                          ;;(OVRRUN,RXERR)
1408                                          ;;MODE:ISYMOD
1409                                          ;;LENGTH:EIGHT
1410                                          ;;CHAR:252
1411                                          ;;
1412  002466  012737  000002  001122  TST2:   MOV     #2,TSTNO        ;SAVE THIS
1413  002474  012737  002730  001112          MOV     #TST3,NEXT      ;GO TO THIS TEST WHEN THRU
1414  002502  052777  000400  014326          BIS     #MRESET,@TXCSR  ;MASTER RESET
1415  002510  012777  000000  014314          MOV     #ISYMOD,@PARCSR ;SET THE MODE
1416  002516  052777  000400  014312          BIS     #MRESET,@TXCSR  ;MASTER RESET
1417
1418                          ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1419  002524  012777  064001  014304          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1420
1421                          ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1422  002532  012777  006000  014272          MOV     #ISYMOD!EIGHT!NOPAR!0,@PARCSR
1423  002540  052777  000020  014254          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
1424                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
1425  002546  042777  020000  014262          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1426  002554  052777  020000  014254          BIS     #CLK,@TXCSR     ;POKE CLK UP
1427                          ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1428  002562  042777  020000  014246          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1429  002570  052777  020000  014240          BIS     #CLK,@TXCSR     ;POKE CLK UP
1430  002576  013703  017026                  MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
1431  002602  012700  000252                  MOV     #252,R0 ;EXPECTED
1432  002606  012737  000012  001134          MOV     #10.,SHIFT      ;# OF SHIFTS
1433  002614  012737  001524  001140          MOV     #1524,TEMP1     ;DATA CHAR
1434  002622  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
```

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1435  002626  105777  014170                  TSTB    @RXCSR  ;RXDONE ?
1436  002632  100401                          BMI     .+4
1437  002634  104000                          HLT     ;RXDONE SHOULD BE SET
1438  002636  017701  014164                  MOV     @RXDBUF,R1      ;ACTUAL
1439  002642  020001                          CMP     R0,R1   ;COMPARE EXPECTED VS. ACTUAL
1440  002644  001401                          BEQ     .+4
1441  002646  104002                          HLT     2               ;RECEIVED DATA DID NOT MATCH
1442                                                                  ;EXPECTED DATA - CHECK MAINT DATA
1443                                                                  ;OR RECEIVER LOGIC
1444  002650  012737  000012  001134          MOV     #10.,SHIFT      ;# OF SHIFTS
1445  002656  012737  001524  001140          MOV     #1524,TEMP1     ;DATA CHAR
1446  002664  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1447                          ;NOW SHIFT IN A SECOND CHARACTER WITHOUT READING RXDBUF
1448  002670  012737  000012  001134          MOV     #10.,SHIFT      ;# OF SHIFTS
1449  002676  012737  001524  001140          MOV     #1524,TEMP1     ;DATA CHAR
1450  002704  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1451  002710  012700  140252                  MOV     #140000!252,R0  ;EXPECTED DATA PLUS
1452                                                                  ;RXERR & OVRRUN
1453  002714  017701  014106                  MOV     @RXDBUF,R1      ;ACTUAL
1454  002720  020001                          CMP     R0,R1   ;COMPARE EXP VS. ACT
1455  002722  001401                          BEQ     .+4
1456  002724  104002                          HLT     2               ;SPECIFICALLY LOOK AT RXERR &
1457                                                                  ;OVRRUN BITS...THEY BOTH SHOULD BE SET
1458  002726  104400                          SCOPE
1459                                          ;;THIS TEST VERIFYS WORD LENGTH SELECT OF THE
1460                                          ;;RECEIVER SECTION,IT USES THE ERROR FLAGS
1461                                          ;;TO DETERMINE THAT IT WAS SELECTED CORRECTLY
1462                                          ;;(OVRRUN,RXERR)
1463                                          ;;MODE:SYNEXT
1464                                          ;;LENGTH:EIGHT
1465                                          ;;CHAR:252
1466                                          ;;
1467  002730  012737  000003  001122  TST3:   MOV     #3,TSTNO        ;SAVE THIS
1468  002736  012737  003156  001112          MOV     #TST4,NEXT      ;GO TO THIS TEST WHEN THRU
1469  002744  052777  000400  014064          BIS     #MRESET,@TXCSR  ;MASTER RESET
1470  002752  012777  020000  014052          MOV     #SYNEXT,@PARCSR ;SET THE MODE
1471  002760  052777  000400  014050          BIS     #MRESET,@TXCSR  ;MASTER RESET
1472
1473                          ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1474  002766  012777  064001  014042          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1475
1476                          ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1477  002774  012777  026000  014030          MOV     #SYNEXT!EIGHT!NOPAR!D,@PARCSR
1478  003002  052777  000020  014012          BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
1479                          ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1480  003010  042777  020000  014020          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1481  003016  052777  020000  014012          BIS     #CLK,@TXCSR     ;POKE CLK UP
1482  003024  013703  017026                  MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
1483  003030  012700  000252                  MOV     #252,R0 ;EXPECTED
1484  003034  012737  000010  001134          MOV     #8.,SHIFT       ;# OF SHIFTS
1485  003042  012737  000252  001140          MOV     #252,TEMP1      ;DATA CHAR
1486  003050  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1487  003054  105777  013742                  TSTB    @RXCSR  ;RXDONE ?
1488  003060  100401                          BMI     .+4
1489  003062  104000                          HLT     ;RXDONE SHOULD BE SET
1490  003064  017701  013736                  MOV     @RXDBUF,R1      ;ACTUAL
```

```
1491  003070  020001                        CMP     R0,R1   ;COMPARE EXPECTED VS. ACTUAL
1492  003072  001401                        BEQ     .+4
1493  003074  104002                        HLT     2       ;RECEIVED DATA DID NOT MATCH
1494                                                        ;EXPECTED DATA - CHECK MAINT DATA
1495                                                        ;OR RECEIVER LOGIC
1496  003076  012737  000010  001134        MOV     #8.,SHIFT       ;# OF SHIFTS
1497  003104  012737  000252  001140        MOV     #252,TEMP1      ;DATA CHAR
1498  003112  004737  016526                JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1499                                ;NOW SHIFT IN A SECOND CHARACTER WITHOUT READING RXDBUF
1500  003116  012737  000010  001134        MOV     #8.,SHIFT       ;# OF SHIFTS
1501  003124  012737  000252  001140        MOV     #252,TEMP1      ;DATA CHAR
1502  003132  004737  016526                JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1503  003136  012700  140252                MOV     #140000!252,R0  ;EXPECTED DATA PLUS
                                                                    ;RXERR & OVRRUN
1504
1505  003142  017701  013660                MOV     @RXDBUF,R1      ;ACTUAL
1506  003146  020001                        CMP     R0,R1   ;COMPARE EXP VS. ACT
1507  003150  001401                        BEQ     .+4
1508  003152  104002                        HLT     2       ;SPECIFICALLY LOOK AT RXERR &
                                                            ;OVRRUN BITS...THEY BOTH SHOULD BE SET
1509
1510  003154  104400                        SCOPE
1511                                        ;;THIS TEST PERFORMS BINARY DATA CHECK ON THE
1512                                        ;;RECEIVER
1513                                        ;;LENGTH:EIGHT PLUS PARITY
1514                                        ;;MODE:ISYMOD
1515                                        ;;PARITY:EVEPAR
1516                                        ;;
1517  003156  012737  000004  001122  TST4:  MOV     #4,TSTNO        ;SAVE THIS
1518  003164  012737  003356  001112        MOV     #TST5,NEXT      ;GO TO THIS TEST WHEN THRU
1519  003172  052777  000400  013636        BIS     #MRESET,@TXCSR  ;MASTER RESET
1520  003200  012777  000000  013624        MOV     #ISYMOD,@PARCSR ;SET THE MODE
1521  003206  052777  000400  013622        BIS     #MRESET,@TXCSR  ;MASTER RESET
1522
1523                                ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1524  003214  012777  064001  013614        MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1525
1526                                ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1527  003222  012777  007400  013602        MOV     #ISYMOD!EIGHT!EVEPAR!D,@PARCSR
1528  003230  052777  000020  013564        BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
1529                                        ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
1530  003236  042777  020000  013572        BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1531  003244  052777  020000  013564        BIS     #CLK,@TXCSR     ;POKE CLK UP
1532                                ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1533  003252  042777  020000  013556        BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1534  003260  052777  020000  013550        BIS     #CLK,@TXCSR     ;POKE CLK UP
1535  003266  013703  017026                MOV     RXDBUF,R3       ;SET UP ERROR MESSAGE
1536  003272  005004                        CLR     R4      ;DATA CHAR
1537  003274  010400                1$:     MOV     R4,R0   ;EXPECTED
1538  003276  012737  000013  001134        MOV     #11.,SHIFT      ;# OF SHIFTS
1539  003304  010437  001140                MOV     R4,TEMP1        ;"TO BE SHIFTED CHARACTER"
1540  003310  004737  016700                JSR     PC,EVENB        ;CALC PARITY
1541  003314  000241                        CLC
1542  003316  006137  001140                ROL     TEMP1   ;GENERATE START BIT
1543  003322  052737  002000  001140        BIS     #BIT10,TEMP1    ;GENERATE STOP BIT
1544                                ;TEMP1 NOW HAS CHARACTER TO BE POKED INTO RECEIVER
1545  003330  004737  016526                JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1546  003334  017701  013466                MOV     @RXDBUF,R1      ;ACTUAL
```

```
1547  003340  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1548  003342  001401                          BEQ     .+4
1549  003344  104002                          HLT     2       ;DATA CHARS SHOULD MATCH
1550                                                          ;THERE SHOULD BE NO PARITY ERROR
1551  003346  005204                          INC     R4      ;UPGRADE NEXT CHAR
1552  003350  105704                          TSTB    R4      ;LAST CHAR ?
1553  003352  001350                          BNE     1$
1554  003354  104400                          SCOPE
1555                                          ;;THIS TEST PERFORMS BINARY DATA CHECK ON THE
1556                                          ;;RECEIVER
1557                                          ;;LENGTH:EIGHT PLUS PARITY
1558                                          ;;MODE:SYNEXT
1559                                          ;;PARITY:EVEPAR
1560                                          ;;
1561  003356  012737  000005  001122  TST5:   MOV     #5,TSTNO        ;SAVE THIS
1562  003364  012737  003526  001112          MOV     #TST6,NEXT      ;GO TO THIS TEST WHEN THRU
1563  003372  052777  000400  013436          BIS     #MRESET,@TXCSR  ;MASTER RESET
1564  003400  012777  020000  013424          MOV     #SYNEXT,@PARCSR ;SET THE MODE
1565  003406  052777  000400  013422          BIS     #MRESET,@TXCSR  ;MASTER RESET
1566
1567                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1568  003414  012777  064001  013414          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1569
1570                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1571  003422  012777  027400  013402          MOV     #SYNEXT!EIGHT!EVEPAR!0,@PARCSR
1572  003430  052777  000020  013364          BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
1573                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1574  003436  042777  020000  013372          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1575  003444  052777  020000  013364          BIS     #CLK,@TXCSR     ;POKE CLK UP
1576  003452  013703  017026                  MOV     RXDBUF,R3       ;SET UP ERROR MESSAGE
1577  003456  005004                          CLR     R4      ;DATA CHAR
1578  003460  010400                  1$:     MOV     R4,R0   ;EXPECTED
1579  003462  012737  000011  001134          MOV     #9.,SHIFT       ;# OF SHIFTS
1580  003470  010437  001140                  MOV     R4,TEMP1        ;"TO BE SHIFTED CHARACTER"
1581  003474  004737  016700                  JSR     PC,EVENB        ;CALC PARITY
1582                                  ;TEMP1 NOW HAS CHARACTER TO BE POKED INTO RECEIVER
1583  003500  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1584  003504  017701  013316                  MOV     @RXDBUF,R1      ;ACTUAL
1585  003510  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1586  003512  001401                          BEQ     .+4
1587  003514  104002                          HLT     2       ;DATA CHARS SHOULD MATCH
1588                                                          ;THERE SHOULD BE NO PARITY ERROR
1589  003516  005204                          INC     R4      ;UPGRADE NEXT CHAR
1590  003520  105704                          TSTB    R4      ;LAST CHAR ?
1591  003522  001356                          BNE     1$
1592  003524  104400                          SCOPE
1593                                          ;;THIS TEST CHECKS THE STRIP SYNC FUNCTION
1594                                          ;;OF THE RECEIVER LOGIC
1595                                          ;;MODE:SYNINT
1596                                          ;;LENGTH:FIVE
1597                                          ;;NOTE: RXDONE SHOULD NEVER ASSERT
1598                                          ;;CHAR: 26 (SYNC)
1599                                          ;;
1600  003526  012737  000006  001122  TST6:   MOV     #6,TSTNO        ;SAVE THIS
1601  003534  012737  003712  001112          MOV     #TST7,NEXT      ;GO TO THIS TEST WHEN THRU
1602  003542  052777  000400  013266          BIS     #MRESET,@TXCSR  ;MASTER RESET
```

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1603  003550  012777  030000  013254          MOV     #SYNINT,@PARCSR ;SET THE MODE
1604  003556  052777  000400  013252          BIS     #MRESET,@TXCSR  ;MASTER RESET
1605
1606                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1607  003564  012777  064001  013244          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1608
1609                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1610  003572  012777  030026  013232          MOV     #SYNINT!FIVE!NOPAR!26,@PARCSR
1611  003600  052777  000020  013214          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
1612                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
1613  003606  042777  020000  013222          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1614  003614  052777  020000  013214          BIS     #CLK,@TXCSR     ;POKE CLK UP
1615                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1616  003622  042777  020000  013206          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1617  003630  052777  020000  013200          BIS     #CLK,@TXCSR     ;POKE CLK UP
1618  003636  052777  000400  013156          BIS     #STPSYN,@RXCSR  ;SET STRIP SYNC
1619  003644  012737  000003  001136          MOV     #3,COUNT        ;# OF SYNC CHARS
1620  003652  012737  000026  001140  1$:     MOV     #26,TEMP1       ;CHAR TO BE SHIFTED
1621  003660  012737  000005  001134          MOV     #5,SHIFT        ;# OF SHIFTS
1622  003666  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1623  003672  105777  013124                  TSTB    @RXCSR  ;RXDONE ?
1624  003676  100001                          BPL     .+4
1625  003700  104000                          HLT     ;RXDONE SHOULD NOT BE ASSERTED
1626  003702  005337  001136                  DEC     COUNT   ;# OF SYNC CHARS
1627  003706  001361                          BNE     1$
1628  003710  104400                          SCOPE
1629                                          ;;THIS TEST CHECKS THE STRIP SYNC FUNCTION
1630                                          ;;OF THE RECEIVER LOGIC
1631                                          ;;MODE:SYNINT
1632                                          ;;LENGTH:EIGHT
1633                                          ;;NOTE: RXDONE SHOULD NEVER ASSERT
1634                                          ;;CHAR: 26 (SYNC)
1635                                          ;;
1636  003712  012737  000007  001122  TST7:   MOV     #7,TSTNO        ;SAVE THIS
1637  003720  012737  004076  001112          MOV     #TSTB,NEXT      ;GO TO THIS TEST WHEN THRU
1638  003726  052777  000400  013102          BIS     #MRESET,@TXCSR  ;MASTER RESET
1639  003734  012777  030000  013070          MOV     #SYNINT,@PARCSR ;SET THE MODE
1640  003742  052777  000400  013066          BIS     #MRESET,@TXCSR  ;MASTER RESET
1641
1642                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
1643  003750  012777  064001  013060          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
1644
1645                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
1646  003756  012777  036026  013046          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
1647  003764  052777  000020  013030          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
1648                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
1649  003772  042777  020000  013036          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1650  004000  052777  020000  013030          BIS     #CLK,@TXCSR     ;POKE CLK UP
1651                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
1652  004006  042777  020000  013022          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1653  004014  052777  020000  013014          BIS     #CLK,@TXCSR     ;POKE CLK UP
1654  004022  052777  000400  012772          BIS     #STPSYN,@RXCSR  ;SET STRIP SYNC
1655  004030  012737  000003  001136          MOV     #3,COUNT        ;# OF SYNC CHARS
1656  004036  012737  000026  001140  1$:     MOV     #26,TEMP1       ;CHAR TO BE SHIFTED
1657  004044  012737  000010  001134          MOV     #8.,SHIFT       ;# OF SHIFTS
1658  004052  004737  016526                  JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
```

```
                                        TSTB    @RXCSR  ;RXDONE ?
                                        BPL     .+4
                                        HLT     ;RXDONE SHOULD NOT BE ASSERTED
                                        DEC     COUNT   ;# OF SYNC CHARS
                                        BNE     1$
                                        SCOPE
                                ;;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 & SYNC CHARACTERS ARE SENT
                                ;;.....BUT IF AN ERROR SHOULD OCCUR....THIS AUTOMATIC RESET
                                ;;IS DISCOMBOBULATED
                                ;;IE. FORCE PARITY ERROR WHILE STRIP SYNC IS SET
                                ;;NOTE: NORMALLY THE LOGIC RESETS THE RXDONE &ERROR FLAGS
                                ;;PROVIDING THAT ONLY GOOD SYNC CHARACTERS ARE SENT....
                                ;;BUT, IF AN RXERR OCCURS   RXDONE PLUS RXERR ARE ASSERTED
                                ;;MODE: ISOC (ISYMOD)
                                ;;LENGTH: EIGHT
                                ;;PARITY: EVEPAR
                                ;;CHARACTER EXPECTED:26
                                ;;CHARACTER SENT: SYNC CHARACTER
                                ;;NOTE: THIS TEST USES ONLY THE RECEIVER LOGIC
                                ;;
001122  012737  000010  001122  TSTB:   MOV     #8,TSTNO        ;SAVE THIS
001112  012737  004500  001112          MOV     #TST9,NEXT      ;GO TO THIS TEST WHEN THRU
012716  052777  000400  012716          BIS     #MRESET,@TXCSR  ;MASTER RESET
012704  012777  000000  012704          MOV     #ISYMOD,@PARCSR ;SET THE MODE
012702  052777  000400  012702          BIS     #MRESET,@TXCSR  ;MASTER RESET

                                ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
012674  012777  064001  012674          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR

                                ;SET MODE, # OF BITS,PARITY SENSE,&LOAD SYNC REG
012662  012777  007426  012662          MOV     #ISYMOD!EIGHT!EVEPAR!26,@PARCSR
017026  013703  017026                  MOV     RXDBUF,R3       ;SET UP FOR ERROR MSG
001136  012737  000003  001136          MOV     #3,COUNT        ;# OF TIMES SYNC CHAR WILL BE SENT
012632  052777  000020  012632          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
                                        ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
012640  042777  020000  012640          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
012632  052777  020000  012632          BIS     #CLK,@TXCSR     ;POKE CLK UP
                                ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
012624  042777  020000  012624          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
012616  052777  020000  012616          BIS     #CLK,@TXCSR     ;POKE CLK UP
012574  052777  000400  012574          BIS     #STPSYN,@RXCSR  ;SET STRIP SYNC
001134  012737  000013  001134  2$:     MOV     #11.,SHIFT      ;# OF SHIFTS
001140  012737  003054  001140          MOV     #3054,TEMP1     ;SYNC CHAR + START&STOP+ PARITY
016526  004737  016526          1$:     JSR     PC,RPOKE        ;SHIFT IN THIS CHARACTER
012550  105777  012550                  TSTB    @RXCSR  ;RXDONE = 0 ?
100001                                  BPL     .+4
104000                                  HLT     ;RXDONE SHOULD NOT BE SET
001136  005337  001136                  DEC     COUNT   ;# OF  SYNC CHARS
001361                                  BNE     2$      ;GO AGAIN ?
000026  012700  000026                  MOV     #26,R0  ;EXPECTED
012532  017701  012532                  MOV     @RXDBUF,R1      ;ACTUAL
                                                        ;NOTE THAT THIS IS THE FIRST TIME
                                                        ;RXDBUF IS READ.......THERE SHOULD BE
```

```
1715                                                    ;NO OVER RUN ERRORS
1716  004274  020001                            CMP     R0,R1   ;COMPARE EXPECTED VS ACTUAL
1717  004276  001401                            BEQ     .+4
1718  004300  104002                            HLT     2       ;DATA CHARS SHOULD COMPARE
1719                                                    ;THERE SHOULD BE NO RXERR'S
1720  004302  012737  000004  001136            MOV     #4,COUNT        ;# OF TIMES
1721  004310  012700  110026                    MOV     #RXERR!PARER!26,R0      ;EXPECTED
1722  004314  012737  002054  001140            MOV     #2054,TEMP1     ;BAD SYNC CHAR (WRONG PARITY)
1723  004322  012737  000013  001134  3$:       MOV     #11.,SHIFT      ;# OF SHIFTS
1724  004330  004737  016526                    JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1725  004334  105777  012462                    TSTB    @RXCSR  ;RXDONE = 1?
1726  004340  100401                            BMI     .+4
1727  004342  104000                            HLT     ;RXDONE SHOULD BE SET
1728  004344  017701  012456                    MOV     @RXDBUF,R1      ;ACTUAL DATA
1729  004350  020001                            CMP     R0,R1   ;COMPARE EXP VS ACT
1730  004352  001401                            BEQ     .+4
1731  004354  104002                            HLT     2       ;DID THE RESPECTIVE ERROR STOP THE
1732                                                    ;AUTOMATIC RESSETING OF RXDONE & ERROR FLAGS
1733                                                    ;.....CHECK THIS.....
1734  004356  005337  001136                    DEC     COUNT   ;# OF SYNC CHARS
1735  004362  001445                            BEQ     5$      ;FINISHED ? GET OUT OF TEST
1736  004364  022737  000003  001136            CMP     #3,COUNT        ;# OF SYNC CHARS
1737  004372  001423                            BEQ     6$      ;CHECK FRAME ERROR ?
1738  004374  022737  000002  001136            CMP     #2,COUNT        ;# OF SYNC CHARS
1739  004402  001426                            BEQ     7$      ;CHECK FRAME ERROR & BAD PARITY ?
1740                                                    ;NOPE THEN IT (COUNT) MUST BE = 1  THEREFORE....
1741  004404  012737  000013  001134            MOV     #11.,SHIFT      ;# OF SHIFTS
1742  004412  012737  000054  001140            MOV     #54,TEMP1       ;FRAME & PARITY ERROR
1743  004420  004737  016526                    JSR     PC,RPOKE        ;SHIFT IN THIS CHAR
1744                                                    ;NOW DON'T READ THE RXDBUF TO CREATE OVER RUN
1745  004424  012737  000054  001140            MOV     #54,TEMP1       ;FRAME & PARITY ERROR
1746  004432  012700  170026                    MOV     #RXERR!OVRRUN!FRMERR!PARER!26,R0        ;EXPECTED
1747  004436  000137  004322                    JMP     3$      ;DO IT AGAIN
1748  004442  012737  001054  001140  6$:       MOV     #1054,TEMP1     ;BAD STOP BIT  FOR FRAME ERROR
1749  004450  012700  120026                    MOV     #RXERR!FRMERR!26,R0     ;EXPECTED
1750  004454  000137  004322                    JMP     3$      ;DO IT AGAIN
1751  004460  012737  000054  001140  7$:       MOV     #54,TEMP1       ;BAD STOP BIT & PARITY
1752  004466  012700  130026                    MOV     #RXERR!FRMERR!PARER!26,R0       ;EXPECTED
1753  004472  000137  004322                    JMP     3$      ;DO IT AGAIN
1754  004476  104400                    5$:     SCOPE
1755                                                    ;;THIS TEST VERIFYS WORD LENGTH SELECT OF
1756                                                    ;;THE TRANSMITTER SECTION,IT USES THE DNA FLAG
1757                                                    ;;AND BIT WINDOW TO DETERMINE THAT IT WAS SELECTED
1758                                                    ;;CORRECTLY
1759                                                    ;;NOTE: DNA COMES UP ON THE FIRST RISING BIT
1760                                                    ;;EDGE OF THE NEXT CHARACTER IF NO NEW CHARACTER IS
1761                                                    ;;LOADED INTO TXDBUF
1762                                                    ;;MODE:SYNINT
1763                                                    ;;PARITY:NO PARITY
1764                                                    ;;LENGTH:EIGHT
1765                                                    ;;
1766  004500  012737  000011  001122  TST9:    MOV     #9,TSTNO        ;SAVE THIS
1767  004506  012737  004732  001112            MOV     #TST10,NEXT     ;GO TO THIS TEST WHEN THRU
1768  004514  052777  000400  012314            BIS     #MRESET,@TXCSR  ;MASTER RESET
1769  004522  012777  030000  012302            MOV     #SYNINT,@PARCSR ;SET THE MODE
1770  004530  052777  000400  012300            BIS     #MRESET,@TXCSR  ;MASTER RESET
```

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1771
1772                                        ;SET MAINTENANCE MODE & SEND
1773                                            ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1774  004536  012777  004020  012272          MOV     #MINT!SEND,@TXCSR
1775
1776                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1777  004544  012777  036026  012260          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
1778  004552  013703  017036                  MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1779  004556  112777  000021  012256          MOVB    #21,@TXDBUF     ;LOAD CHAR
1780  004564  012737  000021  001140          MOV     #21,TEMP1       ;SHIFTED CHAR
1781  004572  012737  000010  001134          MOV     #8.,SHIFT       ;# OF SHIFTS
1782                                        ;POKE CLK TO GET INTO SYNCRONIZATION
1783  004600  052777  020000  012230          BIS     #CLK,@TXCSR     ;POKE CLK UP
1784  004606  042777  020000  012222          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1785  004614  005000                  1$:     CLR     R0
1786  004616  006037  001140                  ROR     TEMP1   ;FORCE CARRY
1787  004622  103002                          BCC     2$
1788  004624  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BIT WINDOW
1789  004630                          2$:
1790  004630  052777  020000  012200          BIS     #CLK,@TXCSR     ;POKE CLK UP
1791  004636  042777  020000  012172          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1792  004644  017701  012166                  MOV     @TXCSR,R1       ;ACTUAL
1793  004650  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
1794  004654  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1795  004656  001401                          BEQ     .+4
1796  004660  104003                          HLT     3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1797                                                                  ;BIT.....ALSO CHECK DNA
1798  004662  005337  001134                  DEC     SHIFT   ;# OF SHIFTS
1799  004666  001352                          BNE     1$      ;DO IT AGAIN ?
1800                                      ;NOW POKE CLK TO SEE DNA
1801  004670  052777  020000  012140          BIS     #CLK,@TXCSR     ;POKE CLK
1802  004676  012700  100000                  MOV     #100000,R0      ;EXPECTED
1803  004702  017701  012130                  MOV     @TXCSR,R1       ;ACTUAL
1804  004706  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
1805  004712  020001                          CMP     R0,R1   ;COMPARE EXPECTED VS ACTUAL
1806  004714  001401                          BEQ     .+4
1807  004716  104003                          HLT     3               ;DNA SHOULD BE SET
1808                                                                  ;IF DNA DID NOT SET ,CHECK WORD LENGTH
1809                                                                  ;SELECT LOGIC OF THE TRANSMITTER
1810  004720  005777  012112                  TST     @TXCSR  ;DNA ?
1811  004724  100001                          BPL     .+4
1812  004726  104000                          HLT                     ;DNA SHOULD NOT BE SET
1813                                                                  ;IT SHOULD HAVE BEEN CLEARED FROM
1814                                                                  ;PREVIOUS READ
1815  004730  104400                      SCOPE
1816                                      ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1817                                      ;;OF THE TRANSMITTER SECTION.
1818                                      ;;IT ALSO CHECKS DNA TIMING
1819                                      ;;MODE:ISYMOD
1820                                      ;;LENGTH:SEVEN PLUS PARITY
1821                                      ;;PARITY:EVEPAR
1822                                      ;;CHARACTER:125
1823                                      ;;
1824  004732  012737  000012  001122  TST10:  MOV     #10,TSTNO       ;SAVE THIS
1825  004740  012737  005154  001112          MOV     #TST11,NEXT     ;GO TO THIS TEST WHEN THRU
1826  004746  052777  000400  012062          BIS     #MRESET,@TXCSR  ;MASTER RESET
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 1827  004754  012777  000000  012050          MOV     #ISYMOD,@PARCSR ;SET THE MODE
 1828  004762  052777  000400  012046          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1829
 1830                                  ;SET MAINTENANCE MODE & SEND
 1831                                      ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
 1832  004770  012777  004020  012040          MOV     #MINT!SEND,@TXCSR
 1833
 1834                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
 1835  004776  012777  005426  012026          MOV     #ISYMOD!SEVEN!EVEPAR!26,@PARCSR
 1836  005004  013703  017036                  MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
 1837  005010  112777  000125  012024          MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
 1838  005016  012737  001252  001140          MOV     #1252,TEMP1     ;TO BE SHIFTED CHAR
 1839  005024  012737  000012  001134          MOV     #10.,SHIFT      ;# OF SHIFTS
 1840                                  ;POKE CLK TO GET INTO SYNCRONIZATION
 1841  005032  052777  020000  011776          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1842  005040  042777  020000  011770          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1843  005046  005000                  1$:     CLR     R0
 1844  005050  006037  001140                  ROR     TEMP1   ;FORCE CARRY
 1845  005054  103002                          BCC     2$      ;BR IF CARRY CLR
 1846  005056  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BITW
 1847  005062                          2$:
 1848  005062  052777  020000  011746          BIS     #CLK,@TXCSR     ;POKE CLK UP
 1849  005070  042777  020000  011740          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 1850  005076  017701  011734                  MOV     @TXCSR,R1       ;ACTUAL
 1851  005102  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
 1852  005106  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
 1853  005110  001401                          BEQ     .+4
 1854  005112  104003                          HLT     3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
 1855                                                          ;BIT,...ALSO CHECK DNA
 1856  005114  005337  001134                  DEC     SHIFT   ;# OF SHIFTS
 1857  005120  001352                          BNE     1$      ;DO IT AGAIN ?
 1858                                  ;NOW POKE CLK TO SEE DNA
 1859  005122  052777  020000  011706          BIS     #CLK,@TXCSR     ;POKE CLK
 1860  005130  012700  000000                  MOV     #0,R0   ;EXPECTED
 1861  005134  017701  011676                  MOV     @TXCSR,R1       ;ACTUAL
 1862  005140  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
 1863  005144  020001                          CMP     R0,R1           ;COMPARE EXP VS ACT
 1864  005146  001401                          BEQ     .+4
 1865  005150  104003                          HLT     3       ;DNA SHOULD BE SET
 1866                                                          ;IF DNA DID NOT SET
 1867                                                          ;CHECK WORD LENGTH SELECT LOGIC
 1868  005152  104400                  SCOPE
 1869                                  ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
 1870                                  ;;OF THE TRANSMITTER SECTION.
 1871                                  ;;IT ALSO CHECKS DNA TIMING
 1872                                  ;;MODE:SYNINT
 1873                                  ;;LENGTH:EIGHT PLUS PARITY
 1874                                  ;;PARITY:EVEPAR
 1875                                  ;;CHARACTER:125
 1876                                  ;;
 1877  005154  012737  000013  001122  TST11:  MOV     #11,TSTNO       ;SAVE THIS
 1878  005162  012737  005376  001112          MOV     #TST12,NEXT     ;GO TO THIS TEST WHEN THRU
 1879  005170  052777  000400  011640          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1880  005176  012777  030000  011626          MOV     #SYNINT,@PARCSR ;SET THE MODE
 1881  005204  052777  000400  011624          BIS     #MRESET,@TXCSR  ;MASTER RESET
 1882
```

```
1883                                    ;SET MAINTENANCE MODE & SEND
1884                                            ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1885  005212  012777  004020  011616            MOV     #MINT!SEND,@TXCSR
1886
1887                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1888  005220  012777  037426  011604            MOV     #SYNINT!EIGHT!EVEPAR!26,@PARCSR
1889  005226  013703  017036                    MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1890  005232  112777  000125  011602            MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
1891  005240  012737  000125  001140            MOV     #125,TEMP1      ;TO BE SHIFTED CHAR
1892  005246  012737  000011  001134            MOV     #9.,SHIFT       ;# OF SHIFTS
1893                                    ;POKE CLK TO GET INTO SYNCRONIZATION
1894  005254  052777  020000  011554            BIS     #CLK,@TXCSR     ;POKE CLK UP
1895  005262  042777  020000  011546            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1896  005270  005000                    1$:     CLR     R0
1897  005272  006037  001140                    ROR     TEMP1   ;FORCE CARRY
1898  005276  103002                            BCC     2$      ;BR IF CARRY CLR
1899  005300  052700  002000                    BIS     #BITW,R0        ;EQUIV OF BITW
1900  005304                            2$:
1901  005304  052777  020000  011524            BIS     #CLK,@TXCSR     ;POKE CLK UP
1902  005312  042777  020000  011516            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1903  005320  017701  011512                    MOV     @TXCSR,R1       ;ACTUAL
1904  005324  042701  075777                    BIC     #075777,R1      ;SAVE BITW & DNA
1905  005330  020001                            CMP     R0,R1   ;COMPARE EXP VS ACT
1906  005332  001401                            BEQ     .+4
1907  005334  104003                            HLT     3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1908                                                                    ;BIT,...ALSO CHECK DNA
1909  005336  005337  001134                    DEC     SHIFT   ;# OF SHIFTS
1910  005342  001352                            BNE     1$      ;DO IT AGAIN ?
1911                                    ;NOW POKE CLK TO SEE DNA
1912  005344  052777  020000  011464            BIS     #CLK,@TXCSR     ;POKE CLK
1913  005352  012700  100000                    MOV     #100000,R0      ;EXPECTED
1914  005356  017701  011454                    MOV     @TXCSR,R1       ;ACTUAL
1915  005362  042701  077777                    BIC     #77777,R1       ;SAVE DNA ONLY
1916  005366  020001                            CMP     R0,R1           ;COMPARE EXP VS ACT
1917  005370  001401                            BEQ     .+4
1918  005372  104003                            HLT     3       ;DNA SHOULD BE SET
1919                                                                    ;IF DNA DID NOT SET
1920                                                                    ;CHECK WORD LENGTH SELECT LOGIC
1921  005374  104400                            SCOPE
1922                                            ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1923                                            ;;OF THE TRANSMITTER SECTION.
1924                                            ;;IT ALSO CHECKS DNA TIMING
1925                                            ;;MODE:SYNINT
1926                                            ;;LENGTH:EIGHT PLUS PARITY
1927                                            ;;PARITY:EVEPAR
1928                                            ;;CHARACTER:252
1929                                            ;;
1930  005376  012737  000014  001122  TST12:    MOV     #12,TSTNO       ;SAVE THIS
1931  005404  012737  005620  001112            MOV     #TST13,NEXT     ;GO TO THIS TEST WHEN THRU
1932  005412  052777  000400  011416            BIS     #MRESET,@TXCSR  ;MASTER RESET
1933  005420  012777  030000  011404            MOV     #SYNINT,@PARCSR ;SET THE MODE
1934  005426  052777  000400  011402            BIS     #MRESET,@TXCSR  ;MASTER RESET
1935
1936                                    ;SET MAINTENANCE MODE & SEND
1937                                            ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1938  005434  012777  004020  011374            MOV     #MINT!SEND,@TXCSR
```

```
1939
1940                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1941  005442  012777  037426  011362              MOV     #SYNINT!EIGHT!EVEPAR!26,@PARCSR
1942  005450  013703  017036                      MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1943  005454  112777  000252  011360              MOVB    #252,@TXDBUF    ;LOAD DATA CHAR
1944  005462  012737  000252  001140              MOV     #252,TEMP1      ;TO BE SHIFTED CHAR
1945  005470  012737  000011  001134              MOV     #9.,SHIFT       ;# OF SHIFTS
1946                                        ;POKE CLK TO GET INTO SYNCRONIZATION
1947  005476  052777  020000  011332              BIS     #CLK,@TXCSR     ;POKE CLK UP
1948  005504  042777  020000  011324              BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1949  005512  005000                      1$:     CLR     R0
1950  005514  006037  001140                      ROR     TEMP1   ;FORCE CARRY
1951  005520  103002                              BCC     2$      ;BR IF CARRY CLR
1952  005522  052700  002000                      BIS     #BITW,R0        ;EQUIV OF BITW
1953  005526                              2$:
1954  005526  052777  020000  011302              BIS     #CLK,@TXCSR     ;POKE CLK UP
1955  005534  042777  020000  011274              BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1956  005542  017701  011270                      MOV     @TXCSR,R1       ;ACTUAL
1957  005546  042701  075777                      BIC     #075777,R1      ;SAVE BITW & DNA
1958  005552  020001                              CMP     R0,R1   ;COMPARE EXP VS ACT
1959  005554  001401                              BEQ     .+4
1960  005556  104003                              HLT     3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1961                                                                      ;BIT,...ALSO CHECK DNA
1962  005560  005337  001134                      DEC     SHIFT   ;# OF SHIFTS
1963  005564  001352                              BNE     1$      ;DO IT AGAIN ?
1964                                        ;NOW POKE CLK TO SEE DNA
1965  005566  052777  020000  011242              BIS     #CLK,@TXCSR     ;POKE CLK
1966  005574  012700  100000                      MOV     #100000,R0      ;EXPECTED
1967  005600  017701  011232                      MOV     @TXCSR,R1       ;ACTUAL
1968  005604  042701  077777                      BIC     #77777,R1       ;SAVE DNA ONLY
1969  005610  020001                              CMP     R0,R1           ;COMPARE EXP VS ACT
1970  005612  001401                              BEQ     .+4
1971  005614  104003                              HLT     3               ;DNA SHOULD BE SET
1972                                                                      ;IF DNA DID NOT SET
1973                                                                      ;CHECK WORD LENGTH SELECT LOGIC
1974  005616  104400                              SCOPE
1975                                        ;;THIS TEST VERIFYS THAT BY SENDING ONLY ONE SYNC
1976                                        ;;CHARACTER (TWO SELECTED BY STRAPPING ) RECACT =0
1977                                        ;;THEN SEND ONE ORDINARY CHARACTER (TO BREAK UP THE SEQUENCE)
1978                                        ;;RECACT =0.....IT WILL TAKE TWO MORE SYNC CHARS
1979                                        ;;BEFORE RECACT =1
1980                                        ;;NOTE: THIS TEST WILL ONLY WORK WHEN TWO SYNC CHARS
1981                                        ;;HAS BEEN BEEN SELECTED ...OTHERWISE JUMP AROUND THIS TEST
1982                                        ;;MODE:SYNC INTERNAL (SYNINT)
1983                                        ;;PARITY: NOPAR
1984                                        ;;LENGTH: EIGHT
1985                                        ;;
1986                                        ;;THIS TEST CHECKS ONLY THE RECEIVER SECTION
1987                                        ;;
1988  005620  012737  000015  001122  TST13:  MOV     #13,TSTNO       ;SAVE THIS
1989  005626  012737  006122  001112              MOV     #TST14,NEXT     ;GO TO THIS TEST WHEN THRU
1990  005634  105737  001172                      TSTB    SYNCNO  ;TEST FOR  # OF SYNC CHARS REQUIRED
1991  005640  100127                              BPL     2$      ;IF NOT TWO  GET OUT OF TEST
1992  005642  052777  000400  011166              BIS     #MRESET,@TXCSR  ;MASTER RESET
1993  005650  012777  030000  011154              MOV     #SYNINT,@PARCSR ;SET THE MODE
1994  005656  052777  000400  011152              BIS     #MRESET,@TXCSR  ;MASTER RESET
```

```
                                        ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
005664  012777  064001  011144            MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR

                                        ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
005672  012777  036026  011132            MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
005700  052777  000020  011114            BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
                                        ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
005706  042777  020000  011122            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
005714  052777  020000  011114            BIS     #CLK,@TXCSR     ;POKE CLK UP
                                        ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
005722  042777  020000  011106            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
005730  052777  020000  011100            BIS     #CLK,@TXCSR     ;POKE CLK UP
005736  012737  000010  001134            MOV     #8.,SHIFT       ;# OF SHIFTS
005744  012737  000026  001140            MOV     #26,TEMP1       ;SYNC CHAR TO BE SHIFTED IN
005752  004737  016526                    JSR     PC,RPOKE        ;SHIFT IN THIS SYNC CHAR
005756  032777  004000  011036            BIT     #RECACT,@RXCSR  ;RECACT = 0 ?
005764  001401                            BEQ     .+4
005766  104000                            HLT     ;RECACT SHOULD BE 0
005770  012737  000010  001134            MOV     #8.,SHIFT       ;# OF SHIFTS
005776  012737  000025  001140            MOV     #25,TEMP1       ;ANY CHARACTER
006004  004737  016526                    JSR     PC,RPOKE        ;SHIFT IN THIS CHARACTER
                                        ;YOU HAVE JUST LOST SYNCRONIZATION.....................
                                        ;POKE THE CLK TWICE TO GET INTO SYNCRONIZATION
                                        ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
006010  042777  020000  011020            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
006016  052777  020000  011012            BIS     #CLK,@TXCSR     ;POKE CLK UP
                                        ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
006024  042777  020000  011004            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
006032  052777  020000  010776            BIS     #CLK,@TXCSR     ;POKE CLK UP
006040  012737  000002  001136            MOV     #2,COUNT        ;# OF SYNC CHARS
006046  032777  004000  010746  1$:       BIT     #RECACT,@RXCSR  ;RECACT = 0 ?
006054  001401                            BEQ     .+4
006056  104000                            HLT             ;RECACT SHOULD BE  0
006060  012737  000010  001134            MOV     #8.,SHIFT       ;# OF SHIFTS
006066  012737  000026  001140            MOV     #26,TEMP1       ;SYNC CHAR
006074  004737  016526                    JSR     PC,RPOKE        ;SHIFT IN THIS SYNC CHAR
006100  005337  001136                    DEC     COUNT
006104  001360                            BNE     1$      ;IS COUNT = 0 ? NO GO AGAIN
006106  032777  004000  010706            BIT     #RECACT,@RXCSR  ;RECACT = 1 ?
006114  001001                            BNE     .+4
006116  104000                            HLT     ;RECACT SHOULD BE ASSERTED
006120  104400                    2$:     SCOPE
                                        ;;THIS TEST VERIFYS TX DONE FUNCTION, DONE = 1
                                        ;;ALSO   VERIFYS THAT THE TRANSMITTER CHIP IDLES "SYNC" CHARACTER
                                        ;;WHEN NO NEW CHARACTER IS LOADED INTO TXDBUF("SYNC" = BINARY COUNT PATTERN)
                                        ;;MODE:  SYNC INTERNAL
                                        ;;PARITY:  NO PARITY (NOPAR)
                                        ;;LENGTH:  EIGHT
                                        ;;
006122  012737  000016  001122  TST14:   MOV     #14,TSTNO       ;SAVE THIS
006130  012737  006420  001112            MOV     #TST15,NEXT     ;GO TO THIS TEST WHEN THRU
006136  012737  006322  001114            MOV     #6$,LOCK        ;SET UP FOR SCOPE LOOP
006144  012704  036000                    MOV     #SYNINT!EIGHT!NOPAR!0,R4        ;MODE ETC.
006150  052777  000400  010660  5$:       BIS     #MRESET,@TXCSR  ;MASTER RESET
006156  012777  030000  010646            MOV     #SYNINT,@PARCSR ;SET THE MODE
```

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2051  006164  052777  000400  010644          BIS     #MRESET,@TXCSR  ;MASTER RESET
2052  006172  012777  004020  010636          MOV     #MINT!SEND,@TXCSR
2053  006200  010477  010626                  MOV     R4,@PARCSR
2054  006204  105777  010626                  TSTB    @TXCSR          ;TXDONE?
2055  006210  100401                          BMI     .+4
2056  006212  104000                          HLT                     ;TXDONE SHOULD BE SET
2057  006214  112777  000021  010620          MOVB    #21,@TXDBUF     ;LOAD ANY CHAR
2058                                          ;POKE   CLK TO GET INTO SYNCIRONIZATION
2059  006222  052777  020000  010606          BIS     #CLK,@TXCSR     ;POKE CLK UP
2060  006230  042777  020000  010600          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2061  006236  105777  010574                  TSTB    @TXCSR
2062  006242  100001                          BPL     .+4
2063  006244  104000                          HLT                     ;TXDONE SHOULD BE CLR
2064
2065  006246  052777  020000  010562          BIS     #CLK,@TXCSR     ;POKE CLK UP
2066  006254  042777  020000  010554          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2067  006262  105777  010550                  TSTB    @TXCSR
2068  006266  100401                          BMI     .+4
2069  006270  104000                          HLT                     ;TXDONE SHOULD BE SET
2070  006272  012737  000007  001134          MOV     #7,SHIFT
2071  006300                          1$:
2072  006300  052777  020000  010530          BIS     #CLK,@TXCSR     ;POKE CLK UP
2073  006306  042777  020000  010522          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2074  006314  005337  001134                  DEC     SHIFT
2075  006320  001367                          BNE     1$      ;SHIFT OUT THE "21"
2076  006322  013703  017036          6$:     MOV     TXCSR,R3        ;FOR ERROR MESSAGE
                                              ;THE BIT WINDOW IS RE GENERATED INTO
                                              ;A CHARACTER AND LEFT PRESENTED IN R1
                                              ;FOR THE COMPARE OPERATION. IF YOU WANT TO
                                              ;LOCK ON A PARTICULAR SYNC CHARACTER...
                                              ;SET SWR09=1
2082  006326  005000                          CLR     R0
2083  006330  150400                          BISB    R4,R0   ;EXPECT "SYNC"
2084  006332  012737  000010  001134          MOV     #8.,SHIFT       ;# OF SHIFTS
2085  006340  005001                          CLR     R1
2086  006342                          3$:
2087  006342  052777  020000  010466          BIS     #CLK,@TXCSR     ;POKE CLK UP
2088  006350  042777  020000  010460          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2089  006356  000241                          CLC
2090  006360  032777  002000  010450          BIT     #BITW,@TXCSR    ;BITW = ?
2091  006366  001401                          BEQ     2$
2092  006370  000261                          SEC     ;SET CARRY
2093  006372  106001                  2$:     RORB    R1      ;PICK UP CARRY
2094  006374  005337  001134                  DEC     SHIFT
2095  006400  001360                          BNE     3$      ;FINISH THAT CHARACTER
2096  006402  020001                          CMP     R0,R1   ;CMP EXPECTED VS ACTUAL
2097  006404  001401                          BEQ     .+4
2098  006406  104003                          HLT     3       ;SYNC CHAR IS NOT CORRECT
2099  006410  104401                          SCOP1
2100  006412  105204                          INCB    R4      ;SET UP FOR NEXT SYNC HOLDING REG.
2101  006414  001255                          BNE     5$      ;FINISHED WITH BINARY COUNT PATTERN ?
2102
2103  006416  104400                          SCOPE
2104
2105                                  ;;THIS TEST PROVES THAT RXERR FREEZES THE "RECEIVER
2106                                  ;;RESET" WHILE IN STRIP SYNC MODE
```

```
2107                                    ;;THIS TEST FIRST PROVES THAT AUTOMATIC RESETS OCCUR
2108                                    ;;WHEN STRIP SYNC IS SET AND SYNC CHARACTERS ARE SENT
2109                                    ;;BUT IF AN ERROR SHOULD OCCUR...THIS AUTOMATIC RESET
2110                                    ;;IS DISCOMBOBULATED
2111                                    ;;IE:  FORCE OVERRUN (OVERRUN) WHILE STRIP SYNC IS SET
2112                                    ;;BY TRANSMITTING A DATA CHARACTER THEN TRANSMIT A SYNC CHARACTER
2113                                    ;;AND DON'T READ THAT DATA CHARACTER.  NOTE:  NORMALLY THE LOGIC
2114                                    ;;RESETS THE RXDONE & ERROR FLAGS PROVIDING THAT ONLY SYNC CHARACTERS ARE
2115                                    ;;STRIPPED
2116                                    ;;MODE:  SYNC EXTERNAL (SYNEXT)
2117                                    ;;LENGTH:  EIGHT
2118                                    ;;NOTE:  THIS TEST USES BOTH RECEIVER AND TRANSMITTER LOGIC
2119                                    ;;
2120
2121  006420  012737  000017  001122  TST15:  MOV     #15,TSTNO       ;SAVE THIS
2122  006426  012737  006722  001112          MOV     #TST16,NEXT     ;GO TO THIS TEST WHEN THRU
2123
2124  006434  052777  000400  010374          BIS     #MRESET,@TXCSR  ;MASTER RESET
2125  006442  012777  020000  010362          MOV     #SYNEXT,@PARCSR ;SET THE MODE
2126  006450  052777  000400  010360          BIS     #MRESET,@TXCSR  ;MASTER RESET
2127
2128                                  ;SET MAINTENANCE MODE & SEND
2129                                          ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
2130  006456  012777  004020  010352          MOV     #MINT!SEND,@TXCSR
2131
2132                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
2133  006464  012777  026026  010340          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
2134  006472  112777  000026  010342          MOVB    #26,@TXDBUF     ;LOAD SYNC CHAR
2135  006500  052777  000420  010314          BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SYNC SEARCH & STRIP SYNC
```

```
2136  006506  013703  017026                      MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
2137  006512  012737  000003  001136              MOV     #3,COUNT        ;# OF TIMES SYNC WILL BE SENT
2138  006520  052777  020000  010310              BIS     #CLK,@TXCSR     ;POKE CLK UP
2139  006526  042777  020000  010302              BIC     #CLK,@TXCSR     ;  OKE CLK DOWN
2140  006534  012737  000010  001134  2$:         MOV     #8.,SHIFT       ;# OF SHIFTS
2141  006542                           1$:
2142  006542  052777  020000  010266              BIS     #CLK,@TXCSR     ;POKE CLK UP
2143  006550  042777  020000  010260              BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2144  006556  005337  001134                      DEC     SHIFT
2145  006562  001367                              BNE     1$
2146  006564  105777  010232                      TSTB    @RXCSR          ;RXDONE?
2147  006570  100001                              BPL     .+4
2148  006572  104000                              HLT                     ;RXDONE SHOULD NOT ASSERT
2149  006574  005337  001136                      DEC     COUNT
2150  006600  001355                              BNE     2$
2151  006602  012700  000026                      MOV     #26,R0          ;EXPECTED
2152  006606  017701  010214                      MOV     @RXDBUF,R1      ;ACTUAL
2153  006612  020001                              CMP     R0,R1
2154  006614  001401                              BEQ     .+4
2155  006616  104002                              HLT     2               ;NOTE THAT OVERRUN SHOULD NOT OCCUR, ALSO
2156                                                                       ;SECOND & 3RD SYNC CHARACTER CAME FROM
2157                                                                       ;SYNC HOLDING REGISTER
2158  006620  012737  000003  001136              MOV     #3,COUNT        ;# OF TIMES
2159  006626  112777  000025  010206              MOVB    #25,@TXDBUF     ;LOAD ANY CHAR....HOWEVER...
2160                                               ;ONE MORE SYNC CHAR WILL BE SENT BEFORE
2161                                               ;THE "25" CHAR IS SENT (THE DNA BIT IS
2162                                               ;ALREADY UP)
2163
2164  006634  012737  000010  001134  4$:         MOV     #8.,SHIFT       ;# OF SHIFTS
2165
2166  006642                           3$:
2167  006642  052777  020000  010166              BIS     #CLK,@TXCSR     ;POKE CLK UP
2168  006650  042777  020000  010160              BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2169  006656  005337  001134                      DEC     SHIFT
2170  006662  001367                              BNE     3$
2171  006664  005337  001136                      DEC     COUNT
2172  006670  001361                              BNE     4$
2173  006672  105777  010124                      TSTB    @RXCSR  ;RXDONE = 1 ?
2174  006676  100401                              BMI     .+4
2175  006700  104000                              HLT     ;RXDONE SHOULD BE SET
2176  006702  012700  140026                      MOV     #RXERR!OVRRUN!26,R0 ;EXPECTED
2177  006706  017701  010114                      MOV     @RXDBUF,R1      ;ACTUAL
2178  006712  020001                              CMP     R0,R1
2179  006714  001401                              BEQ     .+4
2180  006716  104002                              HLT     2               ;NOTE THAT OVRRUN SHOULD OCCUR,
2181                                                                       ;ALSO SECOND SYNC CHARACTER CAME
2182                                                                       ;FROM SYNC HOLDING REGISTER
```

```
                                                        ;SUMMARY:  THE OVRRUN STOPPED
                                                        ;THE AUTOMATIC RESETTING OF
                                                        ;RXDONE & ERROR FLAGS.....CHECK THIS
                                SCOPE
                        ;;THIS TEST VERIFYS THAT BY DROPPING SYNSCN
                        ;;IN THE MIDDLE OF A CHARACTER, SYNC CHARACTER SEQUENCE
                        ;;IS NEEDED BEFORE RECACT, RXDONE ASSERT AGAIN.
                        ;;ALSO NOTE:  SINCE RECACT IS DEPENDENT ON MATCH DETECT,
                        ;;AND IF SYNSCH IS DROPPED IN THE MIDDLE OF
                        ;;A SYNC CHARACTER AND THEN RAISED AGAIN ;RXDONE SHOULD
                        ;;NOT ASSERT UNTIL NEW SYNC CHARACTER SEQUENCE
                        ;;MODE:  SYNC INTERNAL (SYNINT)
                        ;;LENGTH:  EIGHT
                        ;;
006722  012737  000020  001122  TST16:  MOV     #16,TSTNO       ;SAVE THIS
006730  012737  007452  001112          MOV     #TST17,NEXT     ;GO TO THIS TEST WHEN THRU

006736  105737  001172                  TSTB    SYNCNO          ;TWO SYNC CHARACTERS SELECTED  ?
006742  100002                          BPL     .+6     ;IF ANSWER WAS NO  DO THIS TEST
006744  000137  007450                  JMP     4$      ;IF ANSWER WAS YES  JUMP OVER THIS TEST
006750  052777  000400  010060          BIS     #MRESET,@TXCSR  ;MASTER RESET
006756  012777  030000  010046          MOV     #SYNINT,@PARCSR ;SET THE MODE
006764  052777  000400  010044          BIS     #MRESET,@TXCSR  ;MASTER RESET

                        ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
006772  012777  064001  010036          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR

                        ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
007000  012777  036026  010024          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR

007006  052777  000020  010006          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
                        :POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
007014  042777  020000  010014          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
007022  052777  020000  010006          BIS     #CLK,@TXCSR     ;POKE CLK UP
                        ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
007030  042777  020000  010000          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
007036  052777  020000  007772          BIS     #CLK,@TXCSR     ;POKE CLK UP
007044  012737  000002  001136          MOV     #2,COUNT        ;# OF TIMES
007052  013703  017026                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
007056  012737  000010  001134  1$:     MOV     #8.,SHIFT       ;# OF SHIFTS
007064  012737  000026  001140          MOV     #26,TEMP1       ;SYNC CHAR.
007072  004737  016526                  JSR     PC,RPOKE
007076  005337  001136                  DEC     COUNT
007102  001403                          BEQ     2$
                        ;TEST TO SEE HOW MANY SYNC CHARACTERS NEEDED
007104  105737  001172                  TSTB    SYNCNO
007110  100762                          BMI     1$

007112  032777  004000  007702  2$:     BIT     #RECACT,@RXCSR  ;RECACT=1?
007120  001001                          BNE     .+4
007122  104000                          HLT                     ;RECACT SHOULD BE SET
007124  012737  000004  001134          MOV     #4,SHIFT        ;# OF SHIFTS
007132  012737  000026  001140          MOV     #26,TEMP1       ;SYNC CHAR.
007140  004737  016526                  JSR     PC,RPOKE
007144  032777  004000  007650          BIT     #RECACT,@RXCSR  ;RECACT=1?
```

```
2239  007152  001001                          BNE     .+4
2240  007154  104000                          HLT                     ;RECACT SHOULD  STILL BE SET
2241  007156  042777  000020  007636          BIC     #SYNSCH,@RXCSR  ;DROP SEARCH SYNC
2242  007164  032777  004000  007630          BIT     #RECACT,@RXCSR  ;RECACT=0?
2243  007172  001401                          BEQ     .+4
2244  007174  104000                          HLT                     ;RECACT SHOULD NOT BE SET
2245                                  ;NOW SHIFT TWO BITS TO ALLOW SEARCH SYNC =0 TO TAKE
2246                                  ;EFFECT IN THE LOGIC(THIS ALLOWS THE RECEIVER CHIP TO SEE
2247                                  ;THE DROPPING OF SEARCH SYNC)...MATCH DETECT IN THE  REC.CHIP SHOULD ALSO DROP
2248  007176  012737  000002  001134          MOV     #2,SHIFT        ;# OF SHIFTS
2249  007204  004737  016526                  JSR     PC,RPOKE
2250  007210  052777  000020  007604          BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
2251  007216  032777  004000  007576          BIT     #RECACT,@RXCSR
2252  007224  001401                          BEQ     .+4
2253  007226  104000                          HLT     ;RECACT =0 ?
2254  007230  105777  007566                  TSTB    @RXCSR
2255  007234  100001                          BPL     .+4
2256  007236  104000                          HLT     ;RXDONE = 0 ?
2257  007240  012737  000002  001134          MOV     #2,SHIFT        ;# OF SHIFTS
2258  007246  004737  016526                  JSR     PC,RPOKE
2259  007252  032777  004000  007542          BIT     #RECACT,@RXCSR  ;RECACT=0?
2260  007260  001401                          BEQ     .+4
2261  007262  104000                          HLT                     ;RECACT SHOULD NOT BE SET
2262  007264  105777  007532                  TSTB    @RXCSR          ;RXDONE=0?
2263  007270  100001                          BPL     .+4
2264  007272  104000                          HLT                     ;RXDONE SHOULD NOT BE ASSERTED
2265  007274  012700  000026                  MOV     #26,R0          ;EXPECTED
2266  007300  017701  007522                  MOV     @RXDBUF,R1      ;ACTUAL
2267  007304  020001                          CMP     R0,R1
2268  007306  001401                          BEQ     .+4
2269  007310  104002                          HLT     2               ;CHARACTERS SHOULD BE MATCHED
2270  007312  012737  000002  001136          MOV     #2,COUNT        ;# OF TIMES OF SYNC CHARS.
2271                                  ;TEST TO SEE HOW MANY SYNC CHARS  NEEDED
2272  007320  105737  001172                  TSTB    SYNCNO
2273  007324  100402                          BMI     3$      ;WILL IT BE TWO OR ONE ?
2274  007326  005337  001136                  DEC     COUNT   ;IT WAS ONLY ONE NEEDED
2275  007332  012737  000010  001134  3$:     MOV     #8.,SHIFT       ;#OF SHIFTS
2276  007340  012737  000026  001140          MOV     #26,TEMP1       ;SYNC CHAR
2277  007346  004737  016526                  JSR     PC,RPOKE
2278  007352  005337  001136                  DEC     COUNT   ;IS IT THE LAST SYNC CHAR ?
2279  007356  001365                          BNE     3$      ;GO AGAIN AND SHIFT IN ANOTHER SYNC CHAR
2280  007360  032777  004000  007434          BIT     #RECACT,@RXCSR  ;RECACT=1?
2281  007366  001001                          BNE     .+4
2282  007370  104000                          HLT     ;RECACT SHOULD BE ASSERTED
2283  007372  105777  007424                  TSTB    @RXCSR          ;RXDONE=0?
2284  007376  100001                          BPL     .+4
2285  007400  104000                          HLT                     ;RXDONE SHOULD NOT BE ASSERTED
2286  007402  012737  000010  001134          MOV     #8.,SHIFT       ;#OF SHIFTS
2287  007410  012737  000025  001140          MOV     #25,TEMP1       ;ANY CHARACTER
2288  007416  004737  016526                  JSR     PC,RPOKE
2289  007422  105777  007374                  TSTB    @RXCSR          ;RXDONE=1?
2290  007426  100401                          BMI     .+4
2291  007430  104000                          HLT                     ;RXDONE SHOULD NOW BE ASSERTED
2292  007432  012700  000025                  MOV     #25,R0          ;EXPECTED
2293  007436  017701  007364                  MOV     @RXDBUF,R1      ;ACTUAL
2294  007442  020001                          CMP     R0,R1
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2295  007444  001401                        BEQ     .+4
2296  007446  104002                        HLT     2
                                                      ;CHARACTERS SHOULD BE MATCHED
                                            ;IF THIS  FAILS THEN CHECK THAT THE CORRECT
                                            ;RECEIVER CHIP IS BEING USED...WHAT IS
                                            ;HAPPENING IS THAT MATCH DETECT IS ASSERTING
                                            ;BEFORE A NEW SYNC CHARACTER SEQUENCE
                                            ;TRANSPIRES  THUS RXDONE ASSERTS TOO SOON
                                            ;AND OVER RUN OCCURS SINCE THE RECEIVER WAS NOT READ
                                            ;CONCLUSION::: IF OLDER RECEIVER CHIP
                                            ;IS BEING USED THEN REPLACE IT WITH A NEW
                                            ;RECEIVER CHIP IF 1 SYNC CHARACTER SEQUENCE IS DESIRED

2307  007450  104400                4$:     SCOPE
                                    ;;THIS TEST VERIFYS THAT DSC CAUSES AN INTERRUPT
                                    ;;THIS TEST ONLY WORKS IN MAINT EXTERNAL MODE
                                    ;;INTERRUPT VECTOR:  DURIV
2311  007452  012737  000021  001122  TST17:  MOV     #17,TSTNO       ;SAVE THIS
2312  007460  012737  007652  001112          MOV     #TST18,NEXT     ;GO TO THIS TEST WHEN THRU
2313  007466  105737  001177                  TSTB    JMRBY           ;IN MAINT EXTERNAL?
2314  007472  100066                          BPL     3$              ;IF ANSWER NO JUMP AROUND TEST
2315  007474  052777  000400  007334          BIS     #MRESET,@TXCSR  ;MASTER RESET
2316  007502  012777  007526  007336          MOV     #4$,@DURIV      ;SET UP TRAPCATCHER
2317  007510  013777  016366  007332          MOV     DUPRT,@DURIS    ;
2318  007516  013737  016370  177776          MOV     LESS1,PS        ;ALLOW INTERRUPTS
2319  007524  000423                          BR      1$      ;JUMP AROUND INTERRUPT SVC ROUTINE
                                    ;THE FOLLOWING IS THE INTERRUPT SVC ROUTINE
2321  007526  012737  000340  177776  4$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
2322  007534  005777  007262                  TST     @RXCSR          ;DSC=1?
2323  007540  100401                          BMI     .+4
2324  007542  104000                          HLT                     ;FALSE INTERRUPT
2325  007544  042777  000040  007250          BIC     #DSINTE,@RXCSR  ;CLEAR INTERRUPT ENABLE
2326  007552  012716  007642                  MOV     #2$,(SP)        ;SET UP RETURN LOCATION
2327  007556  013777  017050  007262          MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2328  007564  012777  000000  007256          MOV     #0,@DURIS       ;
2329  007572  000002                          RTI
2331  007574  052777  000040  007220  1$:     BIS     #DSINTE,@RXCSR  ;SET INTERRUPT ENABLE
2332  007602  052777  000002  007212          BIS     #DTR,@RXCSR     ;TRY TO CAUSE INTERRUPT
2333  007610  005000                          CLR     R0
2334  007612  005200                          INC     R0              ;WAIT FOR INTERRUPT
2335  007614  001376                          BNE     .-2
2336  007616  013777  017050  007222          MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2337  007624  012777  000000  007216          MOV     #0,@DURIS       ;
2339  007632  042777  000040  007162          BIC     #DSINTE,@RXCSR  ;CLEAR INTERRUPT ENABLE
2340  007640  104000                          HLT                     ;INTERRUPT FAILED TO OCCUR
2341  007642  012737  000340  177776  2$:     MOV     #LEVEL7,PS .
2342  007650  104400                3$:     SCOPE
                                    ;;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

2348  007652  012737  000022  001122  TST18:  MOV     #18,TSTNO       ;SAVE THIS
2349  007660  012737  010316  001112          MOV     #TST19,NEXT     ;GO TO THIS TEST WHEN THRU
2350  007666  105737  001177                  TSTB    JMRBY           ;IN MAINT. EXTERNAL?
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2351  007672  100402                        BMI     .+6     ;IF ANSWER WAS YES DO THIS TEST
2352  007674  000137  010314                JMP     1$      ;IF ANSWER WAS NO JUMP AROUND TEST
2353  007700  052777  000400  007130        BIS     #MRESET,@TXCSR  ;MASTER RESET
2354  007706  012777  020000  007116        MOV     #SYNEXT,@PARCSR ;SET THE MODE
2355  007714  052777  000400  007114        BIS     #MRESET,@TXCSR  ;MASTER RESET
2356
2357                                ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
2358  007722  012777  064001  007106        MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
2359
2360                                ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
2361  007730  012777  026026  007074        MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
2362  007736  052777  000020  007056        BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
2363                                ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2364  007744  042777  020000  007064        BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2365  007752  052777  020000  007056        BIS     #CLK,@TXCSR     ;POKE CLK UP
2366  007760  012777  010004  007060        MOV     #2$,@DURIV      ;SET UP TRAPCATCHER
2367  007766  013777  016366  007054        MOV     DUPRT,@DURIS    ;
2368  007774  013737  016370  177776        MOV     LESS1,PS        ;ALLOW INTERRUPT
2369  010002  000457                        BR      3$      ;JUMP AROUND SVC ROUTINE
2370
2371                                ;THE FOLLOWING IS THE 1ST INTERRUPT SVC ROUTINE
2372  010004  012737  000340  177776  2$:   MOV     #LEVEL7,PS      ;DON'T ALLOW ANY MORE INTERRUPTS
2373  010012  105777  007004                TSTB    @RXCSR          ;RXDONE = 1 ?
2374  010016  100401                        BMI     .+4
2375  010020  104000                        HLT                     ;FALSE INTERRUPT
2376  010022  012716  010306                MOV     #5$,(SP)        ;SET UP RETURN LOCATION
2377  010026  012777  010110  007012        MOV     #4$,@DURIV      ;SET UP TRAPCATCHER FOR SECOND
2378                                                                ;INTERRUPT
2379  010034  052777  000002  006760        BIS     #DTR,@RXCSR     ;TRY TO CAUSE SECOND INTERRUPT
2380  010042  017701  006760                MOV     @RXDBUF,R1      ;JUST READ RXDBUF TO CLR RXDONE
2381                                                                ;TO ALLOW SECOND INTERRUPT
2382  010046  013737  016370  177776        MOV     LESS1,PS        ;ALLOW INTERRUPT
2383  010054  005000                        CLR     R0
2384  010056  005200                        INC     R0              ;WAIT FOR INTERRUPT
2385  010060  001376                        BNE     .-2
2386  010062  042777  000140  006732        BIC     #RINTEN!DSINTE,@RXCSR   ;CLR INTR ENABLES
2387  010070  104000                        HLT                     ;2ND INTERRUPT FAILED TO OCCUR
2388
2389  010072  013777  017050  006746  6$:   MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2390  010100  012777  000000  006742        MOV     #0,@DURIS       ;
2391  010106  000002                        RTI
2392
2393                                ;THE FOLLOWING IS THE 2ND INTERRUPT SVC ROUTINE
2394  010110  012737  000340  177776  4$:   MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
2395  010116  005777  006700                TST     @RXCSR          ;DSC = 1 ?
2396  010122  100401                        BMI     .+4
2397  010124  104000                        HLT                     ;FALSE INTERRUPT
2398  010126  042777  000140  006666        BIC     #RINTEN!DSINTE,@RXCSR   ;CLR BOTH INTR ENABLES.
2399  010134  012716  010072                MOV     #6$,(SP)        ;SET UP RETURN LOCATION
2400  010140  000002                        RTI
2401
2402  010142  052777  000140  006652  3$:   BIS     #RINTEN!DSINTE,@RXCSR ;SET INTERRUPT ENABLES
2403  010150  012737  000010  001134        MOV     #8.,SHIFT       ;# OF SHIFTS
2404  010156  012737  000025  001140        MOV     #25,TEMP1
2405                                ;THE FOLLOWING POKES THE MAINT DATA BASED UPON THE
2406                                ;INFORMATION CONTAINED IN TEMP1 AND IT IS
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2407                                        ;SHIFTED IN BY THE CONTENTS OF SHIFT
2408  010164  042777  040000  006644  8$:     BIC     #MTDATA,@TXCSR
2409  010172  000241                          CLC
2410  010174  006037  001140                  ROR     TEMP1   ;FORCE CARRY
2411  010200  103003                          BCC     7$
2412  010202  052777  040000  006626          BIS     #MTDATA,@TXCSR
2413  010210  042777  020000  006620  7$:     BIC     #CLK,@TXCSR
2414  010216  052777  020000  006612          BIS     #CLK,@TXCSR
2415  010224  005337  001134                  DEC     SHIFT
2416  010230  001355                          BNE     8$
2417                                        ;1ST INTERRUPT SHOULD NOW OCCUR
2418  010232  005000                          CLR     R0
2419  010234  005200                          INC     R0              ;WAIT FOR INTERRUPT
2420  010236  001376                          BNE     .-2             ;
2421  010240  013777  017050  006600          MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2422  010246  012777  000000  006574          MOV     #0,@DURIS       ;
2423  010254  013703  017026                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
2424  010260  012700  000025                  MOV     #25,R0          ;EXPECTED
2425  010264  017701  006536                  MOV     @RXDBUF,R1
2426  010270  042777  000140  006524          BIC     #RINTEN!DSINTE,@RXCSR   ;CLR INTERRUPT ENABLES
2427  010276  020001                          CMP     R0,R1
2428  010300  001401                          BEQ     .+4
2429  010302  104002                          HLT     2               ;CHARACTERS SHOULD COMPARE
2430  010304  104000                          HLT                     ;INTERRUPT FAILED TO OCCUR
2431
2432  010306  012737  000340  177776  5$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANY MORE INTERRUPTS
2433  010314  104400                  1$:     SCOPE
2434
2435                                        ;;THIS TEST VERIFYS THAT DNA CAUSES AN INTERRUPT
2436                                        ;;MODE:  SYNC EXTERNAL
2437                                        ;;INTERRUPT VECTOR:  DUTIV
2438
2439  010316  012737  000023  001122  TST19:  MOV     #19,TSTNO       ;SAVE THIS
2440  010324  012737  010612  001112          MOV     #TST20,NEXT     ;GO TO THIS TEST WHEN THRU
2441
2442  010332  052777  000400  006476          BIS     #MRESET,@TXCSR  ;MASTER RESET
2443  010340  012777  020000  006464          MOV     #SYNEXT,@PARCSR ;SET THE MODE
2444  010346  052777  000400  006462          BIS     #MRESET,@TXCSR  ;MASTER RESET
2445
2446                                        ;SET MAINTENANCE MODE & SEND
2447                                            ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
2448  010354  012777  004020  006454          MOV     #MINT!SEND,@TXCSR
2449
2450                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
2451  010362  012777  026026  006442          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
2452  010370  112777  000025  006444          MOVB    #25,@TXDBUF     ;LOAD CHARACTER
2453  010376  012737  000010  001134          MOV     #8.,SHIFT
2454                                        ;POKE CLK TO GET INTO SYNCRONIZATION
2455  010404  052777  020000  006424          BIS     #CLK,@TXCSR     ;POKE CLK UP
2456  010412  042777  020000  006416          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2457
2458  010420                                  1$:
2459  010420  052777  020000  006410          BIS     #CLK,@TXCSR     ;POKE CLK UP
2460  010426  042777  020000  006402          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2461  010434  005337  001134                  DEC     SHIFT           ;LAST SHIFT?
2462  010440  001367                          BNE     1$
```

```
2463  010442  012777  010512  006402          MOV     #2$,@DUTIV      ;SET UP TRAPCATCHER
2464  010450  013777  016366  006376          MOV     DUPRT,@DUTIS    ;
2465  010456  013737  016370  177776          MOV     LESS1,PS        ;ALLOW INTERUPTS
2466  010464  052777  000040  006344          BIS     #DNAINTE,@TXCSR ;ENABLE INTERRUPT
2467                                          ;NOW POKE CLK TO GET DNA
2468  010472  052777  020000  006336          BIS     #CLK,@TXCSR     ;POKE CLK
2469  010500  005000                          CLR     R0
2470  010502  005200                          INC     R0              ;WAIT FOR INTERRUPT
2471  010504  001376                          BNE     .-2
2472  010506  104000                          HLT                     ;INTERRUPT FAILED TO OCCUR
2473  010510  000423                          BR      3$      ;JUMP AROUND SVC ROUTINE
2474                              ;THE FOLLOWING IS THE INTERRUPT SERVICE ROUTINE
2475  010512  012737  000340  177776  2$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTERRUPTS
2476  010520  005777  006312                  TST     @TXCSR          ;DNA?
2477  010524  100401                          BMI     .+4
2478  010526  104000                          HLT                     ;FALSE INTERRUPT
2479  010530  042777  000040  006300          BIC     #DNAINTE,@TXCSR ;CLR INTR ENABLE
2480  010536  012716  010602                  MOV     #4$,(SP)        ;SET UP RETURN LOCATION
2481  010542  013777  017054  006302          MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2482  010550  012777  000000  006276          MOV     #0,@DUTIS       ;
2483  010556  000002                          RTI
2484
2485  010560  013777  017054  006264  3$:     MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2486  010566  012777  000000  006260          MOV     #0,@DUTIS       ;
2487
2488  010574  042777  000040  006234          BIC     #DNAINTE,@TXCSR ;CLR INTERRUPT ENABLE
2489  010602  012737  000340  177776  4$:     MOV     #LEVEL7,PS      ;RESTORE NO INTERRUPT STATUS
2490  010610  104400                          SCOPE
2491                              ;;THIS TEST VERIFYS THAT TXDONE CAUSES ONLY ONE INTERRUPT
2492                              ;;PROVIDING THAT TXCSR IS NOT READ
2493                              ;;AND TXDBUF IS NOT LOADED (WRITTEN)
2494                              ;;THIS TEST CHECKS THE ONCE ONLY FLIP/FLOP (V2)
2495                              ;;OF THE INTERRUPT CONTROL LOGIC
2496                              ;;INTERRUPT VECTOR: DUTIV
2497                              ;;NOTE: TXDONE = 1    AFTER A MASTER RESET
2498                              ;;
2499  010612  012737  000024  001122  TST20:  MOV     #20,TSTNO       ;SAVE THIS
2500  010620  012737  011006  001112          MOV     #TST21,NEXT     ;GO TO THIS TEST WHEN THRU
2501  010626  052777  000400  006202          BIS     #MRESET,@TXCSR  ;MASTER RESET
2502  010634  012777  010676  006210          MOV     #1$,@DUTIV      ;SET UP TRAPCATCHER
2503  010642  013777  016366  006204          MOV     DUPRT,@DUTIS    ;
2504  010650  013737  016370  177776          MOV     LESS1,PS        ;ALLOW INTERRUPTS
2505  010656  052777  000100  006152          BIS     #TXINTE,@TXCSR  ;ENABLE INTR ENABLE
2506  010664  005000                          CLR     R0
2507  010666  005200                          INC     R0
2508  010670  001376                          BNE     .-2
2509  010672  104000                          HLT     ;INTERRUPT FAILED TO OCCUR
2510  010674  000427                          BR      4$
2511                              ;THE FOLLOWING IS THE INTR SVC ROUTINE
2512  010676  012737  000340  177776  1$:     MOV     #LEVEL7,PS      ;DON'T ALLOW ANYMORE INTR
2513  010704  012716  010746                  MOV     #3$,(SP)        ;SET UP RETURN LOCATION
2514  010710  012777  010720  006134          MOV     #2$,@DUTIV      ;SET UP TRAPCATCHER TO
2515                                                                  ;PROVE THAT THE INTERRUPT DOES NOT OCCUR
2516                                                                  ;TWICE (AFTER RTI 'ING FROM THIS
2517                                                                  ;SVC ROUTINE
2518  010716  000002                          RTI
```

```
2519                                    ;THE FOLLOWING INTERRUPT SVC ROUTINE WILL CATCH THE SECOND INTR
2520  010720  012737  000340  177776  2$:     MOV     #LEVEL7,PS      ;DON'T ALLOW INTER
2521  010726  012716  010754                  MOV     #4$,(SP)        ;SET UP RETURN LOCATION
2522  010732  105777  006100                  TSTB    @TXCSR  ;TXDONE = 1?
2523  010736  100401                          BMI     .+4
2524  010740  104000                          HLT     ;TXDONE SHOULD BE SET
2525  010742  104000                          HLT     ;THE INTERRUPT WAS TAKEN TWICE.....
2526                                          ;CHECK OUT THE V2 FLIP/FLOP LOGIC
2527                                          ;IN THE INTERRUPT CONTROL LOGIC
2528  010744  000002                          RTI
2529  010746  005000                  3$:     CLR     R0      ;ALLOW TIME TO CATCH SECOND
2530  010750  005200                          INC     R0              ;IF IT WERE TO OCCUR
2531  010752  001376                          BNE     .-2     ;
2532  010754  013777  017054  006070  4$:     MOV     DUTIS,@DUTIV    ;RESTORE TRAPCATCHER
2533  010762  012777  000000  006064          MOV     #0,@DUTIS       ;
2534  010770  042777  000100  006040          BIC     #TXINTE,@TXCSR  ;CLR INTERRUPT ENABLE
2535  010776  012737  000340  177776          MOV     #LEVEL7,PS      ;RESTORE NO INTERRUPT STATUS
2536  011004  104400                          SCOPE
2537                                  ;;THIS TEST VERIFYS CTP MODE (IE SYSTST MODE)
2538                                  ;;IT BASICALLY CHECKS THE EXISTANCE OF
2539                                  ;;THE FREE RUNNING OSCILLATOR
2540                                  ;;MODE: SYNINT
2541                                  ;;LENGTH: EIGHT
2542                                  ;;THIS TEST USES BOTH THE RECEIVER & TRANSMITTER LOGIC
2543                                  ;;
2544  011006  012737  000025  001122  TST21:  MOV     #21,TSTNO       ;SAVE THIS
2545  011014  012737  011650  001112          MOV     #TST22,NEXT     ;GO TO THIS TEST WHEN THRU
2546  011022  052777  000400  006006          BIS     #MRESET,@TXCSR  ;MASTER RESET
2547  011030  012777  030000  005774          MOV     #SYNINT,@PARCSR ;SET THE MODE
2548  011036  052777  000400  005772          BIS     #MRESET,@TXCSR  ;MASTER RESET
2549
2550                                  ;SET MAINTENANCE MODE & SEND
2551                                          ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
2552  011044  012777  014020  005764          MOV     #SYSTST!SEND,@TXCSR
2553
2554                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
2555  011052  012777  036026  005752          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
2556  011060  052777  000420  005734          BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SEARCH SYNC &
2557                                          ;STRIP SYNC SO THAT RXDONE ASSERTS
2558                                          ;WHEN CHAR "25" ARRIVES AND NOT BEFORE...
2559                                          ; ,,,THEREFORE,SET STRIP SYNC
2560                                  ;.............WAIT FOR SYNSCH TO BE
2561                                  ;CLOCKED IN BY SYSTST CLK
2562  011066  005037  001150                  CLR     TEMP5
2563  011072  005002                          CLR     R2
2564  011074  005202                          INC     R2      ;WAIT
2565  011076  001376                          BNE     .-2
2566  011100  005237  001150                  INC     TEMP5
2567  011104  022737  000003  001150          CMP     #3,TEMP5
2568  011112  002367                          BGE     .-20    ;GO BACK TO CLR R2 AND WAIT SOME MORE
2569  011114  012777  011334  005724          MOV     #2$,@DURIV      ;SET UP TRAPCATCHER
2570  011122  013777  016366  005720          MOV     DUPRT,@DURIS    ;
2571  011130  012777  011430  005714          MOV     #3$,@DUTIV      ;
2572  011136  013777  016366  005710          MOV     DUPRT,@DUTIS    ;
2573  011144  013737  016370  177776          MOV     LESS1,PS        ;ALLOW INTERRUPTS
2574  011152  013703  017026                  MOV     RXDBUF,R3       ;SET UP FOR ERROR MSG
```

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2575  011156  012700  000025                    MOV     #25,R0  ;EXPECTED CHAR
2576  011162  012737  000002  001136            MOV     #2,COUNT        ;# OF SYNC CHARS TO GET INTO
2577                                            ;SYNCRONIZATION
2578  011170  105737  001172                    TSTB    SYNCNO  ;TEST TO SEE HOW MANY SYNC CHARS NEEDED
2579  011174  100402                            BMI     9$
2580  011176  005337  001136                    DEC     COUNT   ;MAKE IT ONE LESS
2581  011202  052777  000100  005612  9$:       BIS     #RINTEN,@RXCSR  ;SET INTERRUPT ENABLES
2582  011210  052777  000100  005620            BIS     #TXINTE,@TXCSR  ;
2583  011216  000137  011234                    JMP     8$      ;THE FIRST XMIT INTERRUPT SHOULD COME
2584                                            ;FROM TXDONE = 1 AFTER A MASTER RESET
2585  011222  112777  000026  005612  1$:       MOVB    #26,@TXDBUF     ;LOAD SYNC CHAR
2586  011230  005037  001150                    CLR     TEMP5
2587  011234  005002                    8$:     CLR     R2      ;WAIT FOR INTERRUPT
2588  011236  005202                            INC     R2
2589  011240  001376                            BNE     .-2     ;
2590  011242  005237  001150                    INC     TEMP5
2591  011246  022737  000003  001150            CMP     #3,TEMP5
2592  011254  002367                            BGE     8$
2593  011256  012737  000340  177776            MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2594  011264  042777  000100  005544            BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLES
2595  011272  042777  000100  005522            BIC     #RINTEN,@RXCSR  ;
2596  011300  013777  017050  005540            MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2597  011306  012777  000000  005534            MOV     #0,@DURIS       ;
2598  011314  013777  017054  005530            MOV     DUTIS,@DUTIV    ;
2599  011322  012777  000000  005524            MOV     #0,@DUTIS       ;
2600  011330  104000                            HLT     ;TXDONE INTERRUPT FAILED TO OCCUR
2601                                                    ;WATCH OUT HERE::: THIS FAILURE MAY
2602                                                    ;ALSO BE CAUSED BY TRANSMIT DATA NOT
2603                                                    ;BEING CLOCKED OUT.  I.E.  TXDONE
2604                                                    ;NOT RE-ASCERTING SO THAT THE 2ND
2605                                                    ;SYNC CHARACTER CAN BE LOADED
2606
2607  011332  000542                            BR      7$      ;GET OUT OF THE TEST
2608
2609                                    ;THE FOLLOWING IS THE RECEIVER INTERRUPT SVC ROUTINE
2610  011334  012737  000340  177776  2$:       MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2611  011342  017704  005454                    MOV     @RXCSR,R4       ;SAVE
2612  011346  017701  005454                    MOV     @RXDBUF,R1      ;ACTUAL
2613  011352  013777  017050  005466            MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2614  011360  012777  000000  005462            MOV     #0,@DURIS       ;
2615  011366  013777  017054  005456            MOV     DUTIS,@DUTIV    ;
2616  011374  012777  000000  005452            MOV     #0,@DUTIS       ;
2617  011402  012716  011564                    MOV     #4$,(SP)        ;SET UP RETURN LOCATION
2618  011406  042777  000100  005406            BIC     #RINTEN,@RXCSR  ;CLR INTERRUPT ENABLES
2619  011414  042777  000100  005414            BIC     #TXINTE,@TXCSR  ;
2620  011422  013705  001136                    MOV     COUNT,R5        ;SAVE COUNT
2621  011426  000002                            RTI
2622                                    ;END OF RECEIVER INTERRUPT SVC ROUTINE
2623                                    ;....THE FOLLOWING IS THE XMITTER INTERRUPT SVC ROUTINE
2624  011430  005337  001136            3$:     DEC     COUNT
2625  011434  100403                            BMI     5$
2626  011436  012716  011222                    MOV     #1$,(SP)        ;SET UP RETURN LOCATION
2627                                                            ;(LOAD SYNC CHARACTER AGAIN)
2628  011442  000002                            RTI
2629  011444  012716  011452            5$:     MOV     #6$,(SP)        ;SET UP RETURN LOCATION
2630  011450  000002                            RTI
```

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2631                                                ;END OF XMITTER INTERRUPT SVC ROUTINE
2632  011452  112777  000025  005362  6$:         MOVB    #25,@TXDBUF     ;LOAD CHARACTER
2633  011460  042777  000100  005350              BIC     #TXINTE,@TXCSR  ;CLR INTR ENABLE
2634  011466  005037  001150                      CLR     TEMP5
2635  011472  005002                      10$:     CLR     R2      ;WAIT FOR INTERRUPT(RECEIVER)
2636  011474  005202                              INC     R2
2637  011476  001376                              BNE     .-2     ;
2638  011500  005237  001150                      INC     TEMP5
2639  011504  022737  000003  001150              CMP     #3,TEMP5
2640  011512  002367                              BGE     10$
2641  011514  012737  000340  177776              MOV     #LEVEL7,PS      ;PREVENT INTERRUPTS
2642  011522  042777  000100  005272              BIC     #RINTEN,@RXCSR  ;CLR INTR ENABLE
2643  011530  013777  017050  005310              MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2644  011536  012777  000000  005304              MOV     #0,@DURIS       ;
2645  011544  013777  017054  005300              MOV     DUTIS,@DUTIV    ;
2646  011552  012777  000000  005274              MOV     #0,@DUTIS       ;
2647  011560  104000                              HLT     ;RECEIVER INTR FAILED TO OCCUR
2648  011562  000426                              BR      7$      ;GET OUT OF TEST
2649  011564  020001                      4$:     CMP     R0,R1
2650  011566  001401                              BEQ     .+4
2651  011570  104002                              HLT     2       ;CHARACTERS DID NOT MATCH
2652  011572  013703  017022                      MOV     RXCSR,R3        ;SET UP FOR ERROR MSG
2653  011576  012700  000200                      MOV     #200,R0 ;EXPECTED RXDONE
2654  011602  010401                              MOV     R4,R1   ;ACTUAL
2655  011604  042701  177577                      BIC     #177577,R1      ;SAVE ONLY RXDONE
2656  011610  020001                              CMP     R0,R1
2657  011612  001401                              BEQ     .+4
2658  011614  104001                              HLT     1       ;FALSE INTERRUPT
2659  011616  020527  177777                      CMP     R5,#-1  ;WAS COUNT =-1   WHEN RECEIVER
2660                                                        ;INTERRUPTED ?
2661  011622  001401                              BEQ     .+4
2662  011624  104000                              HLT     ;IF R5 IS GREATER THAN -1.....
2663                                                ;THEN EITHER THE # OF SYNC STRAP IS WRONG
2664                                                ;OR RXDONE IS OCCURING TOO SOON
2665  011626  023727  001136  177777              CMP     COUNT,#-1
2666  011634  001401                              BEQ     .+4
2667  011636  104000                              HLT     ;IF THIS TEST FAILS,BUT THE ABOVE TEST
2668                                                ;DOESN'T.....IT MAY BE THAT CLEARING
2669                                                ;TXINTE IN THE RECEIVER SVC ROUTINE
2670                                                ;IS NOT STOPPING TXDONE INTERRUPTS
2671  011640  012737  000340  177776  7$:         MOV     #LEVEL7,PS      ;INHIBIT INTERRUPTS
2672  011646  104400                              SCOPE
2673                                                ;;THIS TEST VERIFYS MATCH DETECT & DATA RDY
2674                                                ;;FLAGS FOR EVERY POSSIBLE MATCH CHARACTER
2675                                                ;;BY OBSERVING RECACT BIT
2676                                                ;;IT WILL TAKE TWO SYNC # CHARACTERS TO GET RECACT BIT
2677                                                ;;#:    DEPENDENT ON MONITOR .............
2678                                                ;;IF ONE SYNC STRAP IS SELECTED ,IT WILL
2679                                                ;;ONLY TAKE ONE SYNC CHARACTER BEFORE RECACT TO
2680                                                ;;ASSERT
2681                                                ;;MODE: SYNC INTERNAL
2682                                                ;;LENGTH: FIVE
2683                                                ;;SYNC CHARACTER FOR MATCH: B/C
2684                                                ;;THIS TEST USES THE TRANSMITTER AND RECEIVER CHIPS
2685                                                ;;
2686  011650  012737  000026  001122  TST22:  MOV     #22,TSTNO       ;SAVE THIS
```

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 2687  011656  012737  012176  001112          MOV     #TST23,NEXT     ;GO TO THIS TEST WHEN THRU
 2688  011664  012737  012000  001114          MOV     #5$,LOCK        ;SET UP FOR SCOPE LOOP
 2689  011672  052777  000400  005136          BIS     #MRESET,@TXCSR  ;MASTER RESET
 2690  011700  013703  017026                  MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
 2691                                  ;SET SYNC INTERNAL,FIVE,NO PARITY,0 SYNC REGISTER
 2692  011704  012704  030000                  MOV     #SYNINT!FIVE!NOPAR,R4   ;CREATE PARAMETERS
 2693  011710  012777  004020  005120  6$:     MOV     #MINT!SEND,@TXCSR       ;SET SEND & MAINT INTER
 2694  011716  010477  005110                  MOV     R4,@PARCSR      ;LOAD CSR
 2695  011722  052777  000020  005072          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
 2696                                  ;POKE CLK TO GET INTO SYNCRONIZATION
 2697                                  ;BOTH THE LOGIC & RECEIVER
 2698  011730  052777  020000  005100          BIS     #CLK,@TXCSR     ;POKE CLK UP
 2699  011736  042777  020000  005072          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2700  011744  110477  005072                  MOVB    R4,@TXDBUF      ;LOAD DATA CHARACTER
 2701                                  ;POKE CLK TO GET TRANSMITTER & RECEIVER INTO SYNCRONIZATION
 2702  011750  052777  020000  005060          BIS     #CLK,@TXCSR     ;POKE CLK UP
 2703  011756  042777  020000  005052          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2704  011764  032777  004000  005030          BIT     #RECACT,@RXCSR  ;RECACT ?
 2705  011772  001401                          BEQ     .+4
 2706  011774  104000                          HLT     ;RECACT SHOULD NOT BE SET
 2707  011776  000404                          BR      4$
 2708  012000  010477  005026          5$:     MOV     R4,@PARCSR      ;LOAD PARCSR WITH PARAMETERS
 2709  012004  110477  005032                  MOVB    R4,@TXDBUF      ;LOAD SYNC CHAR
 2710  012010  012737  000002  001136  4$:     MOV     #2,COUNT        ;# OF SYNC CHARS
 2711  012016  005777  005014          2$:     TST     @TXCSR  ;DNA ?
 2712  012022  100001                          BPL     .+4     ;BR IF NOT SET
 2713  012024  104000                          HLT     ;DNA SHOULD NOT BE SET OR....
 2714                                          ;IT SHOULD BE CLEARED FROM PREVIOUS READ
 2715  012026  012737  000005  001134          MOV     #5,SHIFT        ;# OF SHIFTS
 2716  012034                          1$:
 2717  012034  052777  020000  004774          BIS     #CLK,@TXCSR     ;POKE CLK UP
 2718  012042  042777  020000  004766          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2719  012050  005337  001134                  DEC     SHIFT   ;# OF SHIFTS
 2720  012054  001367                          BNE     1$
 2721  012056  005337  001136                  DEC     COUNT   ;# OF SYNC CHARS
 2722  012062  001403                          BEQ     3$
 2723                                  ;TEST SYNCNO TO SEE HOW MANY SYNC CHARACTERS NEEDED
 2724  012064  105737  001172                  TSTB    SYNCNO
 2725  012070  100752                          BMI     2$      ;TWO SYNC CHARACTERS..
 2726  012072  032777  004000  004722  3$:     BIT     #RECACT,@RXCSR  ;RECACT ?
 2727  012100  001001                          BNE     .+4
 2728  012102  104000                          HLT             ;RECACT FAILED TO SET,POSSIBLE
 2729                                          ;THAT THE RECEIVER FAILED TO MATCH
 2730                                          ;THE SYNC CHARACTER
 2731  012104  017701  004716                  MOV     @RXDBUF,R1      ;SAVE ACTUAL
 2732  012110  010400                          MOV     R4,R0           ;SAVE EXPECTED
 2733  012112  042700  177400                  BIC     #177400,R0      ;CLR UPPER BYTE
 2734  012116  020001                          CMP     R0,R1   ;DO THEY COMPARE ?
 2735  012120  001401                          BEQ     .+4
 2736  012122  104002                          HLT     2               ;IF RECACT FAILED ALONG WITH THIS
 2737                                          ;...IT PROBABLY IS A TRANSMITTER ERROR
 2738                                          ;HOWEVER,...IF ONLY THIS FAILED IT
 2739                                          ;PROBABLY IS A RECEIVER ERROR
 2740  012124  104401                  SCOP1
 2741                                  ;POKE CLK TO SEE DNA...DNA COMES UP ON THE FIRST
 2742                                  ;BIT OF THE NEXT CHARACTER IF NO CHARACTER IS LOADED INTO
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2743                                        ;TXDBUF
2744  012126  052777  020000  004702        BIS     #CLK,@TXCSR     ;POKE CLK UP
2745  012134  005777  004676                TST     @TXCSR  ;DNA?
2746  012140  100401                        BMI     .+4
2747  012142  104000                        HLT     ;DNA DID NOT ASSERT
2748                                        ;SET UP CONDITIONS FOR NEXT SYNC CHARACTER MATCH
2749  012144  052777  000400  004664        BIS     #MRESET,@TXCSR  ;MASTER RESET
2750  012152  032777  000020  004642        BIT     #SYNSCH,@RXCSR  ;SYNC SEARCH = 0 ?
2751  012160  001401                        BEQ     .+4
2752  012162  104000                        HLT     ;SYNC SEARCH SHOULD BE NOT SET
2753  012164  005204                        INC     R4
2754  012166  122704  000040              CMPB    #40,R4  ;IS THIS THE LAST CHARACTER ?
2755  012172  001246                        BNE     6$      ;NO
2756  012174  104400                        SCOPE
2757                                        ;;THIS TEST PERFORMS A BINARY COUNT DATA PATTERN ON
2758                                        ;;BOTH THE TRANSMITTER AND RECEIVER LOGIC
2759                                        ;;MODE:SYNC EXTERNAL (SYNEXT)
2760                                        ;;LENGTH:EIGHT PLUS PARITY
2761                                        ;;PARITY:ODDPAR
2762                                        ;;MAINT. MODE:MEXT
2763                                        ;;
2764  012176  012737  000027  001122  TST23: MOV     #23,TSTNO       ;SAVE THIS
2765  012204  012737  012456  001112        MOV     #.EOP,NEXT      ;GO TO THIS TEST WHEN THRU
2766  012212  105737  001177                TSTB    JMPBY   ;JUMP AROUND TEST ?
2767  012216  100116                        BPL     4$      ;YES ?
2768  012220  052777  000400  004610        BIS     #MRESET,@TXCSR  ;MASTER RESET
2769  012226  012777  020000  004576        MOV     #SYNEXT,@PARCSR ;SET THE MODE
2770  012234  052777  000400  004574        BIS     #MRESET,@TXCSR  ;MASTER RESET
2771
2772                                    ;SET MAINTENANCE MODE & SEND
2773                                        ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
2774  012242  012777  010020  004566        MOV     #MEXT!SEND,@TXCSR
2775
2776                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
2777  012250  012777  027026  004554        MOV     #SYNEXT!EIGHT!ODDPAR!26,@PARCSR
2778  012256  013703  017026                MOV     RXDBUF,R3       ;SETUP FOR ERROR MSG
2779  012262  005004                        CLR     R4      ;FOR DATA CHAR CREATION
2780  012264  110477  004552                MOVB    R4,@TXDBUF      ;LOAD CHARACTER
2781  012270  052777  000020  004524        BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
2782                                    ;GET INTO SYNCRONIZATION
2783  012276  052777  020000  004532        BIS     #CLK,@TXCSR     ;POKE CLK UP
2784                                        ;WAIT FOR CABLE & DRIVER DELAYS
2785  012304  013702  001132                MOV     HOLD,R2 ;WAIT THIS AMT
2786  012310  005302                        DEC     R2      ;WAIT
2787  012312  001376                        BNE     .-2
2788                                        ;EXIT...
2789  012314  042777  020000  004514        BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2790                                        ;WAIT FOR CABLE & DRIVER DELAYS
2791  012322  013702  001132                MOV     HOLD,R2 ;WAIT THIS AMT
2792  012326  005302                        DEC     R2      ;WAIT
2793  012330  001376                        BNE     .-2
2794                                        ;EXIT...
2795  012332  012737  000011  001134  1$:   MOV     #9.,SHIFT       ;# OF SHIFTS
2796  012340  010400                        MOV     R4,R0   ;EXPECTED
2797  012342                            2$:
2798  012342  052777  020000  004466        BIS     #CLK,@TXCSR     ;POKE CLK UP
```

```
2799
2800  012350  013702  001132                ;WAIT FOR CABLE & DRIVER DELAYS
                        MOV     HOLD,R2 ;WAIT THIS AMT
2801  012354  005302                DEC     R2      ;WAIT
2802  012356  001376                BNE     .-2
2803                    ;EXIT...
2804  012360  042777  020000  004450          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2805                    ;WAIT FOR CABLE & DRIVER DELAYS
2806  012366  013702  001132                MOV     HOLD,R2 ;WAIT THIS AMT
2807  012372  005302                DEC     R2      ;WAIT
2808  012374  001376                BNE     .-2
2809                    ;EXIT...
2810  012376  005337  001134                DEC     SHIFT   ;# OF SHIFTS
2811  012402  022737  000003  001134          CMP     #3,SHIFT        ;TIME TO LOAD NEXT CHAR ?
2812  012410  001003                BNE     3$      ;NO ?
2813  012412  005204                INC     R4      ;GENERATE NEXT CHAR
2814  012414  110477  004422                MOVB    R4,@TXDBUF      ;LOAD NEXT CHARACTER
2815  012420  005737  001134          3$:   TST     SHIFT   ;IS IT 0 ?
2816  012424  001346                BNE     2$
2817  012426  105777  004370                TSTB    @RXCSR  ;RXDONE = 1 ?
2818  012432  100401                BMI     .+4
2819  012434  104000                HLT     ;RXDONE SHOULD BE SET
2820  012436  017701  004364                MOV     @RXDBUF,R1      ;ACTUAL
2821  012442  020001                CMP     R0,R1   ;COMPARE EXP VS ACT
2822  012444  001401                BEQ     .+4
2823  012446  104002                HLT     2       ;CHARACTERS SHOULD COMPARE
2824                    ;CHECK OUT MODEM BYPASS JUMPER
2825  012450  105704                TSTB    R4      ;LAST CHARACTER ?
2826  012452  001327                BNE     1$      ;NO
2827  012454  104400          4$:   SCOPE
2828
2829
2830                    ;END OF PASS
2831                    ;TYPE NAME OF TEST
2832                    ;UPDATE PASS COUNT
2833                    ;CHECK FOR EXIT TO ACT-11
2834                    ;RESTART TEST
2835
2836  012456  012700  000062          .EOP: MOV     #50.,R0
2837  012462  000005          2$:   RESET
2838  012464  005300                DEC     R0
2839  012466  001375                BNE     2$
2840  012470  032737  000100  177570          BIT     #SW06,SWR
2841  012476  001402                BEQ     1$
2842  012500  004737  000250                JSR     PC,EOPHLT
2843  012504  104402          1$:   TYPE                            ;TYPE NAME OF TEST
2844  012506  015353                MEPASS
2845  012510  104410  012742                CONVRT  ,OUTCRY
2846  012514  104402  015074                TYPE    ,DEVICE
2847  012520  105737  001176                TSTB    MULTD   ;ARE YOU RUNNING MULTIPLE DEVICES ?
2848  012524  001511                BEQ     CCC     ;NO,JUMP AROUND
2849  012526  005737  001212                TST     ACTREG  ;ARE ANY DEVICES ACTIVE ?
2850  012532  001007                BNE     RUNIT   ;YES
2851  012534  104402  015106                TYPE    ,MCOW   ;NO
2852  012540  013700  001212                MOV     ACTREG,R0       ;DISPLAY ACTREG
2853  012544  000000                HALT            ;SELECT SOMETHING TO RUN @ ACTREG:
2854                    ;SELECT SWITCHES & HIT CONTINUE (PUT SW00 =1)
```

```
2855  012546  000137  001246                        JMP     .START  ;START OVER AGAIN.....YOU DESELECTED EVERYTHING
2856  012552  062737  000010  001200  RUNIT:        ADD     #10,BASEADD     ;NEXT BLOCK (ADDRESSES)
2857  012560  062737  000010  001206  ZERO:         ADD     #10,BASEIV      ;NEXT BLOCK (VECTORS)
2858  012566  000241                                CLC
2859  012570  006137  001214                        ROL     ROTADD  ;UP DATE ROTATING POINTER
2860  012574  103410                                BCS     2$      ;IS IT THE LAST DEVICE
2861                                                            ;TO BE TESTED IN THIS PASS ?
2862  012576  033737  001214  001212                BIT     ROTADD,ACTREG   ;TEST THIS DEVICE FOR ACTIVE STATUS
2863  012604  001762                                BEQ     RUNIT   ;IF NOT ACTIVE, TRY NEXT ADDRESS
2864  012606  004737  012646                        JSR     PC,REPLAY       ;CALCULATE NEW PARAMETERS
2865  012612  000137  013012                        JMP     RESTRT  ;YES IT WAS ACTIVE,TEST THIS DEVICE
2866  012616  012737  000001  001214  2$:           MOV     #1,ROTADD       ;OK!,NOW SET UP  ROTATING
2867                                                        ;POINTER FOR NEXT MULTIPLE PASS
2868  012624  013737  001202  001200                MOV     KEEPADD,BASEADD ;RESTORE BASE ADDRESS
2869  012632  013737  001210  001206                MOV     KEEPIV,BASEIV   ;RESTORE BASE INTERRUPT VECTORS
2870  012640  004737  012646                        JSR     PC,REPLAY       ;CALC NEW PARAMETERS
2871  012644  000441                                BR      CCC     ;JUMP AROUND REPLAY
2872  012646  013737  001200  016524  REPLAY:       MOV     BASEADD,DUBASE  ;SET UP FOR NEW ADDRESSES
2873  012654  004737  016372                        JSR     PC,DUADDR       ;CREATE NEW ADDRESSES
2874  012660  013737  001206  017046                MOV     BASEIV,DURIV    ;CREATE DURIV
2875  012666  062737  000002  001206                ADD     #2,BASEIV
2876  012674  013737  001206  017050                MOV     BASEIV,DURIS    ;CREATE DURIS
2877  012702  062737  000002  001206                ADD     #2,BASEIV
2878  012710  013737  001206  017052                MOV     BASEIV,DUTIV    ;CREATE DUTIV
2879  012716  062737  000002  001206                ADD     #2,BASEIV
2880  012724  013737  001206  017054                MOV     BASEIV,DUTIS    ;CREATE DUTIS
2881  012732  013737  017046  001206                MOV     DURIV,BASEIV    ;RESTORE
2882  012740  000207                                RTS     PC
2883
2884  012742  000001                        OUTCRY: 1
2885  012744     006      002                        .BYTE   6,2
2886  012746  017022                                RXCSR
2887
2888  012750                                CCC:
2889  012750  005037  001130                        CLR     LSTERR                  ;CLEAR LAST ERROR PC
2890  012754  005037  001220                        CLR     ERRFLG                  ;CLEAR ERROR FLAG
2891  012760  005237  001124                        INC     PASCNT                  ;UPDATE PASS COUNT
2892  012764  013737  001124  177570                MOV     PASCNT,LIGHTS           ;DISPLAY PASS COUNT
2893  012772  013701  000042                        MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
2894  012776  001405                                BEQ     RESTRT                  ;IF NOT, CONTINUE TESTING
2895  013000  000005                                RESET
2896  013002  004711                        LOGICAL:        JSR     PC,(R1)
2897  013004  000240                                NOP
2898  013006  000240                                NOP
2899  013010  000240                                NOP
2900  013012  012737  000340  177776  RESTRT:       MOV     #340,PS ;PREVENT INTERRUPTS (PRIO: 7)
2901  013020  012737  002224  001110                MOV     #TST1,RETURN
2902  013026  000137  002224                        JMP     TST1
2903
2904                                                ;SCOPE LOOP AND INTERATION HANDLER
2905
2906  013032                                .SCOPE:
2907                                        ;**** START OF CODE FOR THE X OR TESTER ******
2908  013032  000424                                BR      4$      ;IF RUNNING ON THE X OR TESTER CHANGE
2909                                                        ;THIS INSTRUCTION TO A "NOP"(NOP=240)
2910  013034  013746  000004                        MOV     @#4,-(SP)       ;SAVE CONTENTS OF ERROR VECTOR
```

```
2911  013040  012737  013060  000004          MOV     #1$,@#4         ;SET FOR TIME OUT
2912  013046  005737  177060                  TST     @#177060        ;TIME OUT ON  X OR ?
2913  013052  012637  000004                  MOV     (SP)+,@#4       ;RESTORE ERROR VECTOR
2914  013056  000404                          BR      2$      ;GO TO NEXT TEST
2915  013060  022626                  1$:     CMP     (SP)+,(SP)+     ;CLEAR THE STACK AFTER A TIMEOUT
2916  013062  012637  000004                  MOV     (SP)+,@#4       ;RESTORE ERROR VECTOR
2917  013066  000403                          BR      3$      ;LOOP ON PRESENT TEST
2918  013070  013737  001112  001110  2$:     MOV     NEXT,RETURN     ;SET UP NEXT TEST IN RETURN
2919  013076  013716  001110          3$:     MOV     RETURN,(SP)     ;SET UP STACK FOR RTI
2920  013102  000002                          RTI
2921  013104                          4$:     ;**** END OF CODE FOR THE  X OR TESTER ******
2922  013104  032737  040000  177570          BIT     #SW14,SWR       ;LOOP ON CURRENT TEST ?
2923  013112  001407                  TTST:   BEQ     1$
2924  013114  000432                          BR      3$
2925  013116  105777  165756                  TSTB    @TKCSR  ;TEST TTY FLAG
2926  013122  100027                          BPL     3$
2927  013124  017700  165752                  MOV     @TKDBR,R0       ;CLR DONE BIT
2928  013130  000412                          BR      2$      ;IF A TTY KEY IS STRUCK GO TO NEXT TST
2929  013132  032737  004000  177570  1$:     BIT     #SW11,SWR       ;INHIBIT ITERATIONS ?
2930  013140  001006                          BNE     2$
2931  013142  005237  001120                  INC     LPCNT
2932  013146  023737  001120  001116          CMP     LPCNT,ICOUNT    ;CHECK FOR ITERATION CNT FINISH
2933  013154  101412                          BLOS    3$
2934  013156  105027  001220          2$:     CLRB    ERRFLG
2935  013162  005037  001120                  CLR     LPCNT
2936  013166  012737  000005  001116          MOV     #5,ICOUNT       ;SET UP ITERATION COUNT
2937  013174  013737  001112  001110          MOV     NEXT,RETURN     ;SET UP NEXT TEST IN RETURN
2938  013202  013716  001110          3$:     MOV     RETURN,(SP)     ;SET UP STACK FOR RTI
2939  013206  000002                          RTI
2940  013210  001407                  BRW:    1407    ;RESTORE "BEQ 1$" INSTRUCTION
2941  013212  000432                  BRX:    432     ;RESTORE "BR 3$" INSTRUCTION
2942
2943                                          ;CHECK FOR FREEZE ON CURRENT DATA
2944
2945  013214  032737  001000  177570  .SCOP1: BIT     #SW09,SWR
2946  013222  001402                          BEQ     1$
2947  013224  013716  001114                  MOV     LOCK,(SP)
2948  013230  000002                  1$:     RTI
2949
2950                                          ;TELETYPE OUTPUT ROUTINE
2951
2952  013232  017605  000000          .TYPE:  MOV     @(SP),R5
2953  013236  062716  000002                  ADD     #2,(SP)
2954  013242  105715                  1$:     TSTB    (R5)    ;LOOK FOR "0"
2955  013244  001406                          BEQ     3$
2956  013246  105777  165632          2$:     TSTB    @TPCSR  ;TEST DONE BIT
2957  013252  100375                          BPL     2$
2958  013254  112577  165626                  MOVB    (R5)+,@TPDBR    ;TYPE CHAR
2959  013260  000770                          BR      1$      ;DO IT AGAIN UNTIL "0" IS SEEN
2960  013262  000002                  3$:     RTI
2961
2962                                          ;ASCII STRING INPUT ROUTINE
2963
2964  013264  017637  000000  013300  .INSTR: MOV     @(SP),.MSG      ;PICK UP MESSAGE
2965  013272  062716  000002                  ADD     #2,(SP)         ;JUMP AROUND MESSAGE FOR RTI
2966  013276  104402                  .INST1: TYPE
```

```
2967  013300  000000                  .MSG:   0
2968  013302  012704  016150                  MOV     #INBUF,R4       ;GET STARTING LOC OF INBUF
2969  013306  012703  000007                  MOV     #7,R3           ;MAX # OF CHARS
2970  013312  105777  165562          1$:     TSTB    @TKCSR  ;TTY FLAG
2971  013316  100375                          BPL     1$
2972  013320  117714  165556                  MOVB    @TKDBR,(R4)     ;TAKE CHAR
2973  013324  142714  000200                  BICB    #200,(R4)       ;STRIP
2974  013330  122427  000015                  CMPB    (R4)+,#15       ;CHECK FOR CR
2975  013334  001413                          BEQ     INSTR2
2976  013336  105777  165542          2$:     TSTB    @TPCSR  ;TEST FLAG
2977  013342  100375                          BPL     2$
2978  013344  117777  165532  165534          MOVB    @TKDBR,@TPDBR   ;ECHO CHARACTER
2979  013352  005303                          DEC     R3      ;DID YOU TYPE TOO MANY CHARS ?
2980  013354  001356                          BNE     1$
2981  013356  104402                  .INSTE: TYPE
2982  013360  015257                          MQM     ;?
2983  013362  000745                          BR      .INST1  ;RETRY
2984  013364  000002                  INSTR2: RTI
2985
2986                                          ;CONVERT ASCII STRING TO OCTAL
2987
2988  013366  011605                  .PARAM: MOV     (SP),R5 ;PUT CONTENTS OF SP INTO R5
2989  013370  012537  013542                  MOV     (R5)+,LOLIM     ;PUT LOW LIMIT INTO LOLIM
2990  013374  012537  013544                  MOV     (R5)+,HILIM     ;PUT HIGH LIMIT INTO HILIM
2991  013400  012537  013546                  MOV     (R5)+,DEVADR    ;PUT STORE LOC INTO DEVADR
2992  013404  112537  013550                  MOVB    (R5)+,LOBITS    ;PUT MASK INTO LOBITS
2993  013410  112537  013551                  MOVB    (R5)+,ADRCNT    ;PUT COUNT INTO ADRCNT
2994  013414  010516                          MOV     R5,(SP) ;RESTORE RETURN ADDR ON STACK FOR RTI
2995  013416  005005                  PARAM1: CLR     R5
2996  013420  012704  016150                  MOV     #INBUF,R4
2997  013424  122714  000015                  CMPB    #15,(R4)        ;CR ?
2998  013430  001420                          BEQ     PARERR  ;YOU TYPED CR TOO SOON !
2999  013432  121427  000060          1$:     CMPB    (R4),#60        ;LOW LIMIT ASCII 0
3000  013436  002415                          BLT     PARERR
3001  013440  121427  000067                  CMPB    (R4),#67        ;HIGH LIMIT ASCII 7
3002  013444  003012                          BGT     PARERR
3003  013446  142714  000060                  BICB    #60,(R4)        ;CONVERT TO OCTAL
3004  013452  152405                          BISB    (R4)+,R5        ;STORE AWAY ITS AN OK CHAR
3005  013454  122714  000015                  CMPB    #15,(R4)        ;CR ?
3006  013460  001406                          BEQ     LIMITS  ;NOW CHECK FOR HIGH &LOW LIMIT CONDS
3007  013462  006305                          ASL     R5      ;ALLOCATE ROOM FOR NEXT CHAR
3008  013464  006305                          ASL     R5
3009  013466  006305                          ASL     R5
3010  013470  000760                          BR      1$
3011  013472  104404                  PARERR: INSTER  ;RETRY
3012  013474  000750                          BR      PARAM1
3013
3014                                          ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
3015
3016  013476  020537  013544          LIMITS: CMP     R5,HILIM
3017  013502  101373                          BHI     PARERR  ;THE # IS TOO HIGH
3018  013504  020537  013542                  CMP     R5,LOLIM
3019  013510  103770                          BLO     PARERR  ;THE # IS TOO LOW
3020  013512  133705  013550                  BITB    LOBITS,R5       ;TEST BY MASKINGTHE #
3021  013516  001365                          BNE     PARERR
3022
```

```
                                        ;STORE NUMBER AT SPECIFIED ADDRESS

013520  013704  013546                 MOV     DEVADR,R4       ;GET STARTING ADDR OF
013524  010524                  1$:     MOV     R5,(R4)+        ;STORE AT THIS ADDR
013526  062705  000002                  ADD     #2,R5
013532  105337  013551                  DECB    ADRCNT  ;HOW MANY TIMES + 2 ?
013536  001372                          BNE     1$
013540  000002                          RTI
013542  000000                  LOLIM:  0
013544  000000                  HILIM:  0
013546  000000                  DEVADR: 0
013550  000000                  LOBITS: 0
        013551                  ADRCNT=LOBITS+1

                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5

013552  016637  000004  001170          .SAV05: MOV     4(SP),SAVPC

                                        ;SAVE R0-R5

013560  010537  001164                  SV05:   MOV     R5,SAVR5
013564  010437  001162                          MOV     R4,SAVR4
013570  010337  001160                          MOV     R3,SAVR3
013574  010237  001156                          MOV     R2,SAVR2
013600  010137  001154                          MOV     R1,SAVR1
013604  010037  001152                          MOV     R0,SAVR0
013610  000002                          RTI

                                        ;RESTORE R0-R5

013612  013700  001152                  .RES05: MOV     SAVR0,R0
013616  013701  001154                          MOV     SAVR1,R1
013622  013702  001156                          MOV     SAVR2,R2
013626  013703  001160                          MOV     SAVR3,R3
013632  013704  001162                          MOV     SAVR4,R4
013636  013705  001164                          MOV     SAVR5,R5
013642  000002                          RTI

                                        ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER

013644  104402                  .CONVR: TYPE
013646  015263                          MCRLF   ;CR  LF
013650  017601  000000                  MOV     @(SP),R1        ;PICK UP DATA POINTER
013654  062716  000002                  ADD     #2,(SP) ;SET UP SP FOR RTI
013660  012137  014014                  MOV     (R1)+,WRDCNT    ;PICK UP # OF WORDS FROM TABLE
013664  112137  014016          1$:     MOVB    (R1)+,CHRCNT    ;PICK UP # OF CHARS FROM TABLE
013670  112137  014017                  MOVB    (R1)+,SPACNT    ;PICK UP # OF SPACES FROM TABLE
013674  013137  014020                  MOV     @(R1)+,BINWRD   ;PICK UP ADDRESS OF  MSG
                                                                ;FROM TABLE
013700  013704  014020          2$:     MOV     BINWRD,R4       ;SAVE
013704  113705  014016                  MOVB    CHRCNT,R5       ;SAVE
013710  012700  016212                  MOV     #TEMP,R0        ;STARTING ADDRESS OF TEMP BLOCK
013714  010403                  3$:     MOV     R4,R3           ;SAVE
013716  042703  177770                  BIC     #177770,R3      ;CLR OUT UPPER BITS .. SAVE CHAR
013722  062703  000260                  ADD     #260,R3 ;CONVERT TO ASCII
013726  110320                          MOVB    R3,(R0)+        ;STORE AWAY
```

```
3079  013730  006204                        ASR     R4      ;SHIFT FOR NEXT #
3080  013732  006204                        ASR     R4      ;DITTO
3081  013734  006204                        ASR     R4      ;DITTO
3082  013736  005305                        DEC     R5      ;DEC CHAR COUNT
3083  013740  001365                        BNE     3$      ;DO IT AGAIN ?
3084  013742  012703  016254                MOV     #MDATA,R3       ;STARTING ADDRESS OF MDATA BLOCK
3085  013746  114023              4$:       MOVB    -(R0),(R3)+     ;REVERSE THE ORDER OF NUMBERS
3086  013750  105337  014016                DECB    CHRCNT  ;DEC CHAR COUNT
3087  013754  001374                        BNE     4$      ;DO IT AGAIN ?
3088  013756  105737  014017                TSTB    SPACNT  ;HOW MANY SPACES ?
3089  013762  001405                        BEQ     6$      ;TYPE # IF BR =0
3090  013764  112723  000240        5$:     MOVB    #240,(R3)+      ;"SPACE" IN ASCII
3091  013770  105337  014017                DECB    SPACNT  ;DEC # OF SPACE COUNT
3092  013774  001373                        BNE     5$      ;DO IT AGAIN ?
3093  013776  105013              6$:       CLRB    (R3)    ;INSERT "0" FOR TTY OUTPUT ROUTINE
3094  014000  104402                        TYPE
3095  014002  016254                        MDATA   ;THIS MESSAGE
3096  014004  005337  014014                DEC     WRDCNT  ;HOW MANY #'S ?
3097  014010  001325                        BNE     1$      ;DO THIS ROUTINE AGAIN IF NOT EQUAL TO 0
3098  014012  000002                        RTI     ;RETURN TO PROGRAM
3099  014014  000000              WRDCNT: 0
3100  014016  000000              CHRCNT: 0
3101           014017              SPACNT=CHRCNT+1
3102  014020  000000              BINWRD: 0
3103
3104                                        ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
3105                                        ;BUFFER TO THE CHARACTERS "N" AND "Y".
3106                                        ;IF THE CHARACTER IS "N" CLEAR THE FLAG
3107                                        ;IF THE CHARACTER IS "Y" SET THE FLAG
3108
3109  014022  017605  000000      .SETFLG:MOV     @(SP),R5
3110  014026  122737  000116  016150        CMPB    #'N,INBUF       ;IS IT "N" ?
3111  014034  001002                        BNE     1$
3112  014036  105015                        CLRB    (R5)    ;000
3113  014040  000406                        BR      2$
3114  014042  122737  000131  016150  1$:   CMPB    #'Y,INBUF       ;IS IT "Y" ?
3115  014050  001005                        BNE     3$
3116  014052  112715  177777              MOVB    #-1,(R5)        ;377
3117  014056  062716  000002        2$:     ADD     #2,(SP)
3118  014062  000002                        RTI
3119  014064  104404              3$:       INSTER  ;RETRY
3120  014066  000755                        BR      .SETFLG
3121                                        ;TRAP DISPATCH SERVICE
3122                                        ;ARGUMENT OF TRAP IS EXTRACTED
3123                                        ;AND USED AS OFFSET TO OBTAIN POINTER
3124                                        ;TO SELECTED SUBROUTINE
3125
3126  014070  011646              .TRPSR: MOV     (SP),-(SP)      ;GET PC OF RETURN
3127  014072  162716  000002              SUB     #2,(SP)         ;=PC OF TRAP
3128  014076  017616  000000              MOV     @(SP),(SP)      ;GET TRP
3129  014102  006316              TRPOK:  ASL     (SP)            ;MULTIPLY TRAP ARG BY 2
3130  014104  042716  177001              BIC     #177001,(SP)    ;CLEAR UNWANTED BITS
3131  014110  062716  001222              ADD     #.TRPTAB,(SP)   ;POINTER TO SUBROUTINE ADDRESS
3132  014114  017616  000000              MOV     @(SP),(SP)      ;SUBROUTINE ADDRESS
3133  014120  000136                      JMP     @(SP)+          ;GO TO SUBROUTINE
3134
```

```
                                                        ;ERROR HANDLER
                                                .HLT:   BIT     #SW13,SWR       ;INHIBIT ERROR TYPE OUT ?
                                                        BNE     HALTS
                                                        CMP     (SP),LSTERR
                                                        BEQ     1$
                                                        MOV     (SP),LSTERR
                                                        CLRB    ERRFLG
                                                1$:     SAV05
                                                        MOV     (SP),R5
                                                        SUB     #2,R5
                                                        MOV     #ERRST,R2
                                                        MOV     R5,(R2)+
                                                        MOV     (R5),R4
                                                        ASL     R4
                                                        ADD     (R5),R4
                                                        ASL     R4
                                                        BIC     #177001,R4
                                                        ADD     #.ERRTAB,R4
                                                        MOV     (R4)+,ERRMSG
                                                        MOV     (R4)+,DATAHD
                                                        MOV     (R4),DATABP
                                                        TSTB    ERRFLG
                                                        BEQ     TYPMSG
                                                        TST     DATABP
                                                        BNE     TYPDAT
                                                TYPMSG: CONVRT
                                                        ERTABO
                                                        MOVB    #-1,ERRFLG
                                                        TYPE
                                                ERRMSG: 0
                                                        TST     DATAHD
                                                        BEQ     TYPDAT
                                                        TYPE
                                                DATAHD: 0
                                                TYPDAT: TST     DATABP
                                                        BEQ     RESREG
                                                        MOV     SAVR3,(R2)+
                                                        MOV     SAVR0,(R2)+
                                                        MOV     SAVR1,(R2)+
                                                        MOV     #0,(R2)+
                                                        CONVRT
                                                DATABP: 0
                                                RESREG: RES05
                                                HALTS:  TST     SWR
                                                        BPL     EXITER
                                                        PUSHR0
                                                        MOV     2(SP),R0
                                                        HALT
                                                        POPR0
                                                EXITER: INC     ERRCNT
                                                        BIT     #SW08,SWR       ;LOOP ON ERROR ?
                                                        BNE     1$
                                                        BIT     #SW10,SWR       ;ESCAPE TO NEXT ON ERROR ?
                                                        BEQ     2$
                                                        MOV     NEXT,RETURN     ;SET UP FOR NEXT TEST
```

```
3191  014374  012706  001100          1$:     MOV     #STACK,SP       ;REINITIALIZE SP
3192  014400  000177  164504                  JMP     @RETURN
3193  014404  000002                  2$:     RTI
3194  014406  000001                  ERTABO: 1
3195  014410     006     002                  .BYTE   6,2
3196  014412  001170                          SAVPC
3197                                          ;ENTER HERE ON POWER FAILURE
3198
3199
3200  014414  010046                  .PFAIL: MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
3201  014416  010146                          MOV     R1,-(SP)
3202  014420  010246                          MOV     R2,-(SP)
3203  014422  010346                          MOV     R3,-(SP)
3204  014424  010446                          MOV     R4,-(SP)
3205  014426  010546                          MOV     R5,-(SP)
3206  014430  013746  000024                  MOV     24,-(SP)
3207  014434  010637  001166                  MOV     SP,SAVSP                ;SAVE STACK POINTER
3208  014440  012737  014452  000024          MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
3209  014446  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
3210  014450  000777                          BR      .
3211
3212                                          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
3213
3214  014452  013706  001166          RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
3215  014456  012605                          MOV     (SP)+,R5                ;RESTORE R0-R5
3216  014460  012604                          MOV     (SP)+,R4
3217  014462  012603                          MOV     (SP)+,R3
3218  014464  012602                          MOV     (SP)+,R2
3219  014466  012601                          MOV     (SP)+,R1
3220  014470  012600                          MOV     (SP)+,R0
3221  014472  012737  014414  000024          MOV     #.PFAIL,24              ;SET UP FOR POWER FAILURE
3222  014500  012737  000340  177776          MOV     #340,PS
3223  014506  012706  001100                  MOV     #STACK,SP
3224  014512  005037  016212                  CLR     TEMP
3225  014516  005237  016212                  INC     TEMP
3226  014522  001375                          BNE     .-4
3227  014524  104410                          CONVRT
3228  014526  014550                          PFTAB
3229  014530  104402                          TYPE
3230  014532  015266                          MPFAIL
3231  014534  005037  001220                  CLR     ERRFLG
3232  014540  005037  001130                  CLR     LSTERR
3233  014544  000177  164340                  JMP     @RETURN
3234  014550  000001                  PFTAB:  1
3235  014552     006     002                  .BYTE   6,2
3236  014554  000207                          RETURN
3237  014556  005015  042012  030525  MTITLE: .ASCIZ  <15><12><12>/DU11 DDDUA-A TAPE COMBINED EXERCIZER /<15><12>
3238  014564  020061  042104  052504
3239  014572  026501  020101  040524
3240  014600  042520  041440  046517
3241  014606  044502  042516  020104
3242  014614  054105  051105  044503
3243  014622  042532  020122  005015
3244  014630     000
3245  014631     015  053012  041505  MVECTO: .ASCIZ  <15><12>/VECTOR ADDRESS-/
3246  014636  047524  020122  042101
```

```
3247  014644  051104  051505  026523
3248  014652     000
3249  014653     015  030412  052123  MREGAD: .ASCIZ  <15><12>/1ST DEVICE: RECEIVER CONTROL REGISTER ADDRESS-/
3250  014660  042040  053105  041511
3251  014666  035105  051040  041505
3252  014674  044505  042526  020122
3253  014702  047503  052116  047522
3254  014710  020114  042522  044507
3255  014716  052123  051105  040440
3256  014724  042104  042522  051523
3257  014732  000055
3258  014734  005015  051101  020105  MMULT:  .ASCIZ  <15><12>/ARE YOU RUNNING MULTIPLE DEVICES ? (Y OR N)-/
3259  014742  047531  020125  052522
3260  014750  047116  047111  020107
3261  014756  052515  052114  050111
3262  014764  042514  042040  053105
3263  014772  041511  051505  037440
3264  015000  024040  020131  051117
3265  015006  047040  026451     000
3266  015013     015  046012  051501  MLASTD: .ASCIZ  <15><12>/LAST DEVICE:RECEIVER CONTROL REGISTER ADDRESS-/
3267  015020  020124  042504  044526
3268  015026  042503  051072  041505
3269  015034  044505  042526  020122
3270  015042  047503  052116  047522
3271  015050  020114  042522  044507
3272  015056  052123  051105  040440
3273  015064  042104  042522  051523
3274  015072  000055
3275  015074  042075  053105  041511  DEVICE: .ASCIZ  /=DEVICE  /
3276  015102  020105  000040
3277  015106  005015  047510  020127  MCOW:   .ASCIZ  <15><12>/HOW NOW BROWN COW? ...SELECT SOMETHING TO RUN @ACTREG/
3278  015114  047516  020127  051102
3279  015122  053517  020116  047503
3280  015130  037527  027040  027056
3281  015136  042523  042514  052103
3282  015144  051440  046517  052105
3283  015152  044510  043516  052040
3284  015160  020117  052522  020116
3285  015166  040500  052103  042522
3286  015174  000107
3287  015176  005015  052517  020124  MRANGE: .ASCIZ  <15><12>/OUT OF RANGE:RETYPE LAST DEVICE RXCSR ADDRESS-/
3288  015204  043117  051040  047101
3289  015212  042507  051072  052105
3290  015220  050131  020105  040514
3291  015226  052123  042040  053105
3292  015234  041511  020105  054122
3293  015242  051503  020122  042101
3294  015250  051104  051505  026523
3295  015256     000
3296  015257     040  037440     000  MQM:    .ASCIZ  /  ?/
3297  015263     015  000012          MCRLF:  .ASCIZ  <15><12>
3298  015266  020040  047520  042527  MPFAIL: .ASCIZ  /  POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS/
3299  015274  020122  040506  046111
3300  015302  051125  026105  050040
3301  015310  047522  051107  046501
3302  015316  051040  051505  040524
```

```
3303  015324  052122  040440  020124
3304  015332  042524  052123  044440
3305  015340  020116  051120  043517
3306  015346  042522  051523     000
3307  015353     015  042412  042116  MEPASS: .ASCIZ  <15><12>/END OF PASS TAPE DDDUA-A/
3308  015360  047440  020106  040520
3309  015366  051523  052040  050101
3310  015374  020105  042104  052504
3311  015402  026501  000101
3312  015406  005015  000122          MR:     .ASCIZ  <15><12>/R/
3313  015412  005015  042524  052123  MTSTPC: .ASCIZ  <15><12>/TEST PC-/
3314  015420  050040  026503     000
3315  015425     015  046012  041517  MLOCK:  .ASCIZ  <15><12>/LOCK ON SELECTED TEST? (Y OR N)-/
3316  015432  020113  047117  051440
3317  015440  046105  041505  042524
3318  015446  020104  042524  052123
3319  015454  020077  054450  047440
3320  015462  020122  024516  000055
3321  015470  005015  052504  050040  MLEVEL: .ASCIZ  <15><12>/DU PRIORITY LEVEL-/
3322  015476  044522  051117  052111
3323  015504  020131  042514  042526
3324  015512  026514     000
3325  015515     015  021412  047440  MSYNC:  .ASCIZ  <15><12>/# OF SYNC CHARS SELECTED ( 1 OR 2)-/
3326  015522  020106  054523  041516
3327  015530  041440  040510  051522
3328  015536  051440  046105  041505
3329  015544  042524  020104  020050
3330  015552  020061  051117  031040
3331  015560  026451     000
3332  015563     015  044412  020123  MWIRE6: .ASCIZ  <15><12>/IS SEC XMIT JUMPER #6 IN? (Y OR N)-/
3333  015570  042523  020103  046530
3334  015576  052111  045040  046525
3335  015604  042520  020122  033043
3336  015612  044440  037516  024040
3337  015620  020131  051117  047040
3338  015626  026451     000
3339  015631     015  044412  020123  MWIRE5: .ASCIZ  <15><12>/IS SEC REC JUMPER #5 IN? (Y OR N)-/
3340  015636  042523  020103  042522
3341  015644  020103  052512  050115
3342  015652  051105  021440  020065
3343  015660  047111  020077  054450
3344  015666  047440  020122  024516
3345  015674  000055
3346  015676  005015  051511  047440  MWIRE4: .ASCIZ  <15><12>/IS OPT CLR ENABLE JUMPER #4 IN? (Y OR N)-/
3347  015704  052120  041440  051114
3348  015712  042440  040516  046102
3349  015720  020105  052512  050115
3350  015726  051105  021440  020064
3351  015734  047111  020077  054450
3352  015742  047440  020122  024516
3353  015750  000055
3354  015752  005015  051101  020105  MEXTJ:  .ASCII  <15><12>/ARE YOU RUNNING IN MAINT MODE EXTERNAL?/
3355  015760  047531  020125  052522
3356  015766  047116  047111  020107
3357  015774  047111  046440  044501
3358  016002  052116  046440  042117
```

```
3359  016010  020105  054105  042524
3360  016016  047122  046101     077
3361  016023     015  000412  047101          .ASCII  <15><12><1>/AND ..... DO YOU HAVE THE EXTERNAL MODEM BYPASS/
3362  016030  020104  027056  027056
3363  016036  020056  047504  054440
3364  016044  052517  044040  053101
3365  016052  020105  044124  020105
3366  016060  054105  042524  047122
3367  016066  046101  046440  042117
3368  016074  046505  041040  050131
3369  016102  051501     123
3370  016105     015  000412  052512          .ASCIZ  <15><12><1>/JUMPER CONNECTOR ON ?(Y OR N)-/
3371  016112  050115  051105  041440
3372  016120  047117  042516  052103
3373  016126  051117  047440  020116
3374  016134  024077  020131  051117
3375  016142  047040  026451     000
3376          016150                  .EVEN
3377
3378                                  ;BUFFERS FOR INPUT-OUTPUT
3379
3380  016150  000000                  INBUF:  0
3381          016212                  .=.+40
3382  016212  000000                  TEMP:   0
3383          016254                  .=.+40
3384  016254  000000                  MDATA:  0
3385          016316                  .=.+40
3386                                  ;*****************************************************************
3387                                          ;UTILITIES
3388                                  ;*****************************************************************
3389
3390                                  ;THIS UTILITY CALCULATES PRIORITY LEVEL
3391  016316  006337  016366          DULEV:  ASL     DUPRT   ;SHIFT LEFT
3392  016322  006337  016366                  ASL     DUPRT   ;
3393  016326  006337  016366                  ASL     DUPRT   ;
3394  016332  006337  016366                  ASL     DUPRT   ;
3395  016336  006337  016366                  ASL     DUPRT   ;
3396  016342  013737  016366  016370          MOV     DUPRT,LESS1     ;MOVE THIS TO LESS1
3397  016350  162737  000001  016370          SUB     #1,LESS1        ;CREATE LESS1
3398  016356  042737  000037  016370          BIC     #37,LESS1       ;CLEAR TNZVC
3399  016364  000207                          RTS     PC
3400  016366  000240                  DUPRT:  LEVEL5
3401  016370  000200                  LESS1:  LEVEL4  ;LEVEL TO ALLOW INTERRUPTS
3402
3403                                          ;NEW DU ADDRESSES
3404  016372  013737  016524  017022  DUADDR: MOV     DUBASE,RXCSR    ;XXX0
3405  016400  005237  016524                  INC     DUBASE
3406  016404  013737  016524  017024          MOV     DUBASE,HRXCSR   ;XXX1
3407  016412  005237  016524                  INC     DUBASE
3408  016416  013737  016524  017026          MOV     DUBASE,RXDBUF   ;XXX2
3409  016424  013737  016524  017032          MOV     DUBASE,PARCSR   ;XXX2
3410  016432  005237  016524                  INC     DUBASE
3411  016436  013737  016524  017030          MOV     DUBASE,HRXDBUF  ;XXX3
3412  016444  013737  016524  017034          MOV     DUBASE,HPARCSR  ;XXX3
3413  016452  005237  016524                  INC     DUBASE
3414  016456  013737  016524  017036          MOV     DUBASE,TXCSR    ;XXX4
```

```
3415  016464  005237  016524                  INC     DUBASE
3416  016470  013737  016524  017040          MOV     DUBASE,HTXCSR   ;XXX5
3417  016476  005237  016524                  INC     DUBASE
3418  016502  013737  016524  017042          MOV     DUBASE,TXDBUF   ;XXX6
3419  016510  005237  016524                  INC     DUBASE
3420  016514  013737  016524  017044          MOV     DUBASE,HTXDBUF  ;XXX7
3421  016522  000207                          RTS     PC
3422  016524  000000                  DUBASE: 0
3423
3424                                          ;THIS UTILITY POKES THE MAINT DATA BASED UPON THE
3425                                          ;INFORMATION CONTAINED IN TEMP1 AND IT IS
3426                                          ;SHIFTED IN BY THE CONTENTS OF SHIFT
3427  016526  042777  040000  000302  RPOKE:  BIC     #MTDATA,@TXCSR
3428  016534  005037  001142                  CLR     TEMP2
3429  016540  006037  001140                  ROR     TEMP1   ;FORCE CARRY
3430  016544  006037  001142                  ROR     TEMP2   ;PICK UP CARRY IN BIT 15
3431  016550  006237  001142                  ASR     TEMP2   ;SHIFT INTO BIT 14
3432  016554  042737  100000  001142          BIC     #BIT15,TEMP2    ;CLR BIT 15
3433  016562  053777  001142  000246          BIS     TEMP2,@TXCSR    ;POKE MAINT DATA
3434  016570  042777  020000  000240          BIC     #CLK,@TXCSR     ;POKE CLK
3435  016576  052777  020000  000232          BIS     #CLK,@TXCSR     ;
3436  016604  005337  001134                  DEC     SHIFT
3437  016610  001346                          BNE     RPOKE
3438  016612  000207                          RTS     PC
3439                                          ;THIS ROUTINE CALCULATES ODD PARITY FOR AN 8 BIT CHAR
3440  016614  013737  001140  001142  ODD8:   MOV     TEMP1,TEMP2     ;SAVE TEMP1
3441  016622  005037  001144                  CLR     TEMP3
3442  016626  012727  000010                  MOV     #8.,(PC)+
3443  016632  000000                  4$:     0
3444  016634  006037  001142          1$:     ROR     TEMP2
3445  016640  005537  001144                  ADC     TEMP3
3446  016644  005337  016632                  DEC     4$
3447  016650  001371                          BNE     1$
3448  016652  006037  001144                  ROR     TEMP3
3449  016656  103404                          BCS     2$
3450  016660  052737  000400  001140          BIS     #BIT8,TEMP1     ;SET ODD PARITY
3451  016666  000403                          BR      3$
3452  016670  042737  000400  001140  2$:     BIC     #BIT8,TEMP1     ;CLR EVEN PARITY
3453                                          ;TEMP1 NOW HAS ODD PARITY CHARACTER
3454  016676  000207                  3$:     RTS     PC
3455
3456                                          ;THIS ROUTINE CALCULATES EVEN PARITY FOR AN 8 BIT CHARACTER
3457  016700  013737  001140  001142  EVENB:  MOV     TEMP1,TEMP2     ;SAVE TEMP1
3458  016706  005037  001144                  CLR     TEMP3
3459  016712  012727  000010                  MOV     #8.,(PC)+
3460  016716  000000                  4$:     0
3461  016720  006037  001142          1$:     ROR     TEMP2
3462  016724  005537  001144                  ADC     TEMP3
3463  016730  005337  016716                  DEC     4$
3464  016734  001371                          BNE     1$
3465  016736  006037  001144                  ROR     TEMP3
3466  016742  103004                          BCC     2$
3467  016744  052737  000400  001140          BIS     #BIT8,TEMP1     ;SET EVEN PARITY
3468  016752  000403                          BR      3$
3469  016754  042737  000400  001140  2$:     BIC     #BIT8,TEMP1     ;CLR ODD PARITY
3470                                          ;TEMP1 NOW HAS EVEN PARITY CHARACTER
```

```
3471  016762  000207                    3$:     RTS     PC
3472
3473  016764  062716  000002            TRPREG: ADD     #2,(SP) ;ALLOW IT TO "CRUNCH" INTO HLT BACK
3474                                              ;IN MAIN PART OF THE PROGRAM
3475  016770  000002                            RTI
3476                                    ;ERROR HLT TABLE
3477  016772  017056                    .ERRTAB:        EM0     ;HLT 0  BIT ERROR (GENERAL)
3478  016774  000000                                    0
3479  016776  000000                                    0
3480  017000  017072                                    EM1     ;HLT 1  REGISTER ERROR
3481  017002  017243                                    DH1
3482  017004  017264                                    DT1
3483  017006  017134                                    EM2     ;HLT 2  RECEIVER ERROR
3484  017010  017243                                    DH1
3485  017012  017264                                    DT1
3486  017014  017176                                    EM3     ;HLT 3  TRANSMITTER ERROR
3487  017016  017243                                    DH1
3488  017020  017264                                    DT1
3489                                    ;DEFAULT DU ADDRESSES
3490  017022  160040                    RXCSR:  160040
3491  017024  160041                    HRXCSR: 160041
3492  017026  160042                    RXDBUF: 160042
3493  017030  160043                    HRXDBUF:        160043
3494  017032  160042                    PARCSR: 160042
3495  017034  160043                    HPARCSR:        160043
3496  017036  160044                    TXCSR:  160044
3497  017040  160045                    HTXCSR: 160045
3498  017042  160046                    TXDBUF: 160046
3499  017044  160047                    HTXDBUF:        160047
3500                                    ;DEFAULT DU VECTORS
3501  017046  000330                    DURIV:  330     ;REC INTR VECTOR
3502  017050  000332                    DURIS:  332     ;REC INTR STATUS
3503  017052  000334                    DUTIV:  334     ;XMIT INTR VECTOR
3504  017054  000336                    DUTIS:  336     ;XMIT INTR STATUS
3505                                    ;ERROR MESSAGES
3506  017056  036440  042440  051122    EM0:    .ASCIZ  / = ERROR PC/
3507  017064  051117  050040  000103
3508  017072  036440  051040  043505    EM1:    .ASCIZ  / = REGISTER ERROR PC/<15><12><1>/REGISTER  /
3509  017100  051511  042524  020122
3510  017106  051105  047522  020122
3511  017114  041520  005015  051001
3512  017122  043505  051511  042524
3513  017130  020122  000040
3514  017134  036440  051040  041505    EM2:    .ASCIZ  / = RECEIVER ERROR PC/<15><12><1>/REGISTER  /
3515  017142  044505  042526  020122
3516  017150  051105  047522  020122
3517  017156  041520  005015  051001
3518  017164  043505  051511  042524
3519  017172  020122  000040
3520  017176  036440  052040  040522    EM3:    .ASCIZ  / = TRANSMITTER ERROR PC/<15><12><1>/REGISTER  /
3521  017204  051516  044515  052124
3522  017212  051105  042440  051122
3523  017220  051117  050040  006503
3524  017226  000412  042522  044507
3525  017234  052123  051105  020040
3526  017242     000
```

```
                                                ;DATA HEADERS FOR ERROR MESSAGES
017243   000105  050130  041505  DH1:    .ASCIZ  /EXPECTED  ACTUAL/
017250   042524  020104  040440
017256   052103  040525  000114
                         .EVEN
                                                ;DATA TABLES FOR ERROR MESSAGES
017264   000003                 DT1:    3
017266   000006  000004                 .BYTE   6,4
017270   001160                 SAVR3   ;REGISTER
017272   000006  000004                 .BYTE   6,4
017274   001152                 SAVR0   ;EXPECTED DATA
017276   000006  000002                 .BYTE   6,2
017300   001154                 SAVR1   ;ACTUAL DATA
         017400                 .=017400
017400   000020                 ERRST:  .BLKW 20
         000001                 .END
```

```
AAA     001722          1278#
ACTREG  001212          1114#  1226*  1240*  1241*  1248*  2849   2852   2862
ADRCNT= 013551          2993*  3028*  3035#
BASEAD  001200          1109#  1208*  1245*  1246   1252*  1254*  2856*  2868*  2872
BASEIV  001206          1112#  1218*  2857*  2869*  2874   2875*  2876   2877*  2878   2879*  2880   2881*
BBB     001540          1225   1229#
BINWRD  014020          3070*  3072   3102#
BITW  = 002000           765#  1788   1846   1899   1952   2090
BIT0  = 000001           713#   741    772
BIT1  = 000002           712#   740
BIT10 = 002000           703#   731    765   1543
BIT11 = 004000           702#   730
BIT12 = 010000           701#   729    746
BIT13 = 020000           700#   728    745    764
BIT14 = 040000           699#   727    744    763
BIT15 = 100000           698#   726    743    762   3432
BIT2  = 000004           711#   739   1321
BIT3  = 000010           710#   738    771
BIT4  = 000020           709#   737    770
BIT5  = 000040           708#   736    769
BIT6  = 000100           707#   735    766
BIT7  = 000200           706#   734    767
BIT8  = 000400           705#   733    749    766   3450   3452   3467   3469
BIT9  = 001000           704#   732    748
BREAK = 000001           772#  1364   1419   1474   1524   1568   1607   1643   1689   1997   2209   2358
BRW     013210          1318   1332   2940#
BRX     013212          1319   1333   2941#
CARDET= 010000           729#
CCC     012750          2848   2871   2888#
CHRCNT  014016          3068*  3073   3086*  3100#  3101
CLK   = 020000           764#  1364   1370   1371   1373   1374   1419   1425   1426   1428   1429   1474   1480
                        1481   1524   1530   1531   1533   1534   1568   1574   1575   1607   1613   1614   1616
                        1617   1643   1649   1650   1652   1653   1689   1697   1698   1700   1701   1783   1784
                        1790   1791   1801   1841   1842   1848   1849   1859   1894   1895   1901   1902   1912
                        1947   1948   1954   1955   1965   1997   2003   2004   2006   2007   2020   2021   2023
                        2024   2059   2060   2065   2066   2072   2073   2087   2088   2138   2139   2142   2143
                        2167   2168   2209   2216   2217   2219   2220   2358   2364   2365   2413   2414   2455
                        2456   2459   2460   2468   2698   2699   2702   2703   2717   2718   2744   2783   2789
                        2798   2804   3434   3435
CONVRT= 104410          1157#  2845   3161   3176   3227
COUNT   001136          1085#  1619*  1626*  1655*  1662*  1694*  1709*  1720*  1734*  1736   1738   2025*  2032*
                        2137*  2149*  2158*  2171*  2221*  2226*  2270*  2274*  2278*  2576*  2580*  2620   2624*
                        2665   2710*  2721*
CTS   = 020000           728#
DATABP  014316          3156*  3159   3170   3177#
DATAHD  014264          3155*  3166   3169#
DEVADR  013546          2991*  3025   3033#
DEVICE  015074          2846   3275#
DH1     017243          3481   3484   3487   3528#
DNA   = 100000           762#
DNAINT= 000040           769#  2466   2479   2488
DSC   = 100000           726#
DSINTE= 000040           736#  2325   2331   2339   2386   2398   2402   2426
DSR   = 001000           732#
DTR   = 000002           740#  2332   2379
DT1     017264          3482   3485   3488   3533#
```

```
DUADDR  016372  1207  2873  3404#
DUBASE  016524  1203  1206  2872*  3404  3405*  3406  3407*  3408  3409  3410*  3411  3412  3413*
                3414  3415*  3416  3417*  3418  3419*  3420  3422#
DULEV   016316  1273  3391#
DUPRT   016366  1270  2317  2367  2464  2503  2570  2572  3391*  3392*  3393*  3394*  3395*  3396
                3400#
DURIS   017050  2317*  2327  2328*  2336  2337*  2367*  2389  2390*  2421  2422*  2570*  2596  2597*
                2613  2614*  2643  2644*  2876*  3502#
DURIV   017046  1214  1217  1218  2316*  2327*  2336*  2366*  2377*  2389*  2421*  2569*  2596*  2613*
                2643*  2874*  2881  3501#
DUTIS   017054  2464*  2481  2482*  2485  2486*  2503*  2532  2533*  2572*  2598  2599*  2615  2616*
                2645  2646*  2880*  3504#
DUTIV   017052  2463*  2481*  2485*  2502*  2514*  2532*  2571*  2598*  2615*  2645*  2878*  3503#
EIGHT = 006000   757#  1367  1422  1477  1527  1571  1646  1692  1777  1888  1941  2000  2048
                2133  2212  2361  2451  2555  2777
EM0     017056  3477  3506#
EM1     017072  3480  3508#
EM2     017134  3483  3514#
EM3     017176  3486  3520#
EOPHLT  000250  1050#  2842
ERRCNT  001126  1078#  1177*  3185*
ERRFLG  001220  1124#  1176*  2890*  2934*  3142*  3157  3163*  3231*
ERRMSG  014252  3154*  3165#
ERRST   017400  3146  3541#
ERTABO  014406  3162  3194#
EVENB   016700  1540  1581  3457#
EVEPAR= 001400   760#  1527  1571  1692  1835  1888  1941
EVPAR = 000400   749#
EXITER  014342  3180  3185#
FIVE  = 000000   754#  1610  2692
FRMERR= 020000   745#  1746  1749  1752
HALTS   014322  3138  3179#
HDXEN = 000010   771#
HILIM   013544  2990*  3016  3032#
HOLD    001132  1083#  2785  2791  2800  2806
HPARCS  017034  3412*  3495#
HRXCSR  017024  3406*  3491#
HRXDBU  017030  3411*  3493#
HTXCSR  017040  3416*  3497#
HTXDBU  017044  3420*  3499#
ICOUNT  001116  1074#  2932  2936*
INBUF   016150  1281  1285  2968  2996  3110  3114  3380#
INIFLG  001216  1122#  1182  1185*
INSTER= 104404  1145#  1289  3011  3119
INSTR = 104403  1142#  1198  1209  1219  1230  1255  1265  1279  1292  1296  1300  1304  1323
                1336
INSTR2  013364  2975  2984#
ISYMOD= 000000   753#  1360  1367  1415  1422  1520  1527  1685  1692  1827  1835
JMPBY   001177  1105#  1307  2313  2350  2766
KEEPAD  001202  1110#  1206*  1208  1252  1254  2868
KEEPIV  001210  1113#  1217*  2869
LASTAD  001204  1111#  1235  1246  1260
LESS1   016370  2318  2368  2382  2465  2504  2573  3396*  3397*  3398*  3401#
LEVEL0= 000000   723#
LEVEL1= 000040   722#
LEVEL2= 000100   721#
```

```
LEVEL3= 000140            720#
LEVEL4= 000200            719#   3401
LEVEL5= 000240            718#   3400
LEVEL6= 000300            717#
LEVEL7= 000340            716#   2321   2341   2372   2394   2432   2475   2489   2512   2520   2535   2593   2610
                         2641   2671
LIGHTS= 177570             683#   2892*
LIMITS  013476            3006   3016#
LOBITS  013550            2992*  3020   3034#  3035
LOCK    001114            1073#  2047*  2688*  2947
LOGICA  013002            2896#
LOKFLG  001221            1125#  1326   1327
LOLIM   013542            2989*  3018   3031#
LPCNT   001120            1075#  1173*  2931*  2932   2935*
LSTERR  001130            1079#  1178*  2889*  3139   3141*  3232*
MCOW    015106            2851   3277#
MCRLF   015263            3064   3297#
MDATA   016254            3084   3095   3384#
MEPASS  015353            2844   3307#
MEXT  = 010000             776#  2774
MEXTJ   015752            1305   3354#
MINT  = 004000             775#  1364   1419   1474   1524   1568   1607   1643   1689   1774   1832   1885   1938
                         1997   2052   2130   2209   2358   2448   2693
MLASTD  015013            1231   3266#
MLEVEL  015470            1266   3321#
MLOCK   015425            1324   3315#
MMULT   014734            1220   3258#
MPFAIL  015266            3230   3298#
MQM     015257            2982   3296#
MR      015406            1346   3312#
MRANGE  015176            1256   3287#
MREGAD  014653            1199   3249#
MRESET= 000400             766#  1359   1361   1414   1416   1469   1471   1519   1521   1563   1565   1602   1604
                         1638   1640   1684   1686   1768   1770   1826   1828   1879   1881   1932   1934   1992
                         1994   2049   2051   2124   2126   2204   2206   2315   2353   2355   2442   2444   2501
                         2546   2548   2689   2749   2768   2770
MSYNC   015515            1280   3325#
MTDATA= 040000             763#  1364   1419   1474   1524   1568   1607   1643   1689   1997   2209   2358   2408
                         2412   3427
MTITLE  014556            1184   3237#
MTSTPC  015412            1337   3313#
MULTD   001176            1104#  1222   1223   1315   2847
MVECTO  014631            1210   3245#
MWIRE4  015676            1301   3346#
MWIRE5  015631            1297   3339#
MWIRE6  015563            1293   3332#
NEXT    001112            1072#  1358*  1413*  1468*  1518*  1562*  1601*  1637*  1683*  1767*  1825*  1878*  1931*
                         1989*  2046*  2122*  2199*  2312*  2349*  2440*  2500*  2545*  2687*  2765*  2918   2937
                         3190
NOPAR = 000000             758#  1367   1422   1477   1610   1646   1777   2000   2048   2133   2212   2361   2451
                         2555   2692
ODDPAR= 001000             759#  2777
ODD8    016614            3440#
ONCE    001350            1183   1186#
OPTCLR  001175            1103#  1303
OUTCRY  012742            2845   2884#
```

```
OUTMUL  001700          1228    1253    1264#
OVRRUN= 040000           744*   1746    2176
PARAM = 104405          1148#   1200    1211    1232    1257    1267    1338
PARAM1  013416          2995#   3012
PARCSR  017032          1360*   1367*   1415*   1422*   1470*   1477*   1520*   1527*   1564*   1571*   1603*   1610*   1639*
                        1646*   1685*   1692*   1769*   1777*   1827*   1835*   1880*   1888*   1933*   1941*   1993*   2000*
                        2050*   2053*   2125*   2133*   2205*   2212*   2354*   2361*   2443*   2451*   2547*   2555*   2694*
                        2708*   2769*   2777*   3409*   3494#
PAREN = 001000           748#
PARER = 010000           746*   1721    1746    1752
PARERR  013472          2998    3000    3002    3011#   3017    3019    3021
PASCNT  001124          1077#   1175*   2891*   2892
PC    =%000007           678#   1056*   1207*   1273*   1379*   1391*   1395*   1434*   1446*   1450*   1486*   1498*   1502*
                        1540*   1545*   1581*   1583*   1622*   1658*   1705*   1724*   1743*   2010*   2016*   2031*   2225*
                        2237*   2249*   2258*   2277*   2288*   2842*   2864*   2870*   2873*   2882*   2896*   3399*   3421*
                        3438*   3442*   3454*   3459*   3471*
PFTAB   014550          3228    3234#
POPRO = 012600           692#   3184
POP1SP= 005726           690#
POP2SP= 022626           694#
PS    = 177776           684#   1170*   1311*   2318*   2321*   2341*   2368*   2372*   2382*   2394*   2432*   2465*   2475*
                        2489*   2504*   2512*   2520*   2535*   2573*   2593*   2610*   2641*   2671*   2900*   3222*
PUSHRO= 010046           691#   3181
PUSH1S= 005746           689#
PUSH2S= 024646           693#
RECACT= 004000           730#   2011    2026    2034    2232    2238    2242    2251    2259    2280    2704    2726
REPLAY  012646          2864    2870    2872#
RESREG  014320          3171    3178#
RESTAR  014452          3208    3214#
RESTRT  013012          2865    2894    2900#
RESOS = 104407          1154#   3178
RETURN  001110          1071#   1180*   1345*   1347    2901*   2918*   2919    2937*   2938    3190*   3192    3233
RING  = 040000           727#
RINTEN= 000100           735#   2386    2398    2402    2426    2581    2595    2618    2642
ROTADD  001214          1117#   1227*   1239*   1241    1243*   1248    1251*   2859*   2862    2866*
RPOKE   016526          1379    1391    1395    1434    1446    1450    1486    1498    1502    1545    1583    1622    1658
                        1705    1724    1743    2010    2016    2031    2225    2237    2249    2258    2277    2288    3427#
                        3437
RTS   = 000004           739#
RUNIT   012552          2850    2856#   2863
RXCSR   017022          1368*   1380    1423*   1435    1478*   1487    1528*   1572*   1611*   1618*   1623    1647*   1654*
                        1659    1695*   1702*   1706    1725    2001*   2011    2026    2034    2135*   2146    2173    2214*
                        2232    2238    2241*   2242    2250*   2251    2254    2259    2262    2280    2283    2289    2322
                        2325*   2331*   2332*   2339*   2362*   2373    2379*   2386*   2395    2398*   2402*   2426*   2556*
                        2581*   2595*   2611    2618*   2642*   2652    2695*   2704    2726    2750    2781*   2817    2886
                        3404*   3490#
RXDBUF  017026          1375    1383    1398    1430    1438    1453    1482    1490    1505    1535    1546    1576    1584
                        1693    1712    1728    2136    2152    2177    2222    2266    2293    2380    2423    2425    2574
                        2612    2690    2731    2778    2820    3408*   3492#
RXDONE= 000200           734#
RXERR = 100000           743#   1721    1746    1749    1752    2176
R0    =%000000           671#   1189*   1192*   1194*   1376*   1384    1396*   1399    1431*   1439    1451*   1454    1483*
                        1491    1503*   1506    1537*   1547    1578*   1585    1711*   1716    1721*   1729    1746*   1749*
                        1752*   1785*   1788*   1794    1802*   1805    1843*   1846*   1852    1860*   1863    1896*   1899*
                        1905    1913*   1916    1949*   1952*   1958    1966*   1969    2082*   2083*   2096    2151*   2153
                        2176*   2178    2265*   2267    2292*   2294    2333*   2334*   2383*   2384*   2418*   2419*   2424*
```

```
STFLG   001217          1123#  1174*
STPSYN= 000400           733#  1618   1654   1702   2135   2556
SVOS    013560          3043#
SWR    = 177570           682#  1186   1321   1334   2840   2922   2929   2945   3137   3179   3186   3188
SW00   = 000001           665#  1186
SW01   = 000002           664#  1334
SW02   = 000004           663#
SW03   = 000010           662#
SW04   = 000020           661#
SW05   = 000040           660#
SW06   = 000100           659#  2840
SW08   = 000400           658#  3186
SW09   = 001000           657#  2945
SW10   = 002000           656#  3188
SW11   = 004000           655#  2929
SW12   = 010000           654#
SW13   = 020000           653#  3137
SW14   = 040000           652#  2922
SW15   = 100000           651#
SYNCNO  001172          1100#  1283*  1287*  1990   2201   2229   2272   2578   2724
SYNEXT= 020000           752#  1470   1477   1564   1571   2125   2133   2354   2361   2443   2451   2769   2777
SYNINT= 030000           751#  1603   1610   1639   1646   1769   1777   1880   1888   1933   1941   1993   2000
                        2048   2050   2205   2212   2547   2555   2692
SYNSCH= 000020           737#  1368   1423   1478   1528   1572   1611   1647   1695   2001   2135   2214   2241
                        2250   2362   2556   2695   2750   2781
SYSTST= 014000           777#  2552
TEMP    016212          3074   3224*  3225*  3382#
TEMP1   001140          1086#  1378*  1390*  1394*  1433*  1445*  1449*  1485*  1497*  1501*  1539*  1542*  1543*
                        1580*  1620*  1656*  1704*  1722*  1742*  1745*  1748*  1751*  1780*  1786*  1838*  1844*
                        1891*  1897*  1944*  1950*  2009*  2015*  2030*  2224*  2236*  2276*  2287*  2404*  2410*
                        3429*  3440   3450*  3452*  3457   3467*  3469*
TEMP2   001142          1087#  3428*  3430*  3431*  3432*  3433   3440*  3444*  3457*  3461*
TEMP3   001144          1088#  3441*  3445*  3448*  3458*  3462*  3465*
TEMP4   001146          1089#
TEMP5   001150          1090#  2562*  2566*  2567   2586*  2590*  2591   2634*  2638*  2639
TKCSR   001100          1064#  2925   2970
TKDBR   001102          1065#  2927   2972   2978
TLAST  = 012176          1340  2830#
TPCSR   001104          1066#  2956   2976
TPDBR   001106          1067#  2958*  2978*
TRPOK   014102          3129#
TRPREG  016764          3473#
TSTNO   001122          1076#  1179*  1357*  1412*  1467*  1517*  1561*  1600*  1636*  1682*  1766*  1824*  1877*
                        1930*  1988*  2045*  2121*  2198*  2311*  2348*  2439*  2499*  2544*  2686*  2764*
TST1    002224          1339   1345   1357#  2901   2902
TST10   004732          1767   1824#
TST11   005154          1825   1877#
TST12   005376          1878   1930#
TST13   005620          1931   1988#
TST14   006122          1989   2045#
TST15   006420          2046   2121#
TST16   006722          2122   2198#
TST17   007452          2199   2311#
TST18   007652          2312   2348#
TST19   010316          2349   2439#
TST2    002466          1358   1412#
```

DDDUAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
TST20   010612          2440    2499#
TST21   011006          2500    2544#
TST22   011650          2545    2686#
TST23   012176          2687    2764#   2830
TST24 = ****** U        2765
TST3    002730          1413    1467#
TST4    003156          1468    1517#
TST5    003356          1518    1561#
TST6    003526          1562    1600#
TST7    003712          1601    1636#
TST8    004076          1637    1682#
TST9    004500          1683    1766#
TTST    013112          1318*   1319*   1329*   1330*   1332*   1333*   2923#
TXCSR   017036          1359*   1361*   1364*   1370*   1371*   1373*   1374*   1414*   1416*   1419*   1425*   1426*   1428*
                        1429*   1469*   1471*   1474*   1480*   1481*   1519*   1521*   1524*   1530*   1531*   1533*   1534*
                        1563*   1565*   1568*   1574*   1575*   1602*   1604*   1607*   1613*   1614*   1616*   1617*   1638*
                        1640*   1643*   1649*   1650*   1652*   1653*   1684*   1686*   1689*   1697*   1698*   1700*   1701*
                        1768*   1770*   1774*   1778    1783*   1784*   1790*   1791*   1792    1801*   1803    1810    1826*
                        1828*   1832*   1836    1841*   1842*   1848*   1849*   1850    1859*   1861    1879*   1881*   1885*
                        1889    1894*   1895*   1901*   1902*   1903    1912*   1914    1932*   1934*   1938*   1942    1947*
                        1948*   1954*   1955*   1956    1965*   1967    1992*   1994*   1997*   2003*   2004*   2006*   2007*
                        2020*   2021*   2023*   2024*   2049*   2051*   2052*   2054    2059*   2060*   2061    2065*   2066*
                        2067    2072*   2073*   2076    2087*   2088*   2090    2124*   2126*   2130*   2138*   2139*   2142*
                        2143*   2167*   2168*   2204*   2206*   2209*   2216*   2217*   2219*   2220*   2315*   2353*   2355*
                        2358*   2364*   2365*   2408*   2412*   2413*   2414*   2442*   2444*   2448*   2455*   2456*   2459*
                        2460*   2466*   2469*   2476    2479*   2488*   2501*   2505*   2522    2534*   2546*   2548*   2552*
                        2582*   2594*   2619*   2633*   2689*   2693*   2698*   2699*   2702*   2703*   2711    2717*   2718*
                        2744*   2745    2749*   2768*   2770*   2774*   2783*   2789*   2798*   2804*   3414*   3427*   3433*
                        3434*   3435*   3496#
TXDBUF  017042          1779*   1837*   1890*   1943*   2057*   2134*   2159*   2452*   2585*   2632*   2700*   2709*   2780*
                        2814*   3418*   3498#
TXDONE= 000200           767#
TXINTE= 000100           768#   2505    2534    2582    2594    2619    2633
TYPDAT  014266          3160    3167    3170#
TYPE  = 104402          1139#   1184    1346    2843    2846    2851    2966    2981    3063    3094    3164    3168    3229
TYPMSG  014236          3158    3161#
USER  = 000000           774#
VOID  = 000001           741#
WRDCNT  014014          3067*   3096*   3099#
ZERO    012560          2857#
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                        1637    1638#   1683    1684#   1767    1768#   1825    1826#   1878    1879#   1931    1932#   1989
                        1990#   2046    2048#   2122    2123#   2199    2200#   2312    2313#   2349    2350#   2440    2441#
                        2500    2501#   2545    2546#   2687    2689#   2765    2766#
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                        1990#   2045    2048#   2121    2123#   2198    2200#   2311    2313#   2348    2350#   2439    2441#
                        2499    2501#   2544    2546#   2686    2689#   2764    2766#   2830#
$Y    = 000012          1126#   1132    1135#   1138#   1141#   1144#   1147#   1150#   1153#   1156#   1159#   1162#
.     = 017440           779#   780     782     784     786     788     790     792     794     796     798     800     802
                         804    806     808     810     812     814     816     818     820     822     824     826     828
                         830    832     834     836     838     840     842     844     846     848     850     852     854
                         856    858     860     862     864     866     868     870     872     874     876     878     880
                         882    884     886     888     890     892     894     896     898     900     902     904     906
                         908    910     912     914     916     918     920     922     924     926     928     930     932
                         934    936     938     940     942     944     946     948     950     952     954     956     958
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		1046#	1049#	1060#	1381	1385	1400	1436	1440	1455	1488	1492	1507	1548
		1586	1624	1660	1707	1717	1726	1730	1795	1806	1811	1853	1864	1906
		1917	1959	1970	2012	2027	2035	2055	2062	2068	2097	2147	2154	2174
		2179	2202	2233	2239	2243	2252	2255	2260	2263	2268	2281	2284	2290
		2295	2323	2335	2351	2374	2385	2396	2420	2428	2471	2477	2508	2523
		2531	2565	2568	2589	2637	2650	2657	2661	2666	2705	2712	2727	2735
		2746	2751	2787	2793	2802	2808	2818	2822	3210	3226	3376#	3381#	3383#
		3385#	3540#	3541#										
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.CONVR	013644	1158	3063#											
.EOP	012456	2765	2836#											
.ERRTA	016772	3153	3477#											
.HLT	014122	1042	3137#											
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.INST1	013276	2966#	2983											
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.PARAM	013366	1149	2988#											
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.SAV05	013552	1152	3039#											
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DDDUAA.P11 CROSS REFERENCE TABLE -- MACRO NAMES

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ESCAPE      1#
GETPRI      1#
GETSWR      1#
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         2269   2282  2285  2291  2296  2324  2340  2375  2387  2397  2429  2430  2472  2478  2509
         2524   2525  2600  2647  2651  2658  2662  2667  2706  2713  2728  2736  2747  2752  2819
         2823
MULT        1#
NEWTST      1#
POP         1#
PRGEND    634#  2829
PRGFRT    634#   635
PUSH        1#
PUSSYF    634#  2783  2797
REPORT      1#
RSETUP    634#  1359  1414  1469  1519  1563  1602  1638  1684  1992  2204  2353
SETPRI      1#
SETUP       1#
SKIP        1#
SLASH       1#
STARS       1#
SWRSU       1#
TSETUP    634#  1768  1826  1879  1932  2124  2442  2546  2768
TYPBIN      1#
TYPDEC      1#
TYPNAM      1#
TYPNUM      1#
TYPOCS      1#
TYPOCT      1#
TYPTXT      1#
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$BUFFE    634#  3377
$CABLE    634#
$CATCH    634#   778
$CLRVE    634#  1186
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$RECAC    634#
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$RESET    634#  1359  1361  1414  1416  1469  1471  1519  1521  1563  1565  1602  1604  1638  1640
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$SCOPI    634#  2942
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$SYNCR    634#  1368  1423  1528  1611  1647  1695  2001  2214
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$TSTNO    634#  1357  1412  1467  1517  1561  1600  1636  1682  1766  1824  1877  1930  1988  2045
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$UNIBU    634#
$VARIA    634#  1059
$WORDF    634#
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.HEADE      1#
.KT11       1#
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.$APTH      1#
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.$ASTA      1#
.$CATC      1#
.$CMTA      1#
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        3150  3153  3473
ASL     3007  3008  3009  3129  3149  3151  3391  3392  3393  3394  3395
ASR     3079  3080  3081  3431
BCC     1787  1845  1898  1951  2411  3466
BCS     1244  2860  3449
BEQ     1317  1322  1328  1335  1385  1400  1440  1455  1492  1507  1548  1586  1717  1730  1735
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        3167  3171  3189
BGE     2568  2592  2640
BGT     3002
BHI     1247  3017
BIC     1370  1373  1425  1428  1480  1530  1533  1574  1613  1616  1649  1652  1697  1700  1784
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BICB    2973  3003
BIS     1241  1248  1359  1361  1368  1371  1374  1414  1416  1423  1426  1429  1469  1471  1478
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BLO     3019
BLOS    2933
BLT     1197  3000
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CLR     1173  1175  1177  1178  1193  1226  1227  1240  1536  1577  1785  1843  1896  1949  2082
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CLRB    1174  1176  1283  2934  3093  3112  3142
CMP     1196  1246  1384  1399  1439  1454  1491  1506  1547  1585  1716  1729  1736  1738  1794
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DECB    3028  3086  3091
EMT      695
HALT     781   783   785   787   789   791   793   795   797   799   801   803   805   807   809
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JSR     1207  1273  1379  1391  1395  1434  1446  1450  1486  1498  1502  1540  1545  1581  1583
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NOP     1291  1329  1330  2897  2898  2899
RESET   2837  2895
RETURN  1341  3236
ROL     1243  1542  2859
ROR     1786  1844  1897  1950  2410  3429  3430  3444  3448  3461  3465
RORB    2093
RTI     2329  2391  2400  2483  2518  2528  2621  2628  2630  2920  2939  2948  2960  2984  3030
        3049  3059  3098  3118  3193  3475
RTS     1056  2882  3399  3421  3438  3454  3471
SEC     2092
SUB     3127  3145  3397
TRAP    1133  1136  1139  1142  1145  1148  1151  1154  1157  1160
TST     1313  1810  2322  2395  2476  2711  2745  2815  2849  2912  3159  3166  3170  3179
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.ASCIZ  3237  3245  3249  3258  3266  3275  3277  3287  3296  3297  3298  3307  3312  3313  3315
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.BLKW   3541
.BYTE   1100  1101  1102  1103  1104  1105  1122  1123  1124  1125  1204  1205  1215  1216  1236
        1237  1261  1262  1271  1272  1342  1343  2885  3195  3235  3534  3536  3538
.ENABL     1   630   632   634
.END    3542
.ENDC   1359  1375  1414  1430  1469  1482  1519  1535  1544  1563  1576  1582  1602  1618  1638
        1654  1679  1684  1734  1768  1826  1861  1879  1914  1932  1967  1990  2047  2123  2200
        2313  2350  2441  2501  2546  2688  2766  2768  2795  2810
.EQUIV   695
.EVEN   1106  3376  3531
.IF     1358  1368  1413  1423  1468  1478  1518  1528  1541  1562  1572  1582  1601  1611  1637
        1647  1679  1683  1734  1767  1825  1860  1879  1913  1931  1966  1989  2046  2122  2199
        2312  2349  2440  2500  2545  2687  2765  2766  2783  2797
.IFF    1358  1359  1368  1413  1414  1423  1468  1469  1482  1518  1519  1528  1562  1563  1576
        1601  1602  1611  1637  1638  1647  1683  1684  1767  1768  1825  1826  1861  1878  1879
        1913  1931  1932  1966  1989  1990  2046  2047  2122  2123  2199  2200  2312  2313  2349
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        1684  1767  1768  1825  1826  1878  1879  1931  1932  1989  1990  2046  2047  2122  2123
        2199  2200  2312  2313  2349  2350  2440  2441  2500  2501  2545  2546  2687  2688  2765
        2766  2824
.IRP    1132  1135  1138  1141  1144  1147  1150  1153  1156  1159  1357  1358  1412  1413  1467
        1468  1517  1518  1561  1562  1600  1601  1636  1637  1682  1683  1766  1767  1824  1825
        1877  1878  1930  1931  1988  1989  2045  2046  2121  2122  2198  2199  2311  2312  2348
        2349  2439  2440  2499  2500  2544  2545  2686  2687  2764  2765  2830
.LIST      1     4   629   634   648  1126  1135  1138  1141  1144  1147  1150  1153  1156  1159
        1162  1357  1358  1359  1412  1413  1414  1467  1468  1469  1517  1518  1519  1561  1562
        1563  1600  1601  1602  1636  1637  1638  1682  1683  1684  1766  1767  1768  1824  1825
        1826  1877  1878  1879  1930  1931  1932  1988  1989  1990  2045  2046  2047  2048  2121
        2122  2123  2198  2199  2200  2311  2312  2313  2348  2349  2350  2439  2440  2441  2499
        2500  2501  2544  2545  2546  2686  2687  2688  2689  2764  2765  2766  2830
.MACRO     1   634
.NLIST     1     4   634   648  1126  1135  1138  1141  1144  1147  1150  1153  1156  1159  1162
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DDDUAA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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        1357    1358    1359    1412    1413    1414    1467    1468    1469    1517    1518    1519    1561    1562    1563
        1600    1601    1602    1636    1637    1638    1682    1683    1684    1766    1767    1768    1824    1825    1826
        1877    1878    1879    1930    1931    1932    1988    1989    1990    2045    2046    2047    2048    2121    2122
        2123    2198    2199    2200    2311    2312    2313    2348    2349    2350    2439    2440    2441    2499    2500
        2501    2544    2545    2546    2686    2687    2688    2689    2764    2765    2766    2830
.PAGE      4      48     633     667     778    1036    1099
.RADIX  1357    1358    1359    1412    1413    1414    1467    1468    1469    1517    1518    1519    1561    1562    1563
        1600    1601    1602    1636    1637    1638    1682    1683    1684    1766    1767    1768    1824    1825    1826
        1877    1878    1879    1930    1931    1932    1988    1989    1990    2045    2046    2047    2048    2121    2122
        2123    2198    2199    2200    2311    2312    2313    2348    2349    2350    2439    2440    2441    2499    2500
        2501    2544    2545    2546    2686    2687    2688    2689    2764    2765    2766    2830
.REM       5      48
.REPT    780
.TITLE   648
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ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

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RUN-TIME:  40 51 5 SECONDS
RUN-TIME RATIO:  381/97=3.8
CORE USED:  44K  (87 PAGES)
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