

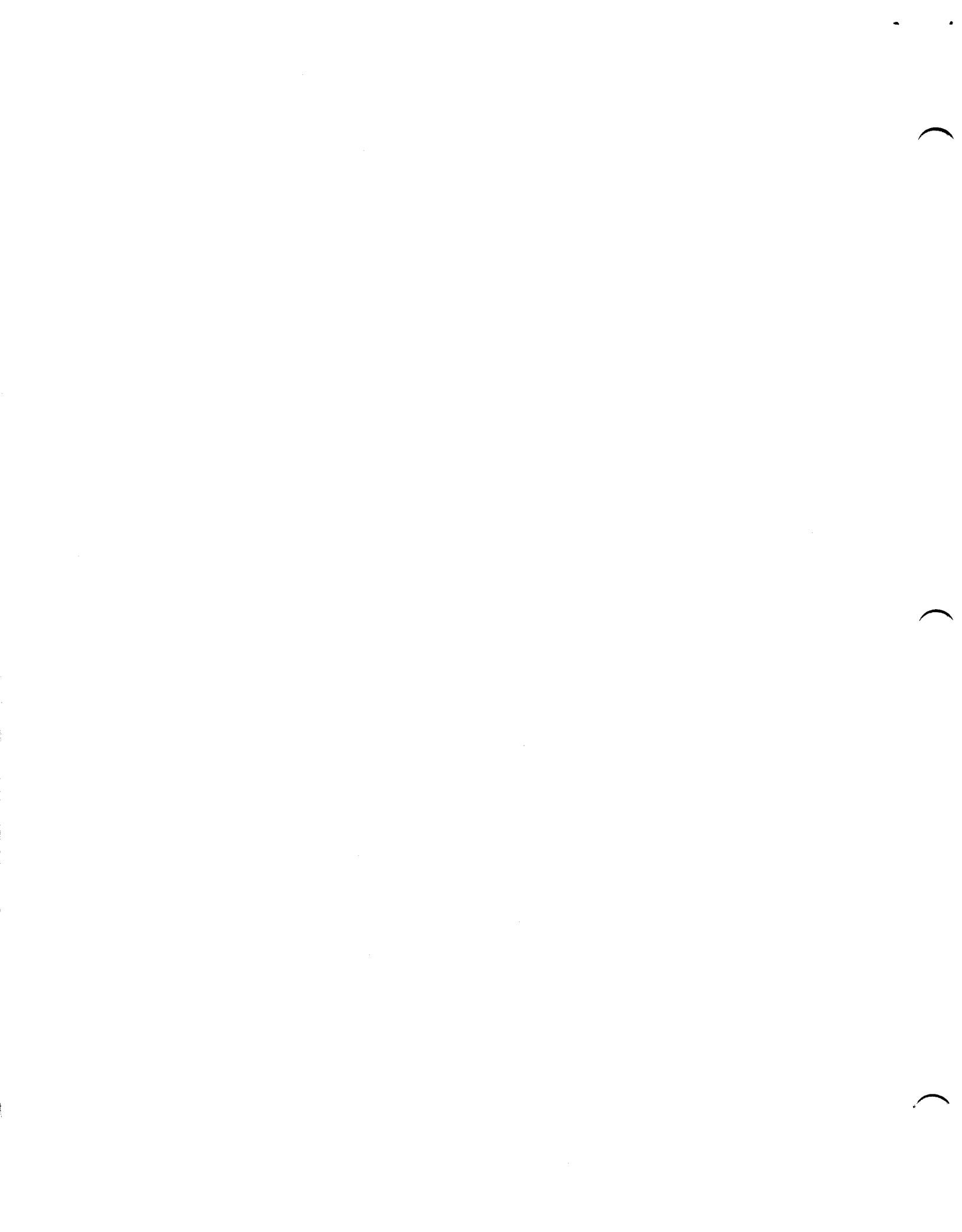
**M. C. N. REQUIRED
THIS PROGRAM REQUIRES MCN(S)
IN ORDER TO WORK PROPERLY**

IDENTIFICATION

PRODUCT CODE: MAINDEC-Ø8-DHKLC-B-D
PRODUCT NAME: KL8F DOUBLE BUFFERED
ASYNCHRONOUS INTERFACE DIAGNOSTIC
DATE REVISED: MAY 1972
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: PATRICK COYNE

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1.0 ABSTRACT

THIS DIAGNOSTIC FACILITATES THE CHECK-OUT OF THE KL8F DOUBLE
SUFFERED ASYNCHRONOUS INTERFACE. THIS IS A CLOSED LOOP TEST,
A METHOD TO CONNECT EIA OUTPUT TO EIA INPUT IS REQUIRED.
REFER TO TEST PROCEDURE M8652-0-3 FOR CONFIGURATION,
ERROR HALTS AND SCOPE LOOPS ARE PROVIDED.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-8E COMPUTER
ASR-33 TELETYPE OR EQUIVALENT DEVICE
M8652 QUAD MODULE
ONE LOOP BACK PLUG #7008517
IF LOOP BACK PLUG IS NOT AVAILABLE, CONNECT PINS
E TO M, AND F TO J ON CONNECTOR J1 OF M8652 MODULE.

2.2 STORAGE

THE PROGRAM OCCUPIES MEMORY LOCATIONS 0000 TO 3000.

3.0 LOADING PROCEDURE

LOAD PROGRAM VIA BINARY LOADER.

4.0 STARTING PROCEDURE

4.1 LOAD STARTING ADDRESS 0200-DEPRESS CONTINUE. PROGRAM WILL HLT AT
LOCATION 0202.

4.2 FIRST PROGRAM HLT (0202) IS TO ALLOW OPERATOR TO SELECT IOT STRUCTURE,
THROUGH THE SWITCHES, FOR WHICH HIS M8652 HAS BEEN JUMPERED TO
OPERATE WITH.

SWITCHES	SELECTS
0-5	RECEIVE IOT
6-11	TRANSMIT IOT

FOR EXAMPLE, IF THE NUMBER 0304 WAS PLACED IN THE SWITCHES THE IOT
STRUCTURE WOULD BE:

RECEIVE -	603X
TRANSMIT -	604X

WHERE X=0-7

DEPRESS CONTINUE
PROGRAM WILL HALT AT LOCATION 0204.

4.3 THE SECOND PROGRAM HLT (0204) IS TO ALLOW THE OPERATOR TO PLACE
IN THE SWITCH REGISTER (S,R.) THE NUMBER OF DATA BITS PER
CHARACTER TO BE TRANSMITTED.
THERE ARE FOUR POSSIBLE COMBINATIONS:

S,R.=0037	(5 DATA BITS)
S,R.=0077	(6 DATA BITS)
S,R.=0177	(7 DATA BITS)
S,R.=0377	(8 DATA BITS)

DEPRESS CONTINUE PROGRAM WILL HALT AT LOCATION 0207.

4.4 THE THIRD PROGRAM HLT (0207) ALLOWS THE OPERATOR TO SELECT THROUGH THE S.R, THE TEST TO BE RUN, BAUD RATE AT WHICH DATA IS TO BE TRANSFERRED, AND THE TOTAL NUMBER OF BITS (INCLUDING START, STOP, PARITY) EACH CHARACTER IS COMPOSED OF. FOR CONTROL SWITCH SETTINGS REFER TO PARA. 5.1
 DEPRESS CONTINUE PROGRAM WILL NOW HALT ONLY IF AN ERROR IS ENCOUNTERED;

5.0 OPERATING PROCEDURE

5.1 CONTROL SWITCH SETTINGS

S.R. BIT(S) SET AS ACTION ON PROGRAM

0	0	STAY IN SCOPE LOOP
	1	EXIT SCOPE LOOP
1,2,3	0	RUN ALL TESTS
	1	TEST ONE ONLY
	2	TEST TWO ONLY
	3	TEST THREE ONLY
	4	TEST FOUR ONLY
	5	TEST FIVE ONLY
	6	TEST SIX ONLY
	7	TEST SEVEN ONLY

4.5 NOT USED

(A) 6,7,8

0	7 BITS PER CHARACTER
1	8 BITS PER CHARACTER
2	9 BITS PER CHARACTER
3	10 BITS PER CHARACTER
4	11 BITS PER CHARACTER
5	12 BITS PER CHARACTER
6	NOT USED
7	NOT USED

(B) 9,10,11

0	110 BAUD
1	134.5 BAUD
2	150 BAUD
3	300 BAUD
4	600 BAUD
5	1200 BAUD
6	1800 BAUD
7	2400 BAUD

NOTE(A) USED TO SELECT TOTAL NUMBER OF BITS PER CHARACTER, INCLUDING DATA (5,6,7 OR 8), START (1), STOP (1 OR 2), PARITY (0,1).

NOTE(B) USED TO SELECT BAUD RATE AT WHICH DATA IS TRANSFERRED;

5.2 THE OPERATOR HAS THE OPTION OF RUNNING ALL TESTS OR ANY ONE TEST, THROUGH THE SETTING OF THE CONTROL SWITCHES, REFER TO PARA 5.1.

5.3 AS AN INDICATION THAT A TEST HAS RUN SUCCESSFULLY THE M.O. REGISTER IS LOADED WITH THE TEST NUMBER (1,2,3,4,5,6,7) AFTER IT HAS MADE A COMPLETE PASS.

6.0 ERRORS

UPON DETECTION OF AN ERROR DURING ANY TEST THE PROGRAM WILL HALT, FOR A DESCRIPTION OF EACH ERROR REFER TO THE PROGRAM LISTING.

6.1 SCOPE LOOPS - ERROR RECOVERY

SCOPE LOOPS ARE PROVIDED FOR ALL ERRORS, TO ENTER SCOPE LOOP AFTER ENCOUNTERING AN ERROR HALT, DEPRESS KEY CONTINUE; ALL SCOPE LOOPS MAY BE EXITED BY PUTTING S.R. 0 TO A ONE.

DUE TO TIMING CONSIDERATIONS TWO DIFFERENT TYPES OF SCOPE LOOP ARE USED; ALL TIMING AND CONTROL TESTS (TST1, TST2, TST3, TST4, TST5, AND TST7A) SCOPE LOOPS WHEN EXITED (SW000) WILL GO TO THE NEXT TEST OR SUBTEST IN SEQUENCE. FOR EXAMPLE, WHEN EXITING A SCOPE LOOP IN TST3A, THE PROGRAM WOULD THEN CONTINUE ON TO TST3B;

ON THE OTHER HAND ALL DATA PATTERN TEST (TST6, TST7B) SCOPE LOOPS WHEN EXITED WILL RETURN TO THE HLT (0207) WHICH REQUIRES THE OPERATOR TO PLACE IN THE S.R. THE CONTROL SWITCH SETTING. AT THIS TIME HE MAY SELECT ANOTHER TEST AND CONTINUE.

7.0 RESTRICTIONS

STARTING RESTRICTIONS

THE OPERATOR HAS THE CHOICE OF THREE RESTART LOCATIONS, RESTARTING AT 0200 WILL NECESSITATE SELECTING IOT STRUCTURE, NUMBER OF DATA BITS PER CHARACTER, AND CONTROL SWITCH SETTINGS; THE SECOND RESTART ADDRESS WOULD BE LOCATION 0203, THE OPERATOR WOULD LOAD ADDRESS 0203 AND THEN SETUP THE NUMBER OF DATA BITS PER CHARACTER BEFORE DEPRESSING CONTINUE, THE PROGRAM WOULD THEN HALT FOR CONTROL SWITCH SETTINGS, THE THIRD RESTART LOCATION WOULD BE ADDRESS 0210; THE OPERATOR WOULD LOAD ADDRESS 0210 AND THEN SETUP THE CONTROL SWITCH SETTINGS BEFORE DEPRESSING CONTINUE.

8.0 PROGRAM DESCRIPTION

THE FIRST FUNCTION PERFORMED BY THE PROGRAM IS TO DETERMINE, THROUGH THE USE OF THE THREE PROGRAM HALTS PREVIOUSLY DESCRIBED (REFER TO PARA 4.0), THE CONFIGURATION OF THE M8652 MODULE REGARDING, IOT STRUCTURE, BIT CONFIGURATION AND BAUD RATE.

8.1 THIS PROGRAM CONTAINS SEVEN TESTS:
TST1 - TRANSMIT CONTROL LOGIC TEST
TST2 - TRANSMIT TIMING TEST
TST3 - RECEIVE CONTROL LOGIC TEST
TST4 - RECEIVE TIMING TEST
TST5 - BREAK TEST
TST6 - DATA TEST
TST7 - STATUS REGISTER TEST

8.2 TST1 - TRANSMIT CONTROL LOGIC TEST

THIS IS A BASIC TEST OF THE TRANSMITTER LOGIC, FUNCTIONS SUCH AS SKIPS, CLEARS, AND SETS ARE CHECKED, NO TIMING IS TAKEN INTO ACCOUNT AT THIS POINT,

8.3 TST2 - TRANSMIT TIMING TEST

THIS TEST BEGINS BY INSURING THAT THE TRANSMIT FLAG CAN BE SET AT A TIME APPROXIMATELY DOUBLE THAT OF THE BAUD RATE SELECTED (TST2A), THEN A TIME MUCH LOWER THAN THE BAUD RATE SELECTED IS USED TO VERIFY THAT THE FLAG IS NOT SETTING TOO SOON, AND FINALLY THE FLAG IS CHECKED AT THE CORRECT BAUD RATE,

8.4 TST3 - RECEIVE CONTROL LOGIC TEST

THIS IS A BASIC TEST OF THE RECEIVER LOGIC, BASIC COMMANDS ARE TESTED SUCH AS SKIPS, CLEARS, AND SETS, NO TIMING OR CHECKING OF DATA TRANSFERS IS PERFORMED,

8.5 TST4 - RECEIVE TIMING TEST

IS SIMILAR IN FUNCTION TO THE TRANSMIT TIMING TEST, IN THAT GROSS TIMES ARE FIRST USED TO VERIFY THAT THE RECEIVE FLAG CAN BE SET AND CLEARED, ONCE THIS IS VERIFIED THE CORRECT BAUD RATE IS THEN TESTED,

8.6 TST5 - BREAK TEST

CHECKS THE ABILITY OF UTPK TO GENERATE A BREAK AND AFTER APPROXIMATELY 235 MILS TO SET THE TRANSMIT FLAG, FLAG IS ALSO CHECKED FOR SETTING TOO SOON AND TOO LATE,

8.7 TST6 - DATA TEST

THIS TEST IS DIVIDED INTO TWO SECTIONS, TST6A WHICH GENERATES AND TRANSMITS A BINARY COUNT PATTERN, AND TST6B WHICH GENERATES AND TRANSMITS A RANDOM DATA PATTERN, EACH SECTION OF THIS TEST WHEN IT ENCOUNTERS AN ERROR WILL HALT WITH THE BAD DATA PATTERN IN THE AC. DEPRESSING KEY CONTINUE WILL STEP THE PROGRAM TO A SECOND HALT WHICH WILL DISPLAY THE GOOD DATA PATTERN IN THE AC. DEPRESSING KEY CONTINUE A SECOND TIME WILL PUT THE PROGRAM INTO A SCOPE LOOP. REFER TO PARA. 6.1 FOR INFORMATION REGARDING THE EXITING OF A DATA TEST SCOPE LOOP.

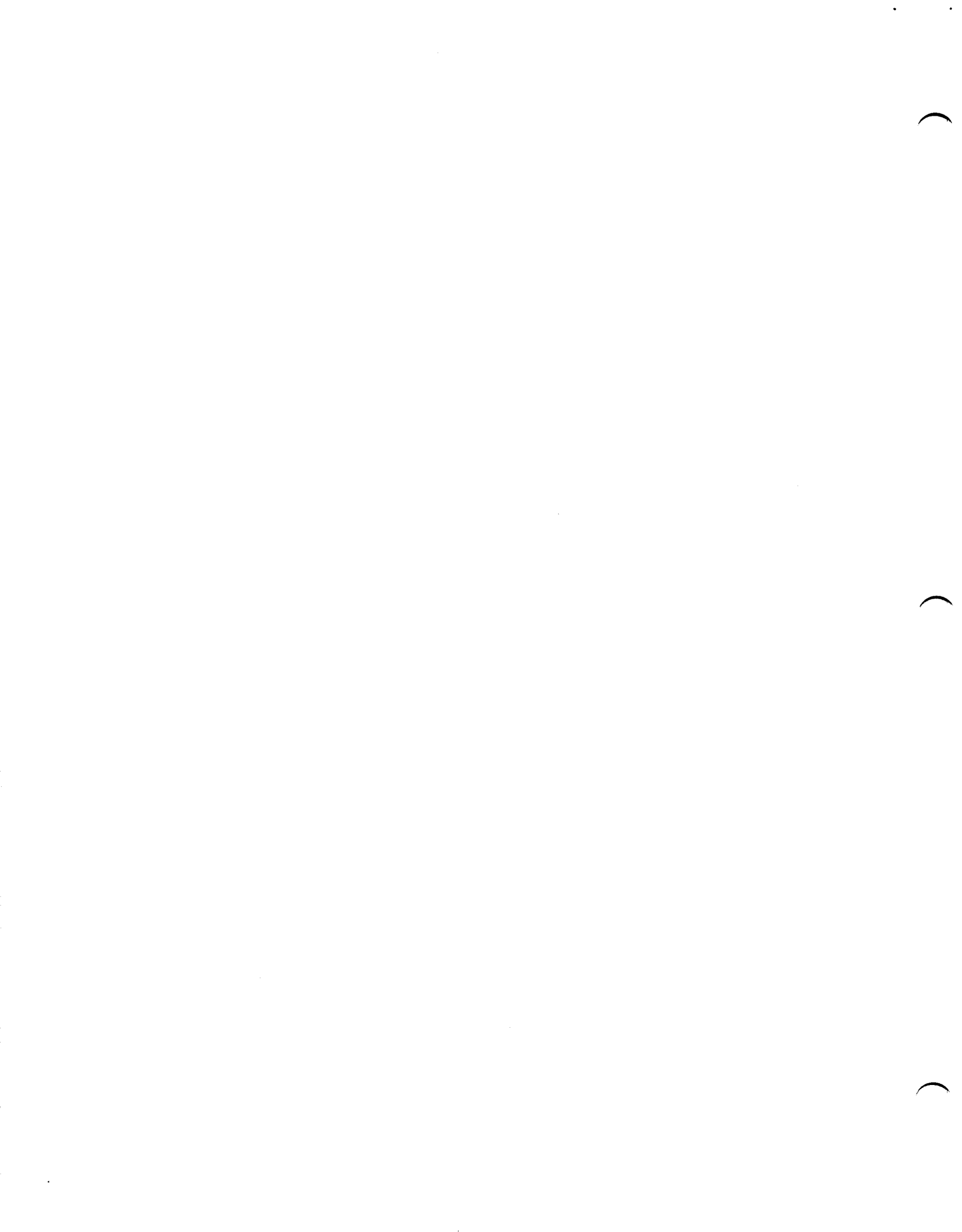
8.8 TST7 - STATUS REGISTER TEST

MADE UP OF TWO SUBTESTS TST7A AND TST7B, TST7A FORCES AN OVERRUN ERROR AND CHECKS THAT THE OVERRUN ERROR BIT (AC02) COMES UP AND COMBINED WITH STATUS WORD ENABLE WILL CAUSE THE STATUS ERROR BIT (AC00) TO COME UP. ERROR HALTS AND SCOPE LOOPS ARE PROVIDED, EXITING SCOPE LOOP, PROGRAM CONTINUES ON TO TST7B.

TST7B GENERATES A RANDOM DATA PATTERN AND CHECKS FOR STATUS ERRORS (OVERRUN, PARITY AND FRAMING). WHEN AN ERROR OCCURS PROGRAM WILL HALT WITH FALLING STATUS BIT AND DATA WORD IN THE AC. SCOPE LOOP IS ENTERED BY DEPRESSING KEY CONTINUE. EXITING SCOPE LOOP IS THE SAME AS THAT FOR TST6, REFER TO PARA. 6.1.

FOR FURTHER INFORMATION REGARDING TESTS AND ERROR HALTS, REFER TO THE PROGRAM LISTING.

9.0 LISTING



//KL8F DOUBLE BUFFERED ASYNCHRONOUS INTERFACE
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//INSTRUCTION EQUALITIES//

4473 UKCF=JMS I XXKCF /CLEAR RECEIVE FLAG,
4474 UKSF=JMS I XXKSF /SKIP ON RECEIVE FLAG,
4475 UKCC=JMS I XKKCC /CLEAR RECEIVE FLAG AND AC,
4476 UKRS=JMS I XXKRS /INPUT DATA BUFFER V AC4=11 TO AC4=11
/Parity error and SWE V AC01 TO AC01
/Overrun error and SWE V AC02 TO AC02,
/Priming error and SWE V AC03 TO AC03,
/PE + OE + FE) AND SWE V AC00 TO AC00;
4477 UKIE=JMS I XXKIE /DATA 11 TO INTERRUPT ENABLE,
4500 UKRB=JMS I XXKRB /DATA 10 TO STATUS WORD ENABLE,
4501 USPF=JMS I XXSPF /CLEAR AC AND RECEIVE FLAG,
4502 UTSF=JMS I XTTSF /SET TRANSMIT FLAG,
4503 UTCF=JMS I XTTCF /SKIP ON TRANSMIT FLAG;
4504 UTPC=JMS I XTTPC /CLEAR TRANSMIT FLAG;
4505 USPI=JMS I XXSPI /AC4=11 TO OUTPUT DATA BUFFER,
4506 UTLS=JMS I XTLS /TRANSMIT, SET TRANSMIT FLAG WHEN DONE;
4507 UTPK=JMS I XXTPK /SKIP ON INTERRUPT FLAG,
/AC4=11 TO OUTPUT DATA BUFFER,
/TRANSMIT, SET TRANSMIT FLAG WHEN DONE;
/GENERATE BREAK.

/CLEAR ALL FLAGS;
/LOAD MQ;

6007 CAF=6007
7421 MQL=7421
4020 DELAY=JMS I
4544 ERROR=JMS I
4545 DATERR=JMS I
4043 SETCNT=JMS I
4510 SET1A=JMS I
4511 SET1B=JMS I
4512 SET1C=JMS I
4513 SET2A=JMS I
4514 SET2B=JMS I
4515 SET3A=JMS I
4516 SET3B=JMS I
4517 SET3C=JMS I
4520 SET3D=JMS I
4521 SET4A=JMS I
4522 SET5A=JMS I
4523 SET7A=JMS I

DELAY
XFAIL
XSCOPE
COUNT
XSET1A
XSET1B
XSET1C
XSET2A
XSET2B
XSET3A
XSET3B
XSET3C
XSET3D
XSET4A
XSET5A
XSET7A

//ERROR HALT DESCRIPTIONS//

/SPF FAILED TO SET TRANSMIT FLAG OR
/TSF FAILED TO SKIP ON TRANSMIT FLAG,
/CAF FAILED TO CLEAR TRANSMIT FLAG OR

1207 *HALT1
1207 1216 HALT2

1210 1226 HALT3 /TSF SKIPPED ON TRANSMIT FLAG # 0,
/TCF FAILED TO CLEAR TRANSMIT FLAG OR
/TSF SKIPPED ON TRANSMIT FLAG # 0;
1211 1242 HALT4 /CAF FAILED TO CLEAR ALL FLAGS OR
/SPI SKIPPED WITHOUT INTERRUPT REQUEST OR
/AN ILLEGAL INTERRUPT DID OCCUR,
1212 1256 HALT5 /TRANSMIT FLAG FAILED TO CAUSE INTERRUPT,
1213 1274 HALT6 /SPI FAILED TO SKP ON INTERRUPT REQUEST OR
/SPF FAILED TO SET TRANSMIT FLAG OR
/TRANSMIT FLAG DID NOT SET INTERRUPT REQUEST,
1214 1310 HALT7 /CAF FAILED TO CLEAR ALL FLAGS OR
/AN ILLEGAL INTERRUPT TOOK PLACE,
1215 1413 HALT8 /TPC FAILED TO SET TRANSMIT FLAG OR
/FLAG TAKING TOO LONG TO SET,
1216 1424 HALT9 /TFS FAILED TO CLEAR TRANSMIT FLAG OR
/TRANSMIT FLAG SETTING TOO SOON OR
/TSF SKIPPED ON TRANSMIT FLAG # 0,
1217 1434 HALT10 /TFS FAILED TO SET TRANSMIT FLAG OR
/TRANSMIT FLAG TAKING TOO LONG TO SET OR
/TSF FAILED TO SKIP ON TRANSMIT FLAG,
1220 1461 HALT11 /TRANSMIT FLAG SETTING TOO SOON OR
/TSF SKIPPED ON TRANSMIT FLAG # 0;
1221 1471 HALT12 /TRANSMIT FLAG TAKING TOO LONG TO SET;
1222 1513 HALT13 /TFS FAILED TO SET TRANSMIT FLAG OR
/FLAG IS BEING SET TOO LATE,
1223 1606 HALT14 /KCC FAILED TO CLEAR AC,
1224 1634 HALT15 /KSF FAILED TO SKIP OR
/RECEIVE WAS NOT SET OR WAS SET TOO LATE,
1225 1643 HALT16 /KCC FAILED TO CLEAR RECEIVE FLAG OR
/KSF SKIPPED ON RECEIVE FLAG # 0,
1226 1656 HALT17 /RECEIVE FLAG FAILED TO SET OR SET TOO LATE
/OR KSF FAILED TO SKIP,
1227 1665 HALT18 /KCF FAILED TO CLEAR RECEIVE FLAG
/OR KSF SKIPPED ON RECEIVE FLAG # 0,
1230 1703 HALT19 /KIE FAILED TO DISABLE INTERRUPT ENABLE F/F
/OR SPI SKIPPED ON INTERRUPT ENABLE # 0.

```

//KL8F DOUBLE BUFFERED ASYNCHRONOUS INTERFACE PAL10 V141 22-MAY-72 13157 PAGE 1-2
1231 1715 HALT20
1232 1744 HALT21
1233 2012 HALT22
1234 2022 HALT23
1235 2045 HALT24
1236 2215 HALT25
1237 2231 HALT26
1240 2246 HALT27
1241 2256 HALT28
1242 2442 HALT29
1243 2446 HALT30
1244 2506 HALT31
1245 2511 HALT32
1246 2631 HALT33
1247 2642 HALT34
1250 2710 HALT35
1251 2720 HALT36
1252 2730 HALT37
1253 2740 HALT38
0001 *0001 JMP I RETURN
0001 5402 RETURN, 0
0002 0000

0020 *20
0020 0000 DELAY, 0
0021 7300 CLA CLL

//KIE AND AC11#1 FAILED TO ENABLE INTERRUPT ENABLE F/F
//OR SPI FAILED TO SKIP;
//INTERRUPT DID NOT TAKE PLACE;
//RECEIVE FLAG SET TOO SOON
//OR KSF SKIPPED ON RECEIVE FLAG = 0.
//RECEIVE FLAG NOT SET OR SET TOO LATE
//OR KSF FAILED TO SKIP;
//RECEIVE FLAG FAILED TO SET OR SET TOO LATE,
//TPK FAILED TO SET TRANSMIT FLAG,
//TRANSMIT FLAG SET TOO SOON,
//TRANSMIT FLAG SET TOO LATE OR DID NOT SET;
//TCF FAILED TO CLEAR TRANSMIT AND/OR
//BREAK FLAGS;
//BINARY COUNT PATTERN FAILURES//
//INCORRECT DATA DISPLAYED IN AC,
//CORRECT DATA DISPLAYED IN AC;
//INCORRECT DATA DISPLAYED IN AC,
//CORRECT DATA DISPLAYED IN AC;
//STATUS TEST ERRORS//
//OVERRUN ERROR DID NOT OCCUR,
//BIT 0 FAILED TO GO TO A ONE ON OVERRUN ERROR;
//PARITY ERROR, FAILING STATUS BIT AND DATA WORD TO AC,
//OVERRUN ERROR, FAILING STATUS BIT AND DATA WORD TO AC,
//FRAMEING ERROR, FAILING STATUS BIT AND DATA WORD TO AC,
//ERROR BIT (AC0) = 1;

//DELAY ROUTINE FOR ALL BAUD RATES//

```

```

2022 1124      TAD      NDELAY
2023 3125      DCA      DELAYN
2024 1126      TAD      CON100
2025 3127      DCA      US120
2026 2127      ISZ     US100
2027 5026      JMP      I 01
2030 7200      CLA
2031 7200      CLA
2032 7200      CLA
2033 7200      CLA
2034 2125      ISZ     DELAYN
2035 7610      SKP     CLA
2036 5420      JMP     I
2037 0420      AND     I
2040 0420      AND     I
2041 0020      AND     I
2042 5024      JMP

```

//ROUTINE TO SETUP COUNTER FOR TEST LOOPS//

```

0043 0000      COUNT, 0
0044 7200      CLA
0045 1146      TAD
0046 1177      TAD
0047 3140      DCA
0050 1540      TAD I
0051 3132      DCA
0052 5443      JMP I

```

//POINTER FOR EXACT BAUD RATE TABLES//

```

0053 3000      ONBAUD, ON110
0054 3006      ON134
0055 3014      ON150
0056 3022      ON300
0057 3030      ON600
0060 3036      ON1200
0061 3044      ON1800
0062 3052      ON2400

```

//POINTER FOR LOW END VALUE BAUD RATE TABLES//

```

0063 3060      LOBAUD, LO110
0064 3066      LO134
0065 3074      LO150
0066 3102      LO300
0067 3110      LO600
0070 3116      LO1200
0071 3124      LO1800
0072 3132      LO2400

```

//POINTERS FOR IOT SUBROUTINES//

```

0073 0600      XKXCF, XKCF
0074 0604      XXKSF, XKSF

```

2275 0612 XKCC, XKCC
 2276 0616 XKRS, XKRS
 2277 0622 XKIE, XKIE
 2100 0626 XKRB, XKRB
 2101 0632 XSPF, XSPF
 2102 0636 XTSF, XTSF
 2103 0644 XTFC, XTFC
 2104 0650 XTPC, XTPC
 2105 0654 XSPI, XSPI
 0106 0662 XTLS, XTLS
 0107 0666 XTPK, XTPK

//LINKS FOR ERROR HALT ROUTINES//

0110 1000 XSET1A, SET1A
 0111 1010 XSET1B, SET1B
 0112 1016 XSET1C, SET1C
 0113 1024 XSET2A, SET2A
 0114 1034 XSET2B, SET2B
 0115 1044 XSET3A, SET3A
 0116 1050 XSET3B, SET3B
 0117 1062 XSET3C, SET3C
 0120 1070 XSET3D, SET3D
 0121 1074 XSET4A, SET4A
 0122 1104 XSET5A, SET5A
 0123 1116 XSET7A, SET7A

//CONSTANTS AND WORK LOCATIONS//

0124 0000 NDELAY, 0
 0125 0000 DELAYN, 0
 0126 7754 CON100, -24
 0127 0000 US100, 0
 0130 0000 GETBAK, 0
 0131 0000 NXTST, 0
 0132 0000 TSTCNT, 0
 0133 0000 XMTCH, 0
 0134 0000 BITMSK, 0
 0135 1233 RP18, 1233
 0136 7622 RP28, 7622
 0137 0000 HOLD1, 0
 0140 0000 TEMP1, 0
 0141 0000 TNOW, 0
 0142 0000 TOLD, 0
 0143 0000 TLAST, 0
 0144 0312 XFAIL, FAIL
 0145 0332 XSCOPE, SCOPE
 0146 0000 BAUDNO, 0

0200 0200 *200
 0201 7300 BEGIN, CLA CLL
 0202 6007 CAF

```

2222 7402      HLT
2223 4777'    JMS
2224 7402      HLT
2225 7604      LAS

2226 3134      DCA
2227 7402      HLT
2210 4250      JMS
2211 1146      TAD
2212 1376      TAD
2213 3140      DCA
2214 1540      TAD I
2215 1275      TAD
2216 3140      DCA
2217 1540      TAD I
2220 3277      DCA
2221 1277      TAD
2222 1277      TAD
2223 3301      DCA
2224 1146      TAD
2225 1375      TAD
2226 3140      DCA
2227 1540      TAD I
2230 1275      TAD
2231 3140      DCA
2232 1540      TAD I
2233 3300      DCA
2234 1276      TAD
2235 1374      TAD
2236 3237      DCA

0237 0000      TEST, 0
0240 1200      TST1
0241 1200      TST1
0242 1400      TST2
0243 1600      TST3
0244 2000      TST4
0245 2200      TST5
0246 2400      TST6
0247 2600      TST7

0250 0000      DECODE, 0
0251 7300      CLA CLL
0252 7604      LAS
0253 3274      DCA
0254 1274      TAD
0255 0773'    AND
0256 3146      DCA
0257 1274      TAD
0260 7012      RTR
0261 7010      RAR
0262 0773'    AND
0263 3275      DCA

SETIOT
BITMSK
DECODE
BAUDNO
(OBBAUD
TEMP1
TEMP1
BITNO
TEMP1
TEMP1
ONRATE
ONRATE
ONRATE
DOUBLE
BAUDNO
(OBBAUD
TEMP1
TEMP1
BITNO
TEMP1
TEMP1
LORATE
TESTNO
(JMP I TEST+1
TEST

/GET SWITCHES FOR IOTIS.
/GET SWITCHES TO DETERMINE
/NUMBER OF DATA BITS PER WORD,
/CHECK SWITCH SETTINGS,
/GET SETTING OF SW/S 9,10,11,
/ADD POINTER OF BAUD TABLE,
/SAVE NEW POINTER,
/GET BAUD RATE THRU POINTER,
/ADD BIT SIZE OF CHARACTER,
/SAVE FINAL POINTER,
/PICK-UP BAUD RATE CONSTANT
/SAVE IT.
/DOUBLE RATE,
/SAVE DOUBLE BAUD RATE CONSTANT,
/SETUP

/LOWER BAUD LIMIT,
/GET SETTING OF SW/S 1,2,3,
/TO DETERMINE TEST TO BE RUN,

/TRANSMIT CONTROL LOGIC TEST,
/TRANSMIT TIMING TEST,
/RECEIVE CONTROL LOGIC TEST,
/RECEIVE TIMING TEST,
/BREAK TEST,
/STATUS REGISTER TEST,

/ROUTINE TO CHECK ALL SWITCHES

/SAVE BAUD RATE SELECTED,

/SAVE NO. OF BITS PER DATA WORD,

```

```

2264 1274 TAD SWITCH
2265 7012 RTR
2266 7012 RTR
2267 7012 RTR
2270 7012 RTR
2271 0773 AND MASK7
2272 3276 DCA TESTNO
2273 5650 JMP I DECODE
    
```

/SAVE TEST SELECTED,

```

0274 0000 SWITCH, 0
0275 0000 BITNO, 0
0276 0000 TESTNO, 0
0277 0000 ONRATE, 0
0300 0000 LORATE, 0
0301 0000 DOUBLE, 0
    
```

/TABLE OF TEST COUNTER VALUES,

```

TSTBL, -1000
0302 7000
0303 7000
0304 7000
0305 6300
0306 6000
0307 5000
0310 4000
0311 3000
    
```

//ERROR-SCOPE LOOP ROUTINE (FOR TST1 THRU TST5, AND TST7A)//

```

0312 0000 FAIL,
0313 7344 CLA CLL CMA RAL
0314 1312 TAD FAIL
0315 3140 DCA TEMPI
0316 1372 TAD (7000
0317 3540 DCA I TEMPI
0320 1712 TAD I FAIL
0321 3130 DCA GETBAK
0322 2312 ISE FAIL
0323 1712 TAD I FAIL
0324 3131 DCA NXTST
0325 7604 LAS (4000
0326 0371 AND SNA CLA
0327 7650 JMP I GETBAK
0330 5530 JMP I NXTST
0331 5531
    
```

//ERROR-SCOPE LOOP ROUTINE FOR TST6 AND TST7B//

```

0332 0000 SCOPE,
0333 4506 UTLS
0334 4474 UKSF
0335 7410 SKP
0336 5344 JMP RCVD
0337 7300 CLA CLL
0340 1142 TAD TOLD
0341 4506 UTLS
    
```

```

0342 7200      CLA
0343 5334      JMP      SCOPE+2
0344 4500      UKRB
0345 7604      LAS
0346 0371      AND      (4000
0347 7650      SNA CLA
0350 5334      JMP      SCOPE+2
0351 5205      JMP      BEGIN+5

```

```

0371 4000
0372 7000
0373 0466
0374 5640
0375 0063
0376 0053
0377 0400 0400

```

PAGE

/ROUTINE TO SETUP IOT COMMANDS FROM SWITCHES/

```

SETIOT, 0
0400 0000      LAS
0401 7604      DCA
0402 3140      TAD
0403 1140      AND
0404 0377      RTR
0405 7012      RAR
0406 7010      DCA
0407 3270      TAD
0410 1270      TAD
0411 1376      TAD
0412 3775'    DCA
0413 1270      TAD
0414 1374      TAD
0415 3773'    DCA
0416 1270      TAD
0417 1372      TAD
0420 3771'    DCA
0421 1270      TAD
0422 1370      TAD
0423 3767'    DCA
0424 1270      TAD
0425 1366      TAD
0426 3765'    DCA
0427 1270      TAD
0430 1364      TAD
0431 3763'    DCA
0432 7100      CLL
0433 1140      TAD
0434 0362      AND
0435 7006      RTL
0436 7004      RAL
0437 3267      DCA
0440 1267      TAD
0441 1376      TAD
0442 3761'    DCA
0443 1267      TAD

```

```

TEMP1
TEMP1
(7700

RCVIOT
RCVIOT
(6000
RKCF
RCVIOT
(6001
RKSF
RCVIOT
(6002
RKCC
RCVIOT
(6004
RKRS
RCVIOT
(6005
RKIE
RCVIOT
(6006
RKRB

TEMP1
(0077

XMTIOT
XMTIOT
(6000
RSPF
XMTIOT

```



```

2444 1374 TAD (6001
2445 3760' DCA RTSF
2446 1267 TAD XMTIOT
2447 1372 TAD (6002
2450 3757' DCA RTCF
2451 1267 TAD XMTIOT
2452 1370 TAD (6004
2453 3756' DCA RYPC
2454 1267 TAD XMTIOT
2455 1366 TAD (6005
2456 3755' DCA RSPI
2457 1267 TAD XMTIOT
2460 1364 TAD (6006
2461 3754' DCA RYLS
2462 1267 TAD XMTIOT
2463 1353 TAD (6007
2464 3752' DCA RYPK
2465 5600 JMP I SETIOT
    
```

```

0466 0007 MASK7, 7
0467 0000 XMTIOT, 0
0470 0000 RCVIOT, 0
0532 0607
0533 6007
0534 0663
0535 0635
0536 0631
0537 0645
0540 0637
0561 0633
0562 0077
0563 0627
0564 6006
0565 0623
0566 6005
0567 0617
0570 6004
0571 0613
0572 6002
0573 0605
0574 6001
0575 0601
0576 6000
0577 7700
0600
    
```

PAGE

```

0600 0000 XKCF,
0601 0000 RKCF,
0602 5600 JMP I
0603 7402 HLT
0604 0000 XKSF,
    
```

//IOT SUBROUTINES/7
/CLEAR RECEIVE FLAG,

```

2605 0000 RKSF, 0 /SKIP ON RECEIVE FLAG;
2626 7410 SKP
2627 2204 ISZ XKSF
2610 5604 JMP I XKSF
2611 7402 HLT

2612 0000 XKCC, 0 /CLEAR RECEIVE FLAG AND AC;
2613 0000 RKCC, 0
2614 5612 JMP I XKCC
2615 7402 HLT

0616 0000 XKRS, 0 /INPUT DATA BUFFER V AC4-11 TO AC4-11;
0617 0000 RKRS, 0
0620 5616 JMP I XKRS
0621 7402 HLT

0622 0000 XKIE, 0 /DATA 11 TO INTERRUPT ENABLE;
0623 0000 RKIE, 0 /DATA 10 TO STATUS WORD ENABLE;
0624 5622 JMP I XKIE
0625 7402 HLT

0626 0000 XKRB, 0 /CLEAR AC AND RECEIVE FLAG;
0627 0000 RKRB, 0 /INPUT DATA BUFFER TO AC4-11;
0630 5626 JMP I XKRB
0631 7402 HLT

0632 0000 XSPF, 0 /SET TRANSMIT FLAG;
0633 0000 RSPF, 0
0634 5632 JMP I XSPF
0635 7402 HLT

0636 0000 XTSP, 0 /SKIP ON TRANSMIT FLAG;
0637 0000 RTSP, 0
0640 7410 SKP
0641 2236 ISZ XTSP
0642 5636 JMP I XTSP
0643 7402 HLT

0644 0000 XTDF, 0 /CLEAR TRANSMIT FLAG;
0645 0000 RTDF, 0
0646 5644 JMP I XTDF
0647 7402 HLT

0650 0000 XTPC, 0 /AC4-11 TO OUTPUT DATA BUFFER
0651 0000 RTPC, 0 /TRANSMIT, SET TRANSMIT FLAG WHEN DONE;
0652 5650 JMP I XTPC
0653 7402 HLT

0654 0000 XSPI, 0 /SKIP ON INTERRUPT REQUEST SET;
0655 0000 RSPI, 0
0656 7410 SKP
0657 2254 ISZ XSPI
0660 5654 JMP I XSPI
0661 7402 HLT

```

```

0662 0000 XTLS, 0
0663 0000 RILS, 0
0664 5662 JMP I XTLS
0665 7402 HLT

0666 0000 XIPK, 0
0667 0000 RIPK, 0
0670 5666 JMP I XTPK
0671 7402 HLT
    
```

/CLEAR TRANSMIT FLAG,
/AS4-11 TO OUTPUT DATA BUFFER,
/TRANSMIT, SET TRANSMIT FLAG WHEN DONE,

/GENERATE BREAK.

1000 PAGE

//ROUTINES TO SETUP ERROR HALT LOCATIONS//

```

1000 0000 SETT1A, 0
1001 1377 TAD (7402)
1002 3776' DCA HALT1
1003 1377 TAD (7402)
1004 3775' DCA HALT2
1005 1377 TAD (7402)
1006 3774' DCA HALT3
1007 5600 JMP I SETT1A

1010 0000 SETT1B, 0
1011 1377 TAD (7402)
1012 3773' DCA HALT4
1013 1377 TAD (7402)
1014 3772' DCA HALT5
1015 5610 JMP I SETT1B

1016 0000 SETT1C, 0
1017 1377 TAD (7402)
1020 3771' DCA HALT6
1021 1377 TAD (7402)
1022 3770' DCA HALT7
1023 5616 JMP I SETT1C

1024 0000 SETT2A, 0
1025 1377 TAD (7402)
1026 3767' DCA HALT8
1027 1377 TAD (7402)
1030 3766' DCA HALT9
1031 1377 TAD (7402)
1032 3765' DCA HALT10
1033 5624 JMP I SETT2A

1034 0000 SETT2B, 0
1035 1377 TAD (7402)
1036 3764' DCA HALT11
1037 1377 TAD (7402)
1040 3763' DCA HALT12
1041 1377 TAD (7402)
    
```

```

1042 3762' DCA HALT13
1043 5634 JMP I SETT2B

1044 0000 SETT3A, 0
1045 1377 TAD (7402
1046 3761' DCA HALT14
1047 5644 JMP I SETT3A

1050 0000 SETT3B, 0
1051 1377 TAD (7402
1052 3760' DCA HALT15
1053 1377 TAD (7402
1054 3757' DCA HALT16
1055 1377 TAD (7402
1056 3756' DCA HALT17
1057 1377 TAD (7402
1060 3755' DCA HALT18
1061 5650 JMP I SETT3B
    
```

```

1062 0000 SETT3C, 0
1063 1377 TAD (7402
1064 3754' DCA HALT19
1065 1377 TAD (7402
1066 3753' DCA HALT20
1067 5662 JMP I SETT3C
    
```

```

1070 0000 SETT3D, 0
1071 1377 TAD (7402
1072 3752' DCA HALT21
1073 5670 JMP I SETT3D
    
```

```

1074 0000 SETT4A, 0
1075 1377 TAD (7402
1076 3751' DCA HALT22
1077 1377 TAD (7402
1100 3750' DCA HALT23
1101 1377 TAD (7402
1102 3747' DCA HALT24
1103 5674 JMP I SETT4A
    
```

```

1104 0000 SETT5A, 0
1105 1377 TAD (7402
1106 3746' DCA HALT25
1107 1377 TAD (7402
1110 3745' DCA HALT26
1111 1377 TAD (7402
1112 3744' DCA HALT27
1113 1377 TAD (7402
1114 3743' DCA HALT28
1115 5704 JMP I SETT5A
    
```

```

1116 0000 SETT7A, 0
1117 1377 TAD (7402
    
```

```

1120 3742' DCA HALT33
1121 1377 TAD (7402
1122 3741' DCA HALT34
1123 5716 JMP I SEPT7A

1141 2642
1142 2631
1143 2256
1144 2246
1145 2231
1146 2215
1147 2045
1150 2022
1151 2012
1152 1744
1153 1715
1154 1703
1155 1665
1156 1656
1157 1643
1160 1634
1161 1606
1162 1513
1163 1471
1164 1461
1165 1434
1166 1424
1167 1413
1170 1310
1171 1274
1172 1256
1173 1242
1174 1226
1175 1216
1176 1207
1177 7402
1200

```

PAGE

//TST1-BASIC TEST OF TRANSMIT LOGIC//

```

//TST1=CHECKS THE ABILITY OF-
//SPF TO SET THE TRANSMIT FLAG;
//TSF TO SKIP ON TRANSMIT FLAG;
//CAF TO CLEAR TRANSMIT FLAG;
//ICF TO CLEAR TRANSMIT FLAG;
//ISF TO NOT SKIP ON TRANSMIT FLAG EQUAL TO ZERO.

TST1, SETCNT /SETUP TEST LOOP COUNTER
TST1A, SET1A /SETUP HALT LOCATIONS;
        CLA CLL /SET TRANSMIT FLAG;
        USPF /FLAG SET ;
        UTSP SKP CLA

```

```

1236 5213 JMP ,+5
1237 7402 HALT1,
1210 4544 ERROR
1211 1202 TST1A
1212 1222 TST1AB
1213 6007 CAF
1214 4502 UTSF
1215 5222 JMP ,+5
1216 7402 HALT2,
1217 4544 ERROR
1220 1202 TST1A
1221 1222 TST1AB
1222 4501 USPF
1223 4503 UTSF
1224 4502 UTSF
1225 5232 JMP ,+5
1226 7402 HALT3,
1227 4544 ERROR
1230 1222 TST1AB
1231 1234 TST1B=2
1232 2132 ISZ
1233 5202 JMP TSTCNT
TST1A

```

/TST1B=CHECKS THAT NO OTHER DEVICE WILL CAUSE AN INTERRUPT,
/AND THAT TRANSMIT FLAG WILL CAUSE AN INTERRUPT.

```

1234 4043 SETCNT
1235 4511 SET1B
1236 7300 CLA CLL
1237 6007 CAF
1240 4505 USPI
1241 5246 JMP ,+5
1242 7402 HALT4,
1243 4544 ERROR
1244 1236 TST1B
1245 1246 TST1BB
1246 7300 TST1BB, CLA CLL
1247 6007 CAF
1250 1377 TAD (INTOK
1251 3002 DCA RETURN
1252 4501 USPF
1253 6001 ION
1254 7000 NOP
1255 6002 IOF
1256 7402 HALT5,
1257 4544 ERROR
1260 1246 TST1BB
1261 1264 TST1C=2
1262 2132 ISZ TSTCNT
1263 5236 JMP TST1B

```

/TST1C=CHECKS THAT SPI WILL SKIP ON INTERRUPT REQUEST
/AND THAT INTERRUPT ENABLE ALONE WILL NOT CAUSE AN INTERRUPT,

```

YES, CONTINUE TEST,
NO, SPF OR TSF FAILED,
SCOPE LOOP, PRESS CONTINUE TO ENTER,
LOOP ADDRESS,
NEXT TEST,
CLEAR FLAG,
FLAG CLEARED?
YES, CONTINUE TEST,
NO, CAF OR TSF FAILED,
SCOPE LOOP, PRESS CONTINUE TO ENTER,
LOOP ADDRESS,
NEXT TEST,
SET TRANSMIT FLAG,
CLEAR TRANSMIT FLAG,
FLAG CLEARED?
YES, CONTINUE TEST,
NO, TCF OR TSF FAILED,
SCOPE LOOP, PRESS CONTINUE TO ENTER,
LOOP ADDRESS,
NEXT TEST,
TEST LOOP COUNTER,
LOOP,
SETUP TEST LOOP COUNTER,
SETUP HALT LOCATIONS,
CLEAR ALL FLAGS,
SKIP ON INTERRUPT REQUEST,
NO INTERRUPT, CONTINUE,
ILLEGAL INTERRUPT, CAF OR SPI FAILED,
SCOPE LOOP, PRESS CONTINUE TO ENTER,
LOOP ADDRESS,
NEXT TEST,
CLEAR ALL FLAGS,
GET RETURN ADDRESS,
SAVE IT,
SET TRANSMIT FLAG,
TURN INTERRUPT ON,
WAIT,
TURN INTERRUPT OFF,
FAILED, INTERRUPT DID NOT OCCUR,
SCOPE LOOP, PRESS CONTINUE TO ENTER,
LOOP ADDRESS,
NEXT TEST,
TEST LOOP COUNTER,
LOOP,

```

```

1264 4043 SETCNT
1265 4512 SETIC
1266 7300 CLA CLL
1267 6007 CAF
1270 4531 USPF
1271 4505 USPI
1272 7410 SKP
1273 5300 JMP
1274 7402 HLT
1275 4544 ERROR
1276 1266 TST1C
1277 1300 TST1CB
1300 7300 CLA CLL
1301 1376 TAD
1302 3002 DCA
1303 6007 CAF
1304 6001 ION
1305 7000 NOP
1306 6002 IOF
1307 5314 JMP
1310 7402 HALT7, HLT
1311 4544 ERROR
1312 1300 TST1CB
1313 1316 CHECK1
1314 2132 ISZ
1315 5266 JMP
1316 7200 CLA
1317 1375 TAD
1320 7421 MQL
1321 1774, TAD
1322 7640 SZA CLA
1323 5200 JMP
1324 5773, JMP
1400 1400 PAGE
1401 0276
1402 0001
1403 1310
1404 1262
1405 1400

```

```

//TST2=TRANSMIT TIMING TEST//
/IST2A=CHECKS THE ABILITY OF-
/TPC TO SET THE TRANSMIT FLAG,
/ILS TO CLEAR THE TRANSMIT FLAG,
/ILS TO SET THE TRANSMIT FLAG,
TST2, SETCNT
1401 4513 SET2A
1402 7300 CLA CLL
1403 1777, TAD DOUBLE
/SETUP TEST LOOP COUNTER,
/SETUP HALT LOCATIONS,
/SET DELAY ROUTINE TO DELAY TWICE AS

```

```

/SETUP TEST LOOP COUNTER,
/SETUP HALT LOCATIONS,
/CLEAR ALL FLAGS,
/SET TRANSMIT FLAG,
/SKIP ON INTERRUPT REQUEST SET,

```

```

/INTERRUPT REG, SET, CONTINUE,
/SPI FAILED OR INT, REG, NOT SET,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,

```

```

/GET RETURN ADDRESS,
/SETUP RETURN,
/CLEAR ALL FLAGS,
/INTERRUPT ON,
/HAIT
/INTERRUPT OFF,
/NO INTERRUPT, CONTINUE,

```

```

/ILLEGAL INTERRUPT,
/SCOPE LOOP PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,

```

```

/NEXT TEST
/TEST LOOP COUNTER,
/LOOP,

```

```

/LOAD CURRENT TEST
/NUMBER INTO MO REGISTER,
/ARE ALL TESTS BEING RUN?
/YES, GO TO NEXT TEST,
/NO, CONTINUE CURRENT TEST,
/NXT TEST,

```

```

1424 3124 DCA NDELAY
1425 4503 UTCF
1426 4504 UTPC
1427 4020 DELAY
1410 4502 UTSF
1411 7410 SKP
1412 5217 JMP
1413 7402 HALT8,
1414 4544 ERROR
1415 1402 TST2A
1416 1417 TST2AB
1417 7300 CLA CLL
1420 4501 USPF
1421 4506 UTLS
1422 4502 UTSF
1423 5230 JMP
1424 7402 HALT9,
1425 4544 ERROR
1426 1417 TST2AB
1427 1442 TST2B=2
1430 4020 DELAY
1431 4502 UTSF
1432 7410 SKP
1433 5240 JMP
1434 7402 HALT10,
1435 4544 ERROR
1436 1417 TST2AB
1437 1442 TST2B=2
1440 2132 ISZ
1441 5202 JMP
    
```

```

/ LONG AS TIME NEEDED;
/ CLEAR TRANSMIT FLAG;
/ TRANSMIT
/ DELAY TWICE MAX TIME;
/ FLAG SET;

/ YES, CONTINUE;
/ NO, TPC FAILED TO SET FLAG,
/ SCOPE LOOP, PRESS CONTINUE TO ENTER,
/ LOOP ADDRESS,
/ NEXT TEST;

/ SET TRANSMIT FLAG;
/ CLEAR AND SET TRANSMIT FLAG,
/ TRANSMIT FLAG CLEAR?
/ YES, CONTINUE
/ NO, TPC FAILED TO CLEAR FLAG,
/ SCOPE LOOP, PRESS CONTINUE TO ENTER,
/ LOOP ADDRESS,
/ NEXT TEST;
/ DELAY TWICE MAX TIME;
/ TRANSMIT FLAG SET?

/ YES, CONTINUE;
/ NO, TPC FAILED TO SET FLAG,
/ SCOPE LOOP, PRESS CONTINUE TO ENTER,
/ LOOP ADDRESS,
/ NEXT TEST;
/ TEST LOOP COUNTER;
/ LOOP,
    
```

/TST2B - CHECKS THAT THE TRANSMIT FLAG SETS WITHIN
/THE PROPER TIME FOR THE BAUD RATE SELECTED.

```

1442 4043 SETCNT
1443 4514 SET2B
1444 7300 CLA CLL
1445 1776 TAD
1446 3124 DCA
1447 4506 UTLS
1450 4502 UTSF
1451 5250 JMP
1452 4506 UTLS
1453 4502 UTSF
1454 5253 JMP
1455 4506 UTLS
1456 4020 DELAY
1457 4502 UTSF
1460 5265 JMP
1461 7402 HALT11,
1462 4544 ERROR
1463 1444 TST2B
1464 1475 TST2BB
1465 4020 DELAY
    
```

```

/ SETUP TEST LOOP COUNTER;
/ SETUP HALT LOCATIONS;
/ SET DELAY TO LOWER BAUD LIMIT;
/ INITIALIZE TRANSMIT FLAG;
/ FOR UPCOMING TIMING TEST;

/ WAIT, STILL CLEAR?
/ FLAG, CONTINUE;
/ YES, CONTINUE;
/ NO, FLAG SET TOO SOON,
/ SCOPE LOOP, PRESS CONTINUE TO ENTER,
/ LOOP ADDRESS,
/ NEXT TEST;
/ WAIT AGAIN, TO INSURE THAT FLAG WILL SET;
    
```



```

1466 4502 UTSF
1467 7410 SKP
1470 5275 JMP ,#5
1471 7402 HLT
1472 4544 ERROR
1473 1444 TST2B
1474 1475 TST2BB
1475 7300 TST2BB, CLA CLL
1476 1775, TAD ONRATE
1477 3124 DCA NDELAY
1500 4506 UTLS
1501 4502 UTSF
1502 5301 JMP ,#1
1503 4506 UTLS
1504 4502 UTSF
1505 5304 JMP ,#1
1506 4506 UTLS
1507 4020 DELAY
1510 4502 UTSF
1511 7410 SKP
1512 5317 JMP ,#5

1513 7402 HLT
1514 4544 ERROR
1515 1475 TST2BB
1516 1521 CHECK2
1517 2132 ISZ
1520 5244 JMP
1521 7200 CLA
1522 1374 TAD
1523 7421 MQL
1524 1773, TAD CLA
1525 7640 SEA CLA
1526 5200 JMP
1527 5772, JMP

1572 1600 PAGE
1573 0276
1574 0002
1575 0277
1576 0300
1577 0301
1600

```

/FLAG STILL CLEAR?
/NO, FLAG SET, CONTINUE;
/YES, TAKING TOO LONG TO SET,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/SET DELAY ROUTINE TO WAIT THE
/EXACT TIME REQUIRED TO SET THE FLAG,
/INITIALIZE TRANSMIT FLAG;
/FOR UPCOMING TIMING TEST;

/TRANSMIT
/WAIT
/IS FLAG SET?
/YES, CONTINUE;

/NO, TLS FAILED OR FLAG IS BEING SET TOO LATE,
/SCOPE LOOP, PRESS CONTINUE TO ENTER
/LOOP ADDRESS
/NEXT TEST,
/TEST LOOP COUNTER
/LOOP,
/LOAD CURRENT TEST
/NUMBER INTO MG REGISTER,
/ARE ALL TESTS BEING RUN?
/YES, GO TO NEXT TEST,
/NO, CONTINUE CURRENT TEST
/NXT TEST,

//TST3 - BASIC TEST OF RECEIVE LOGIC//

/TST3A - CHECKS THE ABILITY OF KCC TO CLEAR THE AC;

```

1600 4043 TST3, SETCNT
1601 4515 TST3A, SET3A
1602 7240 CLA CMA
1603 4475 UKCC
1604 7450 SNA
1605 5212 JMP ,#5

```

/SETUP LOOP COUNTER,
/SETUP HALT LOCATIONS;
/SET AC=7777
/CLEAR AC
/IS AC CLEAR?
/YES, CONTINUE

```

1626 7402 HALT14, HLT
1627 4544 ERROR
1610 1622 TST3A
1611 1614 TST3B=2
1612 2132 ISZ
1613 5202 JMP
/NO KCC FAILED
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/TEST LOOP COUNTER,
/LOOP,

```

```

1614 4043
1615 4516
1616 7300
1617 1777,
1620 3124
1621 6007
1622 4506
1623 4502
1624 5223
1625 4506
1626 4020
1627 4502
1630 5227
1631 4474
1632 7410
1633 5240
1634 7402
1635 4544
1636 1616
1637 1647
1640 4475
1641 4474
1642 5247
1643 7402
1644 4544
1645 1616
1646 1647

```

```

1647 7300
1650 4475
1651 4506
1652 4020
1653 4474
1654 7410
1655 5262
1656 7402
1657 4544
1660 1647
1661 1673
1662 4473
1663 4474
1664 5271

```

```

1614 4043
1615 4516
1616 7300
1617 1777,
1620 3124
1621 6007
1622 4506
1623 4502
1624 5223
1625 4506
1626 4020
1627 4502
1630 5227
1631 4474
1632 7410
1633 5240
1634 7402
1635 4544
1636 1616
1637 1647
1640 4475
1641 4474
1642 5247
1643 7402
1644 4544
1645 1616
1646 1647

```

```

1647 7300
1650 4475
1651 4506
1652 4020
1653 4474
1654 7410
1655 5262
1656 7402
1657 4544
1660 1647
1661 1673
1662 4473
1663 4474
1664 5271

```

```

/SET3B - CHECKS THE ABILITY OF=
/UTLS TO SET THE RECEIVE FLAG,
/KSF TO SKIP ON RECEIVE FLAG EQUAL TO ONE,
/KCF TO CLEAR RECEIVE FLAG,
/KCC TO CLEAR RECEIVE FLAG,
/KSF TO NOT SKIP ON RECEIVE FLAG EQUAL TO ZERO,
/SETUP TEST COUNTER,
/SETUP HALT LOCATIONS,

```

```

TST3B,
TAD
DCA
CAF
UTLS
UTSF
JMP
UTLS
DELAY
UTSF
JMP
UKSF
SKP
JMP
HLT
ERROR
TST3B
TST3BB
UKCC
UKSF
JMP
HLT
ERROR
TST3B
TST3BB

```

```

TST3B,
TAD
DCA
CAF
UTLS
UTSF
JMP
UTLS
DELAY
UTSF
JMP
UKSF
SKP
JMP
HLT
ERROR
TST3B
TST3BB
UKCC
UKSF
JMP
HLT
ERROR
TST3B
TST3BB

```

```

TST3BB,
CLA CLL
UKCC
UTLS
DELAY
UKSF
SKP
JMP
HLT
ERROR
TST3BB
UKCF
UKSF
JMP

```

```

TST3BB,
CLA CLL
UKCC
UTLS
DELAY
UKSF
SKP
JMP
HLT
ERROR
TST3BB
TST3C=2
UKCF
UKSF
JMP

```

```

/SET DELAY ROUTINE TO DELAY TWICE AS
/LONG AS TIME NEEDED,
/CLEAR ALL FLAGS,

```

```

/TRANSMIT
/DELAY TWICE MAX TIME,
/TRANSMIT FLAG SET,
/WAIT FOR IT
/NOV RECEIVE FLAG SHOULD ALSO BE SET,

```

```

/RECEIVE FLAG SET, CONTINUE,
/RECEIVE FLAG OR KSF FAILED,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS
/NEXT TEST,
/CLEAR RECEIVE FLAG,
/SKIP ON RECEIVE FLAG=1,
/RECEIVE FLAG CLEAR CONTINUE,
/KCC OR KSF FAILED,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,

```

```

/CLEAR RECEIVE FLAG,
/TRANSMIT,
/DELAY TWICE MAX TIME,
/SKIP ON RECEIVE FLAG,
/FLAG SET CONTINUE
/RECEIVE FLAG OR KSF FAILED,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/CLEAR RECEIVE FLAG,
/RECEIVE FLAG CLEARED?
/YES, CONTINUE

```

```

/FLAG SET CONTINUE
/RECEIVE FLAG OR KSF FAILED,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/CLEAR RECEIVE FLAG,
/RECEIVE FLAG CLEARED?
/YES, CONTINUE

```

```

1665 7402  HALT18, HLT
1666 4544  ERROR
1667 1647  TST38B
1670 1673  TST3C=2
1671 2132  ISZ
1672 5216  JMP
    
```

```

1673 4043  /TST3C - CHECKS THE ABILITY OF
1674 4517  /KIE TO DISABLE INTERRUPT ENABLE F/F,
1675 7300  /KIE TO ENABLE INTERRUPT ENABLE F/F,
1676 6007  SETCNT
1677 4477  SET3C
1700 4501  CLA CLL
1701 4505  CAF
1702 5307  UKIE
1703 7402  USPF
1704 4544  USPI
1705 1675  JMP
1706 1707  HALT19, HLT
1707 7201  ERROR
1710 4477  TST3C
1711 4501  TST3CB
1712 4505  CLA IAC
1713 7410  UKIE
1714 5321  USPF
1715 7482  USPI
1716 4544  SKP
1717 1707  JMP
1720 1725  HALT20, HLT
1721 2132  ERROR
1722 5275  TST3C
    
```

```

1723 4043  /TST3D - CHECKS THAT THE RECEIVE FLAG WILL CAUSE AN INTERRUPT,
1724 4520  SETCNT
1725 7300  SET3D
1726 6007  CLA CLL
1727 1376  CAF
1730 3002  TAD
1731 4506  DCA
1732 4502  UTLS
1733 5332  UTSF
1734 4506  JMP
1735 4020  UTLS
1736 4502  DELAY
1737 5336  UTSF
1740 4503  JMP
1741 6001  ION
1742 7000  NOP
    
```

```

1743 4043  /NO, KCF OF KSF FAILED,
1744 4544  /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1745 1647  /LOOP ADDRESS,
1746 1673  /NEXT TEST
1747 2132  /TEST LOOP COUNTER,
1748 5216  /LOOP,

1749 4043  /CLEAR ALL FLAGS, ENABLE INT, ENABLE F/F,
1750 4517  /DISABLE INTERRUPT ENABLE F/F,
1751 7300  /SET TRANSMIT FLAG,
1752 6007  /INTERRUPT REQUEST SET?
1753 1376  /NO, CONTINUE,
1754 3002  /YES, KIE FAILED,
1755 4506  /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1756 4502  /LOOP ADDRESS,
1757 5332  /NEXT TEST,
1758 4506  /TEST LOOP COUNT,
1759 5332  /LOOP,

1760 4043  /AC11=1
1761 4517  /ENABLE INTERRUPT ENABLE F/F
1762 7300  /SET TRANSMIT FLAG
1763 6007  /INTERRUPT REQUEST SET?
1764 1376  /YES, CONTINUE
1765 3002  /NO, KIE FAILED,
1766 4506  /SCOPE LOOP, PRESS CONTINUE TO ENTER
1767 4502  /LOOP ADDRESS,
1768 5332  /NEXT TEST,
1769 4506  /TEST LOOP COUNT,
1770 5332  /LOOP,

1771 4043  /TRANSMIT,
1772 4517  /DELAY TWICE MAX TIME,
1773 7300  /WAIT FOR TRANSMIT FLAG, AT WHICH TIME
1774 6007  /RECEIVE FLAG SHOULD ALSO BE UP,
1775 1376  /CLEAR TRANSMIT FLAG
1776 3002  /TURN INTERRUPT ON,
1777 4506  /WAIT
    
```

```

1743 6022 IOF
1744 7402 HALT21, HLT
1745 4544 ERROR
1746 1725 TST3D
1747 1752 CHECK3
1750 2132 RINTOK, ISZ TSTCNT
1751 5325 JMP TST3D
1752 7200 CHECK3, CLA
1753 1375 TAD (3
1754 7421 MQL TESTNO
1755 1774, TAD
1756 7640 SZA CLA
1757 5200 JMP TST3A=2
1760 5773, JMP TST4

```

PAGE

//TST4 - RECEIVER TIMING TEST//

/TST4A - CHECKS THE ABILITY OF THE RECEIVER FLAG TO BE SET,
/THAT IT WILL NOT SET TOO SOON, AND THAT IT WILL COME UP
/WITHIN THE TIME SPECIFIED BY THE BAUD RATE SELECTED.

```

2000 4043 TST4, SETCNT
2001 4521 SET4A
2002 7300 CLA CLL
2003 1777, TAD LORATE
2004 3124 DCA NDELAY
2005 4475 UKCC
2006 4506 UTLS
2007 4020 DELAY
2010 4474 UKSF
2011 5216 JMP .+5
2012 7402 HALT22, HLT
2013 4544 ERROR
2014 2002 TST4A
2015 2026 TST4AB
2016 4020 DELAY
2017 4474 UKSF
2020 7410 SKP
2021 5226 JMP .+5
2022 7402 HALT23, HLT
2023 4544 ERROR
2024 2002 TST4A
2025 2026 TST4AB

```

/SETUP TEST LOOP COUNTER,
/SETUP HALT LOCATIONS,
/SET DELAY TO LOWER BAUD LIMIT,
/CLEAR RECEIVE FLAG,
/TRANSMIT,
/WAIT,
/FLAG STILL CLEAR?
/YES, CONTINUE,
/NO, FLAG SET TOO SOON,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/WAIT AGAIN, TO INSURE FLAG WILL SET,
/FLAG STILL CLEAR?
/NO, FLAG NOW A ONE, CONTINUE,
/YES, TAKING TOO LONG TO SET,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/SET DELAY ROUTINE TO WAIT THE

/EXACT TIME REQUIRED TO SET THE FLAG,

NDELAY

DCA

2030 3124

UTLS

2031 4506

UTSF

2032 4502

.01

JMP

2033 5232

UTLS

2034 4506

UTSF

2035 4502

.01

JMP

2036 5235

UKCC

2037 4475

UTLS

2040 4506

DELAY

2041 4020

UKSF

2042 4474

SKP

2043 7410

JMP

2044 5251

HLT

2045 7402

ERROR

2046 4544

TST4AB

2047 2026

CHECK4

2050 2053

ISZ

2051 2132

JMP

2052 5202

CLA

2053 7200

TAD

2054 1375

MQL

2055 7421

TAD

2056 1774

SEA CLA

2057 7640

JMP

2060 5200

JMP

2061 5773

/CLEAR RECEIVE FLAG,

/TRANSMIT,

/WAIT,

/IS FLAG SET?

/YES, CONTINUE;

/NO, FLAG NOT SET OR SET TOO LATE,

/SCOPE LOOP, PRESS CONTINUE TO ENTER,

/LOOP ADDRESS,

/NEXT TEST,

/TEST LOOP COUNTER,

/LOOP,

/LOAD CURRENT TEST

/NUMBER INTO MG REGISTER,

/ARE ALL TESTS BEING RUN?

/YES, GO TO NEXT TEST,

/NO, CONTINUE CURRENT TEST,

/NXT TEST,

HALT24,

CHECK4,

TSTCNT

TST4A

(4

TESTNO

TST4A=2

TST5

PAGE

//TST5 = BREAK TEST//

//TST5A = CHECKS THE ABILITY OF UTPK TO GENERATE A BREAK,
/AND AFTER APPROXIMATELY 235 MILS TO SET THE TRANSMIT FLAG,
/FLAG IS ALSO CHECKED FOR SETTING TOO SOON AND TOO LATE,

TST5, CLA CLL

TAD

2200 7300

DCA

2201 1377

(=5

2202 3132

TSTCNT

2203 4522

SET5A

2204 7300

CLA CLL

2205 1273

TAD

2206 3124

DCA

2207 4503

UTCF

2210 4507

UTPK

2211 4020

DELAY

2212 4502

UTSF

2213 7410

SKP

2214 5221

JMP

2215 7402

.05

HLT

HALT25,

HLT

/SETUP TEST LOOP COUNTER,

/SETUP HALT LOCATIONS,

/GET UPPER TIME LIMIT FOR TRANSMIT FLAG TO SET;

/SAVE IT,

/CLEAR TRANSMIT FLAG,

/GENERATE BREAK,

/WAIT,

/TRANSMIT FLAG SET?

/YES, CONTINUE;

/NO, UTPK FAILED TO SET FLAG,

```

2216 4544 ERROR
2217 2204 TST5A
2220 2221 TST5AB
2221 7300 TST5AB, CLA CLL
2222 1274 LOBKCT
2223 3124 NDELAY
2224 4503 DCA
2225 4507 UTPK
2226 4020 DELAY
2227 4502 UTSF
2230 5235 JMP
2231 7402 HALT26,
2232 4544 HLT
2233 2221 ERROR
2234 2235 TST5AB
TST5A0

```

```

2235 7300 TST5AC, CLA CLL
2236 1275 TAD
2237 3124 BRKCNT
2240 4503 DCA NDELAY
2241 4507 UTPK
2242 4020 DELAY
2243 4502 UTSF
2244 7410 SKP
2245 5232 JMP
2246 7402 HALT27,
2247 4544 HLT
2250 2235 TST5A0
2251 2252 TST5A0
2252 4503 UTPK
2253 4020 DELAY
2254 4502 UTSF
2255 5262 JMP
2256 7402 HALT28,
2257 4544 HLT
2260 2235 TST5A0
2261 2264 CHECK5
2262 2132 ISZ
2263 5204 JMP
2264 7200 CLA
2265 1376 TAD
2266 7421 MQL
2267 1775 TAD
2270 7640 SEA CLA
2271 5202 JMP
2272 5774 JMP

```

```

/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,

/GET LOWER TIME LIMIT,
/SAVE IT,
/CLEAR TRANSMIT FLAG,
/GENERATE BREAK,
/WAIT,
/TRANSMIT FLAG SET?
/NO, CONTINUE,
/YES, FLAG SET TOO SOON,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,

/SET DELAY ROUTINE TO WAIT THE
/EXACT TIME REQUIRED, TO SET THE FLAG,
/CLEAR TRANSMIT FLAG,
/GENERATE BREAK,
/WAIT,
/TRANSMIT FLAG SET?
/YES, CONTINUE,
/NO, FLAG NOT SET OR SET TOO LATE,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/CLEAR TRANSMIT AND BRK FLAGS,
/TRANSMIT FLAG SET?
/NO, CONTINUE,
/YES, TRANSMIT AND/OR BRK FLAG STILL SET,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS,
/NEXT TEST,
/TEST LOOP COUNTER,
/LOOP,
/LOAD CURRENT TEST
/NUMBER INTO HD REGISTER,
/ARE ALL TESTS BEING RUN?
/YES, GO TO NEXT TEST,
/NO, CONTINUE CURRENT TEST,
/NXT TEST,

```

```

2273 1000 HIBKCT, -7000
2274 5060 LOBKCT, -2720
2275 2564 BRKCNT, -5214
2374 2400
2375 0276
2376 0005

```

2377 7773
2400 PAGE

```

//TST6 - DATA TEST//
/TST6A - BINARY COUNT PATTERN,
2400 SETCNT
2401 UKCC
2402 DCA XMTCH
2403 DCA TOLD
2404 DCA TLAST
2405 UTL5
2406 UKSF
2407 SKP
2410 JMP RCV6A
2411 UYSF
2412 JMP LOOP6A
2413 CLA CLL
2414 TAD
2415 DCA TLAST
2416 ISE TOLD
2417 NOP XMTCH
2420 TAD
2421 DCA XMTCH
2422 TAD TLAST
2423 UTL5
2424 CLA
2425 JMP LOOP6A
2426 UKRB
2427 AND
2430 DCA BITMSK
2431 TAD TEMP1
2432 CIA
2433 DCA HOLD1
2434 TAD TOLD
2435 AND BITMSK
2436 TAD HOLD1
2437 SNA CLA
2440 JMP UPDATE
2441 TAD TEMP1
2442 HALT29, HLT
2443 CLA
2444 TAD TOLD
2445 AND BITMSK
2446 HALT30, HLT
2447 DATERR
2450 UPDATE, ISE
2451 JMP TSTCNT
2452 UKSF LOOP6A
2453 JMP .-1

/SETUP TEST COUNTER,
/CLEAR AC AND RECEIVE FLAG,
/INITIALIZE TRANSMIT AND RECEIVE,
/DATA HOLDING LOCATIONS,
/TRANSMIT,
/IS RECEIVE FLAG SET?
/NO, CHECK TRANSMIT,
/YES, GO AND CHECK DATA RECEIVED,
/IS TRANSMIT FLAG SET?
/NO, CHECK FLAGS AGAIN,
/GET LAST CHARACTER TRANSMITTED,
/SAVE IT FOR COMPARISON,
/SETUP NEXT CHARACTER,
/SAVE IT,
/TRANSMIT NEXT CHARACTER,
/RECEIVE,
/MASK OUT UNWANTED BITS,
/SAVE DATA,
/GET IT BACK FOR COMPARISON,
/SAVE COMPLEMENT,
/COMPARE TRANSMIT AND RECEIVE DATA,
/MASK OUT UNWANTED BITS,
/GET COMPLEMENT AND COMPARE,
/DOES TRANSMIT = RECEIVE?
/YES, CONTINUE,
/BAD DATA TO AC,
/GOOD DATA TO AC,
/MASK OUT UNWANTED BITS,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/TEST LOOP COUNTER,
/LOOP
/WAIT FOR RECEIVE FLAG
/TO SET, BEFORE GOING ON,

```

/TST68 - RANDOM DATA PATTERN,

2454	4043	SETCNT				/SETUP TEST COUNTER,
2455	1377	TAD	(1233			/SETUP RANDOM NUMBER
2456	3135	DCA	RP1B			/GENERATOR;
2457	1376	TAD	(7622			
2460	3136	DCA	RP2B			
2461	4475	UKCC				/CLEAR AC AND RECEIVE FLAG;
2462	4324	JMS	RAN1			/GET RANDOM DATA.
2463	4506	UTLS				/TRANSMIT,
2464	4474	UKSF				/IS RECEIVE FLAG SET?
2465	7410	SKP				/NO, CHECK TRANSMIT.
2466	5275	JMP	RCV6B			/YES, GO AND CHECK DATA RECEIVED.
2467	4502	UTSF				/IS TRANSMIT FLAG SET?
2470	5264	JMP	LOOP6B			/NO, CHECK FLAGS AGAIN.
2471	4324	JMS	RAN1			/YES, GET NEXT RANDOM CHARACTER.
2472	4506	UTLS				/TRANSMIT.
2473	7200	CLA				
2474	5264	JMP	LOOP6B			/CHECK FLAGS AGAIN;
2475	4500	UKRB				/RECEIVE;
2476	0134	AND	BITHSK			/MASK OUT UNWANTED BITS.
2477	3140	DCA	TEMP1			/SAVE DATA.
2480	1140	TAD	TEMP1			/GET IT BACK FOR COMPARISON.
2501	7041	CIA				
2502	1142	TAD	TOLD			
2503	7650	SNA	CLA			/COMPARE TRANSMIT AND RECEIVE.
2504	5313	JMP	+7			/DOES TRANSMIT=RECEIVE?
2505	1140	TAD	TEMP1			/YES, CONTINUE.
2506	7402	HLT				/BAD DATA TO AC.
2507	7200	CLA				
2510	1142	TAD	TOLD			/GOOD DATA TO AC.
2511	7402	HLT				
2512	4545	DATERR				/SCOPE LOOP, PRESS CONTINUE TO ENTER.
2513	2132	ISZ	TSTCNT			/TEST LOOP COUNTER.
2514	5264	JMP	LOOP6B			/LOOP.
2515	7200	CLA	(6			
2516	1375	TAD	TESTNO			/LOAD CURRENT TEST
2517	7421	HOL				/NUMBER INTO MO REGISTER;
2520	1774	TAD	TESTNO			/ARE ALL TESTS BEING RUN?
2521	7640	SZA	CLA			/YES, GO TO NEXT TEST.
2522	5200	JMP	TST6			/NO, CONTINUE CURRENT TEST.
2523	5773	JMP	TST7			/NEXT TEST.
2524	0000					//RANDOM NUMBER GENERATORS//
2525	7300	RAN1,				
2526	1142	CLA	CLL			
2527	3143	TAD	TOLD			
2530	1350	DCA	TLAST			
2531	3142	TAD	TNEW			
2532	1135	DCA	TOLD			
2533	7006	TAD	RP1B			
2534	1136	RTL				
2535	3135	TAD	RP2B			
		DCA	RP1B			


```

2536 1135 TAD RP1B
2537 7006 RTL
2540 1136 TAD RP2B
2541 7006 RTL
2542 3136 DCA
2543 1135 TAD RP2B
2544 0134 AND RP1B
2545 3350 AND BITMSK
2546 1350 OCA TNEW
2547 5724 TAD TNEW
                JMP I RAN1
                TNEW, 0
                PAGE
    
```

/MASK OUT UNWANTED BITS.

//TST7 - STATUS REGISTER TEST//

/TST7A - FORCES AN OVERRUN ERROR AND CHECKS THAT THIS CONDITION
/WILL CAUSE THE OVERRUN ERROR BIT (AC02) TO COME UP, AND THAT
/SWE AND OVERRUN WILL CAUSE AC00 TO COME UP.

```

2600 4043 TST7, SETCNI
2601 4523 SET7A
2602 4475 UKCC
2603 1377 TAD (0002
2604 4477 UKIE
2605 4754 JMS I RANGEN
2606 3140 DCA TEMPI
2607 1140 TAD TEMPI
2610 4506 LOOP7A, UTLS
2611 4502 UTSF
2612 5211 JMP .-1
2613 4506 UTLS
2614 4502 UTSF
2615 5214 JMP .-1
2616 4506 UTLS
2617 4502 UTSF
2620 5217 JMP .-1
2621 4500 UKRB
2622 0376 AND
2623 3137 DCA
2624 1137 TAD
2625 0375 AND
2626 7640 SZA CLA
2627 7410 SKP
2630 5235 JMP
2631 7402 HALT33, HLT
2632 4544 ERROR
    
```

/SETUP TEST COUNTER,
/SETUP HALT LOCATIONS,
/CLEAR AC AND RECEIVE FLAG,
/ENABLE SWE.
/GET RANDOM DATA.
/SAVE RANDOM NUMBER JUST
/IN CASE IT IS NEEDED FOR SCOPE LOOP.
/TRANSMIT!
/SKIP ON TRANSMIT FLAG.
/REPEAT TRANSMIT TWICE MORE
/TO FORCE OVERRUN.
/RECEIVE AND READ ERROR BITS,
/MASK FOR ANY ERROR AND OVERRUN,
/SAVE ERROR BITS.
/MASK FOR OVERRUN ERROR BIT,
/OVERRUN ERROR=1?
/YES, CONTINUE;
/FAILED, OVERRUN ERROR DID NOT OCCUR;
/SCOPE LOOP, PRESS CONTINUE TO ENTER;

```

2633 2607 LOOP7A
2634 2650 TST7B
2635 1137 TAD HOLD1
2636 3374 AND (4000
2637 7650 SNA CLA
2640 7410 SKP
2641 5246 JMP
2642 7402 HALT34,
2643 4544 HLT
2644 2607 ERROR
LOOP7A
TST7B
ISE TSTCNT
JMP TST7A
2647 5202

```

```

/LOOP ADDRESS;
/NEXT TEST;
/MASK FOR ERROR BIT 0,

/BIT 0 FAILED TO COME UP ON ERROR,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/LOOP ADDRESS;
/NEXT TEST;
/TEST LOOP COUNTER;
/LOOP,

```

/TST7B - TRANSMITS BINARY COUNT PATTERN AND CHECKS FOR THE OCCURRENCE OF PARITY, OVERRUN OR FRAMING ERRORS.

```

2650 4043 TST7B, SETCNT
2651 1377 TAD (0002
2652 4477 UKIE
2653 4475 UKCC
2654 3133 DCA XMTCH
2655 3142 DCA TOLD
2656 3143 DCA TLAST
2657 4506 UTLS
2660 4474 UKSF
2661 7410 SKP
2662 5300 JMP RCV7B
2663 4502 UT9F
2664 5200 JMP LOOP7B
2665 7300 CLA CLL
2666 1143 TAD TLAST
2667 3142 DCA TOLD
2670 2133 ISZ XMTCH
2671 7000 NOP
2672 1133 TAD XMTCH
2673 3143 DCA TLAST
2674 1143 TAD TLAST
2675 4506 UTLS
2676 7200 CLA
2677 5200 JMP LOOP7B
2700 4500 UKRB
2701 3140 DCA TEMP1
2702 1140 TAD TEMP1
2703 0373 AND (2000
2704 7640 SZA CLA
2705 7410 SKP
2706 5312 JMP
2707 1140 TAD TEMP1

```

```

/SETUP TEST COUNTER,
/SETUP SWE BIT,
/SET SWE,
/CLEAR AC AND RECEIVE FLAG,

/TRANSMIT,
/IS RECEIVE FLAG SET?
/NO, CHECK TRANSMIT,
/YES, GO AND CHECK FOR STATUS ERRORS,
/IS TRANSMIT FLAG SET?
/NO, CHECK FLAGS AGAIN;

```

```

2708 4500 UKRB
2709 3140 DCA TEMP1
2710 1140 TAD TEMP1
2711 0373 AND (2000
2712 7640 SZA CLA
2713 7410 SKP
2714 5312 JMP
2715 1140 TAD TEMP1

```

```

/TRANSMIT,
/RECEIVE,
/SAVE STATUS WORD,
/MASK FOR PARITY ERROR;

/FALLING STATUS BIT AND DATA
/WORD TO THE AC,
/PARITY ERROR,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/MASK FOR OVERRUN ERROR,

```

```

2710 7402 HALT35, HLT
2711 4545 DATERR
2712 1140 TAD TEMP1
2713 0373 AND (1000

```

```

/TRANSMIT,
/RECEIVE,
/SAVE STATUS WORD,
/MASK FOR PARITY ERROR;

/FALLING STATUS BIT AND DATA
/WORD TO THE AC,
/PARITY ERROR,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/MASK FOR OVERRUN ERROR,

```

```

2714 7640 SZA CLA
2715 7410 SKP
2716 5322 JMP
2717 1140 TAD

      +4
      TEMP1

HALT36, HLT 7402
        DATERR 4545
        TAD 1140
        AND 0372
        SZA CLA 7640
        SKP 7410
        JMP 5332
        TAD 1140
        TAD 7402
        HLT 7402
        DATERR 4545
        TAD 1140
        AND 0374
        SZA CLA 7640
        SKP 7410
        JMP 5342
        TAD 1140
        TAD 7402
        HLT 7402
        DATERR 4545
        ISZ 2132
        JMP 5260
        CLA 7200
        TAD 1371
        TAD 7421
        MQL 1770
        TAD 7640
        SZA CLA 7640
        JMP 5200
        DELAY 4020
        JMP 5767

      +4
      TEMP1
      TSYCNT
      LOOP7B
      (7
      TESTNO
      TST7
      TST1

RANGEN, RAN1 2524

2767 1200
2770 0276
2771 0007
2772 0400
2773 2000
2774 4000
2775 1000
2776 5000
2777 0002
2778 3000

```

```

/FAILING STATUS BIT AND DATA
/WORD TO AC,

/OVERRUN ERROR,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/MASK FOR FRAMING ERROR,

/FAILING STATUS BIT AND DATA WORD TO AC,
/FRAMING ERROR,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/MASK FOR BIT 0, ANY ERROR BIT,

/FAILING STATUS BIT AND DATA WORD TO AC,
/ERROR BIT 0=1,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
/TEST LOOP COUNTER,

/LOAD CURRENT TEST
/NUMBER INTO MG REGISTER,
/ARE ALL TESTS BEING RUN?
/YES, GO TO NEXT TEST,
/NO, CONTINUE CURRENT TEST,
/GIVE TIME FOR CKTS TO SETTLE,
/NEXT TEST,

PAGE

/EXACT BAUD RATE TABLES
/USED WHEN TESTING FLAGS TO SET WITHIN SPECS
/110 BAUD
/7 BIT TIME
/8 BIT TIME
/9 BIT TIME

```

3003	6106	-1672	/10 BIT TIME
3004	5746	-2032	/11 BIT TIME
3005	5606	-2172	/12 BIT TIME
3006	6737	-1041	/134.5 BAUD
3007	6620	-1160	/7 BIT TIME
3010	6502	-1276	/8 BIT TIME
3011	6364	-1414	/9 BIT TIME
3012	6246	-1532	/10 BIT TIME
3013	6127	-1651	/11 BIT TIME
			/12 BIT TIME
3014	7027	-751	/150 BAUD
3015	6720	-1060	/7 BIT TIME
3016	6613	-1165	/8 BIT TIME
3017	6505	-1273	/9 BIT TIME
3020	6376	-1402	/10 BIT TIME
3021	6271	-1507	/11 BIT TIME
			/12 BIT TIME
3022	7413	-365	/7 BIT TIME
3023	7351	-427	/8 BIT TIME
3024	7305	-473	/9 BIT TIME
3025	7242	-536	/10 BIT TIME
3026	7200	-600	/11 BIT TIME
3027	7134	-644	/12 BIT TIME
3030	7606	-172	/600 BAUD
3031	7564	-214	/7 BIT TIME
3032	7544	-234	/8 BIT TIME
3033	7522	-256	/9 BIT TIME
3034	7500	-300	/10 BIT TIME
3035	7457	-321	/11 BIT TIME
			/12 BIT TIME
3036	7703	-75	/1200 BAUD
3037	7672	-106	/7 BIT TIME
3040	7661	-117	/8 BIT TIME
3041	7651	-127	/9 BIT TIME
3042	7637	-141	/10 BIT TIME
3043	7627	-151	/11 BIT TIME
			/12 BIT TIME
3044	7727	-51	/1800 BAUD
3045	7722	-56	/7 BIT TIME
3046	7713	-65	/8 BIT TIME
3047	7705	-73	/9 BIT TIME
3050	7700	-100	/10 BIT TIME
3051	7672	-106	/11 BIT TIME
			/12 BIT TIME
3052	7742	-36	/2400 BAUD
3053	7735	-43	/7 BIT TIME
			/8 BIT TIME

3054 7731 -47 /9 BIT TIME
 3055 7724 -54 /10 BIT TIME
 3056 7720 -60 /11 BIT TIME
 3057 7713 -65 /12 BIT TIME

LOW BAUD RATE TABLES
 USED WHEN TESTING FLAGS NOT TO SET TOO SOON

110 BAUD
 3060 7003 -775 /7 BIT TIME
 3061 6672 -1106 /8 BIT TIME
 3062 6562 -1216 /9 BIT TIME
 3063 6451 -1327 /10 BIT TIME
 3064 6340 -1440 /11 BIT TIME
 3065 6227 -1551 /12 BIT TIME

134.5 BAUD
 3066 7141 -637 /7 BIT TIME
 3067 7045 -733 /8 BIT TIME
 3070 6731 -1027 /9 BIT TIME
 3071 6656 -1122 /10 BIT TIME
 3072 6562 -1216 /11 BIT TIME
 3073 6466 -1312 /12 BIT TIME

150 BAUD
 3074 7213 -565 /7 BIT TIME
 3075 7126 -652 /8 BIT TIME
 3076 7041 -737 /9 BIT TIME
 3077 6783 -1029 /10 BIT TIME
 3100 6606 -1112 /11 BIT TIME
 3101 6601 -1177 /12 BIT TIME

300 BAUD
 3102 7505 -273 /7 BIT TIME
 3103 7453 -325 /8 BIT TIME
 3104 7420 -360 /9 BIT TIME
 3105 7366 -412 /10 BIT TIME
 3106 7333 -445 /11 BIT TIME
 3107 7300 -500 /12 BIT TIME

600 BAUD
 3110 7643 -135 /7 BIT TIME
 3111 7626 -152 /8 BIT TIME
 3112 7611 -167 /9 BIT TIME
 3113 7573 -205 /10 BIT TIME
 3114 7556 -222 /11 BIT TIME
 3115 7541 -237 /12 BIT TIME

1200 BAUD
 3116 7722 -56 /7 BIT TIME
 3117 7712 -66 /8 BIT TIME
 3120 7704 -74 /9 BIT TIME
 3121 7676 -102 /10 BIT TIME

3122	7666	-112	/11 BIT TIME
3123	7660	-120	/12 BIT TIME
3124	7741	L01800,	/1800 BAUD
3125	7735	-37	/7 BIT TIME
3126	7730	-43	/8 BIT TIME
3127	7723	-50	/9 BIT TIME
3130	7717	-55	/10 BIT TIME
3131	7712	-61	/11 BIT TIME
		-66	/12 BIT TIME
3132	7751	L02400,	/2400 BAUD
3133	7746	-27	/7 BIT TIME
3134	7742	-32	/8 BIT TIME
3135	7736	-36	/9 BIT TIME
3136	7733	-42	/10 BIT TIME
3137	7730	-45	/11 BIT TIME
		-50	/12 BIT TIME

S

0177 0302

4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700

BAUDNO 2146
 BEGIN 3200
 BITMSK 0134
 BITNO 0275
 BRKCNT 2275
 CAF 6007
 CHECK1 1316
 CHECK2 1521
 CHECK3 1752
 CHECK4 2053
 CHECK5 2264
 CON100 0126
 COUNT 0043
 DATERR 4545
 DECODE 0250
 DELAY 4020
 DELAYN 0125
 DELAY 0020
 DELOOP 0024
 DOUBLE 0301
 ERROR 4544
 FAIL 0312
 GETBAK 0130
 HALT1 1207
 HALT10 1434
 HALT11 1461
 HALT12 1471
 HALT13 1513
 HALT14 1606
 HALT15 1634
 HALT16 1643
 HALT17 1656
 HALT18 1665
 HALT19 1703
 HALT2 1216
 HALT20 1715
 HALT21 1744
 HALT22 2012
 HALT23 2022
 HALT24 2045
 HALT25 2215
 HALT26 2231
 HALT27 2246
 HALT28 2256
 HALT29 2442
 HALT3 1226
 HALT30 2446
 HALT31 2506
 HALT32 2511
 HALT33 2631
 HALT34 2642
 HALT35 2710

HALT36 2720
 HALT37 2730
 HALT38 2740
 HALT4 1242
 HALT5 1256
 HALT6 1274
 HALT7 1310
 HALT8 1413
 HALT9 1424
 HIBKCT 2273
 HOLD1 0137
 INTOK 1262
 LO110 3060
 LO1200 3116
 LO134 3066
 LO150 3074
 LO1800 3124
 LO2400 3132
 LO300 3102
 LO600 3110
 LOBAUD 0063
 LOBKCT 2274
 LOOP6A 2406
 LOOP6B 2464
 LOOP7A 2607
 LOOP7B 2660
 LORATE 0300
 MASK7 0466
 MGL 7421
 NDELAY 0124
 NXTST 0131
 ON110 3000
 ON1200 3036
 ON134 3006
 ON150 3014
 ON1800 3044
 ON2400 3052
 ON300 3022
 ON600 3030
 ONBAUD 0053
 ONRATE 0277
 ONRAN1 2524
 RANGEN 2754
 RCV6A 2426
 RCV6B 2475
 RCV7B 2700
 RCVD 0344
 RCVIOI 0470
 RETURN 0002
 RINTOK 1750
 RKCC 0613
 RKCF 0601

RKIE
 RKRB
 RKRS
 RKSF
 RP1B
 RP2B
 RSPF
 RSPI
 RTCF
 RTLS
 RTPC
 RTPK
 RTSF
 SCOPE
 SET1A
 SET1B
 SET1C
 SET2A
 SET2B
 SET3A
 SET3B
 SET3C
 SET3D
 SET4A
 SET5A
 SET7A
 SETCNT
 SETIOT
 SETT1A
 SETT1B
 SETT1C
 SETT2A
 SETT2B
 SETT3A
 SETT3B
 SETT3C
 SETT3D
 SETT4A
 SETT5A
 SETT7A
 SETCNT
 SETIOT
 SETT1A
 SETT1B
 SETT1C
 SETT2A
 SETT2B
 SETT3A
 SETT3B
 SETT3C
 SETT3D
 SETT4A
 SETT5A
 SETT7A
 SWITCH
 TEMPI
 TEST
 TESTNO
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 TNEW
 TNOW
 TOLD
 TST1
 TST1A
 TST1AB
 TST1B

TST18B
 TST1C
 TST1CB
 TST2
 TST2A
 TST2AB
 TST2B
 TST2BB
 TST3
 TST3A
 TST3B
 TST3BB
 TST3C
 TST3CB
 TST3D
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 TST4A
 TST4AB
 TST5
 TST5A
 TST5AB
 TST5AC
 TST5AD
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 TST7A
 TST7B
 TSTBL
 TSTCNT
 UKCC
 UKCF
 UKIE
 UKRB
 UKRS
 UKSF
 UPDATE
 US100
 USPF
 USPI
 USPI
 UTCF
 UTLS
 UTPC
 UTPK
 UTSF
 XFAIL
 XKCC
 XKCF
 XKIE
 XKRB
 XKRS

0623
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 1116
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 0140
 0237
 0276
 0143
 2550
 0141
 0142
 1200
 1202
 1222
 1236

X4SF 2604
X4TCH 0133
X4Y10T 0467
XSCOPE 0145
XSET1A 0110
XSET1B 0111
XSET1C 0112
XSET1A 0113
XSET2B 0114
XSET3A 0115
XSET3B 0116
XSET3C 0117
XSET3D 0120
XSET4A 0121
XSET5A 0122
XSET7A 0123
XSPF 0632
XSPI 0654
XTCF 0644
XTLS 0662
XTPC 0650
XTPK 0666
XTSF 0636
XXKCC 0075
XXKCF 0073
XXK1E 0077
XXKRB 0100
XXKRS 0076
XXKSF 0074
XXSPF 0101
XSPI 0105
XTCF 0103
XTLS 0106
XTPC 0104
XTPK 0107
XTSF 0102

ERRORS DETECTED 0

LINKS GENERATED 67

RUN-TIME 13 SECONDS

3K CORE USED