

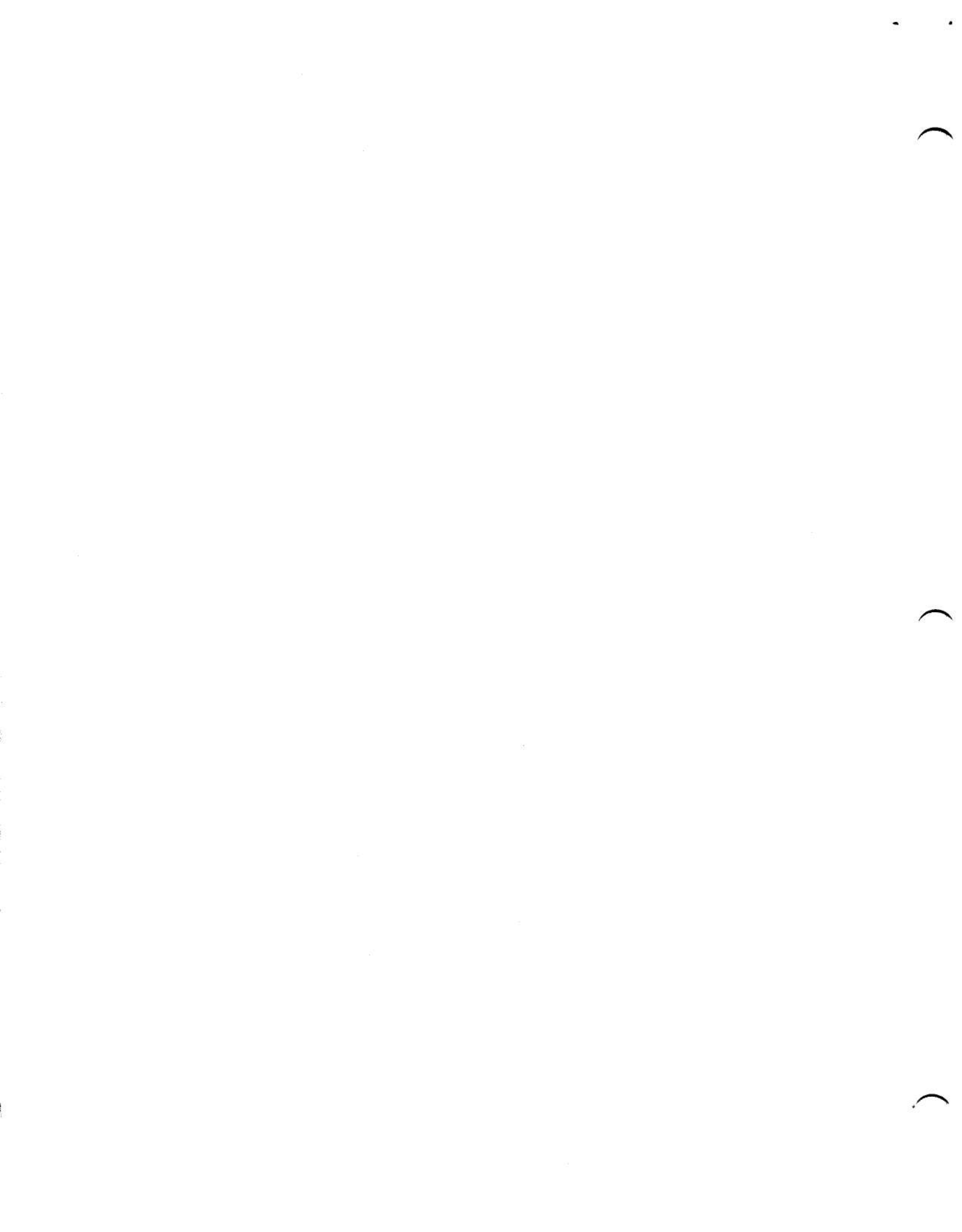
**M. C. N. REQUIRED  
THIS PROGRAM REQUIRES MCN(S)  
IN ORDER TO WORK PROPERLY**

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  
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THIS DIAGNOSTIC FACILITATES THE CHECK-OUT OF THE KL8F DOUBLE BUFFERED ASNYCHRONOUS 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  
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2.1 EQUIPMENT  
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PDP-8E COMPUTER  
ASR-33 TELETYPE OR EQUIVALENT DEVICE  
M8652 QUAD MODULE  
ONE LOOP BACK PLUG #7000517  
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  
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THE PROGRAM OCCUPIES MEMORY LOCATIONS 0000 TO 3000,

3.0 LOADING PROCEDURE  
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LOAD PROGRAM VIA BINARY LOADER;

4.0 STARTING PROCEDURE  
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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,0, REGISTER IS LOADED WITH THE TEST NUMBER (1,2,3,4,5,6,7) AFTER IT HAS MADE A COMPLETE PASS,

6,0 ERRORS  
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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 FAILING 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  
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//KLBF 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	XXKCC	/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, /FRAMING 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, /DATA 10 TO STATUS WORD ENABLE;
4500	UKRB=JMS I	XXKRB	/CLEAR AC AND RECEIVE FLAG, /INPUT DATA BUFFER TO AC4-11,
4501	USPF=JMS I	XXSPF	/SET TRANSMIT FLAG;
4502	UTSF=JMS I	XXTSF	/SKIP ON TRANSMIT FLAG;
4503	UTCF=JMS I	XXTCF	/CLEAR TRANSMIT FLAG;
4504	UTPC=JMS I	XXTPC	/AC4-11 TO OUTPUT DATA BUFFER, /TRANSMIT, SET TRANSMIT FLAG WHEN DONE;
4505	USPI=JMS I	XXSPI	/SKIP ON INTERRUPT REQUEST SET;
4506	UTLS=JMS I	XXTLS	/CLEAR TRANSMIT FLAG, /AC4-11 TO OUTPUT DATA BUFFER, /TRANSMIT, SET TRANSMIT FLAG WHEN DONE;
4507	UTPK=JMS I	XXTPK	/GENERATE BREAK,
6007	CAF=6007		/CLEAR ALL FLAGS;
7421	MQL=7421		/LOAD MQ,
4020	DELAY=JMS	DELLAY	
4544	ERROR=JMS I	XFAIL	
4545	DATER=JMS I	XSCOPE	
4043	SETCNT=JMS	COUNT	
4510	SET1A=JMS I	XSET1A	
4511	SET1B=JMS I	XSET1B	
4512	SET1C=JMS I	XSET1C	
4513	SET2A=JMS I	XSET2A	
4514	SET2B=JMS I	XSET2B	
4515	SET3A=JMS I	XSET3A	
4516	SET3B=JMS I	XSET3B	
4517	SET3C=JMS I	XSET3C	
4520	SET3D=JMS I	XSET3D	
4521	SET4A=JMS I	XSET4A	
4522	SET5A=JMS I	XSET5A	
4523	SET7A=JMS I	XSET7A	

//ERROR HALT DESCRIPTIONS//

1207	*HALT1		/SPF FAILED TO SET TRANSMIT FLAG OR /TSF FAILED TO SKIP ON TRANSMIT FLAG,
1207	1216	HALT2	/CAF FAILED TO CLEAR TRANSMIT FLAG OR

			/TSF SKIPPED ON TRANSMIT FLAG = 0,
1210	1226	HALT3	/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	/TLS FAILED TO CLEAR TRANSMIT FLAG OR /TRANSMIT FLAG SETTING TOO SOON OR /TSF SKIPPED ON TRANSMIT FLAG = 0,
1217	1434	HALT10	/TLS FAILED TO SET TRANSMIT FLAG OR /TRANSMIT FLAG TAKEING 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	/TLS 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 P/F /OR SPI SKIPPED ON INTERRUPT ENABLE = 0.

```

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 5402 JMP I RETURN
0002 0000 RETURN, 0

0020 0000 *20 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;
/TOF 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//

```

0022 1124      TAD      NDELAY
0023 3125      DCA      DELAYN
0024 1126      DELOOP, TAD      CON100
0025 3127      DCA      US100
0026 2127      ISZ      US100
0027 5026      JMP      ,=1
0030 7200      CLA
0031 7200      CLA
0032 7200      CLA
0033 7200      CLA
0034 2125      ISZ      DELAYN
0035 7610      SKP CLA
0036 5420      JMP I  DELLAY
0037 0420      AND I  DELLAY
0040 0420      AND I  DELLAY
0041 0020      AND   DELLAY
0042 5024      JMP   DELOOP
    
```

//ROUTINE TO SETUP COUNTER FOR TEST LOOPS//

```

0043 0000      COUNT, 0
0044 7200      CLA
0045 1146      TAD      BAUDNO
0046 1177      TAD      (TSTBL
0047 3140      DCA      TEMP1
0050 1540      TAD I  TEMP1
0051 3132      DCA      TSTCNT
0052 5443      JMP I  COUNT
    
```

//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, L0110
0064 3066      L0134
0065 3074      L0150
0066 3102      L0300
0067 3110      L0600
0070 3116      L01200
0071 3124      L01800
0072 3132      L02400
    
```

//POINTERS FOR IOT SUBROUTINES//

```

0073 0600      XXKCF, XKCF
0074 0604      XXKSF, XKSF
    
```

2275	0612	XXKCC,	XKCC
2276	0616	XXKRS,	XKRS
2077	0622	XXKIE,	XKIE
2120	0626	XXKRB,	XKRB
2101	0632	XXSPF,	XSPF
2102	0636	XXTSF,	XTSF
2103	0644	XXTCF,	XTCF
2104	0650	XXTPC,	XTPC
2105	0654	XXSPI,	XSPI
2106	0662	XXTLS,	XTLS
2107	0666	XXTPK,	XTPK

//LINKS FOR ERROR HALT ROUTINES//

0110	1000	XSET1A,	SETT1A
0111	1010	XSET1B,	SETT1B
0112	1016	XSET1C,	SETT1C
0113	1024	XSET2A,	SETT2A
0114	1034	XSET2B,	SETT2B
0115	1044	XSET3A,	SETT3A
0116	1050	XSET3B,	SETT3B
0117	1062	XSET3C,	SETT3C
0120	1070	XSET3D,	SETT3D
0121	1074	XSET4A,	SETT4A
0122	1104	XSET5A,	SETT5A
0123	1116	XSET7A,	SETT7A

//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	RP1B,	1233
0136	7622	RP2B,	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	
0200	7300	BEGIN,	CLA CLL
0201	6007		CAF

```

0202 7402 HLT
0203 4777' JMS SETIOT /GET SWITCHES FOR IOT'S;
0204 7402 HLT
0205 7604 LAS /GET SWITCHES TO DETERMINE

0206 3134 DCA BITMSK /NUMBER OF DATA BITS PER WORD,
0207 7402 HLT
0210 4250 JMS DECODE /CHECK SWITCH SETTINGS;
0211 1146 TAD BAUDNO /GET SETTING OF SW'S 9,10,11,
0212 1376 TAD (ONBAUD /ADD POINTER OF BAUD TABLE;
0213 3140 DCA TEMP1 /SAVE NEW POINTER;
0214 1540 TAD I TEMP1 /GET BAUD RATE THRU POINTER;
0215 1275 TAD BITNO /ADD BIT SIZE OF CHARACTER;
0216 3140 DCA TEMP1 /SAVE FINAL POINTER;
0217 1540 TAD I TEMP1 /PICK-UP BAUD RATE CONSTANT
0220 3277 DCA ONRATE /SAVE IT;
0221 1277 TAD ONRATE
0222 1277 TAD ONRATE /DOUBLE RATE;
0223 3301 DCA DOUBLE /SAVE DOUBLE BAUD RATE CONSTANT;
0224 1146 TAD BAUDNO
0225 1375 TAD (LOBAUD /SETUP
0226 3140 DCA TEMP1
0227 1540 TAD I TEMP1
0230 1275 TAD BITNO
0231 3140 DCA TEMP1
0232 1540 TAD I TEMP1
0233 3300 DCA LORATE /LOWER BAUD LIMIT;
0234 1276 TAD TESTNO /GET SETTING OF SW'S 1,2,3;
0235 1374 TAD (JMP I TEST+1 /TO DETERMINE TEST TO BE RUN;
0236 3237 DCA TEST

```

```

0237 0000 TEST, 0
0240 1200 TST1
0241 1200 TST1 /TRANSMIT CONTROL LOGIC TEST;
0242 1400 TST2 /TRANSMIT TIMING TEST;
0243 1600 TST3 /RECEIVE CONTROL LOGIC TEST;
0244 2000 TST4 /RECEIVE TIMING TEST;
0245 2200 TST5 /BREAK TEST;
0246 2400 TST6 /DATA TEST;
0247 2600 TST7 /STATUS REGISTER TEST;

```

```

0250 0000 DECODE, 0 /ROUTINE TO CHECK ALL SWITCHES
0251 7300 CLA CLL
0252 7604 LAS
0253 3274 DCA SWITCH
0254 1274 TAD SWITCH
0255 0773' AND MASK7
0256 3146 DCA BAUDNO /SAVE BAUD RATE SELECTED;
0257 1274 TAD SWITCH
0260 7012 RTR
0261 7010 RAR
0262 0773' AND MASK7
0263 3275 DCA BITNO /SAVE NO. OF BITS PER DATA WORD,

```

```

0264 1274      TAD      SWITCH
0265 7012      RTR
0266 7012      RTR
0267 7012      RTR
0270 7012      RTR
0271 0773      AND      MASK7
0272 3276      DCA      TESTNO
0273 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
    
```

```

0302 7000      TSTBL,  -1000
0303 7000      -1000
0304 7000      -1000
0305 6300      -1500
0306 6000      -2000
0307 5000      -3000
0310 4000      -4000
0311 3000      -5000
    
```

/TABLE OF TEST COUNTER VALUES,

```

0312 0000      FAIL,   0
0313 7344      CLA CLL CMA RAL
0314 1312      TAD      FAIL
0315 3140      DCA      TEMP1
0316 1372      TAD      (7000
0317 3540      DCA I    TEMP1
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
0326 0371      AND      (4000
0327 7650      SNA CLA
0330 5530      JMP I    GETBAK
0331 5531      JMP I    NXTST
    
```

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

```

0332 0000      SCOPE,  0
0333 4506      UTLS
0334 4474      UKSF
0335 7410      SKP
0336 5344      JMP      RCVD
0337 7300      CLA CLL
0340 1142      TAD      TOLD
0341 4506      UTLS
    
```

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

```

0342 7200          CLA
0343 5334          JMP      SCOPE+2
0344 4500  RCVD,  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/

```

0400 0000  SETIOT, 0
0401 7604          LAS
0402 3140          DCA      TEMP1
0403 1140          TAD      TEMP1
0404 0377          AND      (7700
0405 7012          RTR
0406 7010          RAR
0407 3270          DCA      RCVIOT
0410 1270          TAD      RCVIOT
0411 1376          TAD      (6000
0412 3775'         DCA      RKCF
0413 1270          TAD      RCVIOT
0414 1374          TAD      (6001
0415 3773'         DCA      RKSF
0416 1270          TAD      RCVIOT
0417 1372          TAD      (6002
0420 3771'         DCA      RKCC
0421 1270          TAD      RCVIOT
0422 1370          TAD      (6004
0423 3767'         DCA      RKRS
0424 1270          TAD      RCVIOT
0425 1366          TAD      (6005
0426 3765'         DCA      RKIE
0427 1270          TAD      RCVIOT
0430 1364          TAD      (6006
0431 3763'         DCA      RKRB
0432 7100          CLL
0433 1140          TAD      TEMP1
0434 0362          AND      (0077
0435 7006          RTL
0436 7004          RAL
0437 3267          DCA      XMTIOT
0440 1267          TAD      XMTIOT
0441 1376          TAD      (6000
0442 3761'         DCA      RSPF
0443 1267          TAD      XMTIOT

```



```

2444 1374 TAD (6001
2445 3762' 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 RTPC
2454 1267 TAD XMTIOT
2455 1366 TAD (6005
2456 3755' DCA RSPI
2457 1267 TAD XMTIOT
2460 1364 TAD (6006
2461 3754' DCA RTLS
2462 1267 TAD XMTIOT
2463 1353 TAD (6007
2464 3752' DCA RTPK
2465 5600 JMP I SEPIOT
    
```

```

0466 0007 MASK7, 7
0467 0000 XMTIOT, 0
0470 0000 RQVIOT, 0
0532 0667
0533 6007
0534 0663
0535 0655
0536 0651
0537 0645
0560 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, 0
0601 0000 RKCF, 0
0602 5600 JMP I XKCF
0603 7402 HLT
0604 0000 XKSF, 0
    
```

//IOT SUBROUTINES//

/CLEAR RECEIVE FLAG,

2625	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		
2613	0000	RKCC,	0		/CLEAR RECEIVE FLAG AND AC;
2614	5612		JMP I	XKCC	
2615	7402		HLT		
2616	0000	XKRS,	0		
2617	0000	RKRS,	0		/INPUT DATA BUFFER V AC4-11 TO AC4-11;
2620	5616		JMP I	XKRS	
2621	7402		HLT		
2622	0000	XKIE,	0		
2623	0000	RKIE,	0		/DATA 11 TO INTERRUPT ENABLE;
2624	5622		JMP I	XKIE	/DATA 10 TO STATUS WORD ENABLE;
2625	7402		HLT		
2626	0000	XKRB,	0		
2627	0000	RKRB,	0		/CLEAR AC AND RECEIVE FLAG;
2630	5626		JMP I	XKRB	/INPUT DATA BUFFER TO AC4-11;
2631	7402		HLT		
2632	0000	XSPF,	0		
2633	0000	RSPF,	0		/SET TRANSMIT FLAG;
2634	5632		JMP I	XSPF	
2635	7402		HLT		
2636	0000	XTSF,	0		
2637	0000	RTSF,	0		/SKIP ON TRANSMIT FLAG;
2640	7410		SKP		
2641	2236		ISZ	XTSF	
2642	5636		JMP I	XTSF	
2643	7402		HLT		
2644	0000	XTCF,	0		
2645	0000	RTCF,	0		/CLEAR TRANSMIT FLAG;
2646	5644		JMP I	XTCF	
2647	7402		HLT		
2650	0000	XTPC,	0		
2651	0000	RTPC,	0		/AC4-11 TO OUTPUT DATA BUFFER
2652	5650		JMP I	XTPC	/TRANSMIT, SET TRANSMIT FLAG WHEN DONE;
2653	7402		HLT		
2654	0000	XSPI,	0		
2655	0000	RSPI,	0		/SKIP ON INTERRUPT REQUEST SET;
2656	7410		SKP		
2657	2254		ISZ	XSPI	
2660	5654		JMP I	XSPI	
2661	7402		HLT		

0662	0000	XTLS,	0		/CLEAR TRANSMIT FLAG,
0663	0000	RILS,	0		/AS4-11 TO OUTPUT DATA BUFFER,
0664	5662		JMP I	XTLS	/TRANSMIT, SET TRANSMIT FLAG WHEN DONE,
0665	7402		HLT		

0666	0000	XTPK,	0		
0667	0000	RTPK,	0		/GENERATE BREAK,
0670	5666		JMP I	XTPK	
0671	7402		HLT		

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	SETT7A
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	1296		
1173	1242		
1174	1226		
1175	1216		
1176	1207		
1177	7402		
	1200		

PAGE

//TST1=BASIC TEST OF TRANSMIT LOGIC//

/TST1A=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.

1200	4043	TST1,	SETCNI	/SETUP TEST LOOP COUNTER
1201	4510		SET1A	/SETUP HALT LOCATIONS,
1202	7300	TST1A,	CLA CLL	
1203	4501		USPF	/SET TRANSMIT FLAG,
1204	4502		UTSF	/FLAG SET ?
1205	7610		SKP CLA	

```

1226 5213          JMP      ,+5          /YES, CONTINUE TEST,
1227 7402  HALT1,  HLT              /NO, SPF OR TSP FAILED,
1210 4544          ERROR            /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1211 1202          TST1A            /LOOP ADDRESS,
1212 1222          TST1AB           /NEXT TEST,
1213 6007          CAF              /CLEAR FLAG,
1214 4502          UTSF             /FLAG CLEARED?
1215 5222          JMP      ,+5          /YES, CONTINUE TEST,
1216 7402  HALT2,  HLT              /NO, CAF OR TSP FAILED,
1217 4544          ERROR            /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1220 1202          TST1A            /LOOP ADDRESS,
1221 1222          TST1AB           /NEXT TEST,
1222 4501  TST1AB,  USPF             /SET TRANSMIT FLAG,
1223 4503          UTCF             /CLEAR TRANSMIT FLAG,
1224 4502          UTSF             /FLAG CLEARED?
1225 5232          JMP      ,+5          /YES, CONTINUE TEST,
1226 7402  HALT3,  HLT              /NO, TCF OR TSP FAILED,
1227 4544          ERROR            /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1230 1222          TST1AB           /LOOP ADDRESS,
1231 1234          TST1B=2          /NEXT TEST,
1232 2132          ISZ      TSTCNT    /TEST LOOP COUNTER,
1233 5202          JMP      TST1A     /LOOP,

```

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

```

1234 4043          SETCNT           /SETUP TEST LOOP COUNTER,
1235 4511          SET1B            /SETUP HALT LOCATIONS,
1236 7300  TST1B,  CLA  CLL           /CLEAR ALL FLAGS,
1237 6007          CAF              /SKIP ON INTERRUPT REQUEST,
1240 4505          USPI             /NO INTERRUPT, CONTINUE,
1241 5246          JMP      ,+5          /ILLEGAL INTERRUPT, CAF OR SPI FAILED,
1242 7402  HALT4,  HLT              /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1243 4544          ERROR            /LOOP ADDRESS,
1244 1236          TST1B            /NEXT TEST,
1245 1246          TST1BB           /CLEAR ALL FLAGS,
1246 7300  TST1BB, CLA  CLL           /GET RETURN ADDRESS,
1247 6007          CAF              /SAVE IT,
1250 1377          TAD      (INTOK    /SET TRANSMIT FLAG,
1251 3002          DCA      RETURN    /TURN INTERRUPT ON,
1252 4501          USPF             /WAIT,
1253 6001          ION              /TURN INTERRUPT OFF,
1254 7000          NOP              /FAILED, INTERRUPT DID NOT OCCUR,
1255 6002          IOF              /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1256 7402  HALT5,  HLT              /LOOP ADDRESS,
1257 4544          ERROR            /NEXT TEST,
1260 1246          TST1BB           /TEST LOOP COUNTER,
1261 1264          TST1C=2          /LOOP,
1262 2132  INTOK,  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,

```

1264 4043          SETCNT          /SETUP TEST LOOP COUNTER,
1265 4512          SET1C           /SETUP HALT LOCATIONS,
1266 7300  TST1C,  CLA CLL
1267 6007          CAF              /CLEAR ALL FLAGS,
1270 4531          USPF            /SET TRANSMIT FLAG,
1271 4505          USPI            /SKIP ON INTERRUPT REQUEST SET,
1272 7410          SKP
1273 5300          JMP              ,+5
1274 7402  HALT6,  HLT              /INTERRUPT REQ; SET, CONTINUE,
1275 4544          ERROR           /SPI FAILED OR INT; REQ, NOT SET,
1276 1266          TST1C           /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1277 1300          TST1CB          /LOOP ADDRESS,
1300 7300  TST1CB, CLA CLL          /NEXT TEST,
1301 1376          TAD              (HALT7
1302 3002          DCA              RETURN
1303 6007          CAF              /GET RETURN ADDRESS,
1304 6001          ION              /SETUP RETURN,
1305 7000          NOP              /CLEAR ALL FLAGS,
1306 6002          IOF              /INTERRUPT ON,
1307 5314          JMP              ,+5
1307 5314          JMP              /WAIT
1310 7402  HALT7,  HLT              /INTERRUPT OFF,
1311 4544          ERROR           /NO INTERRUPT, CONTINUE.
1312 1300          TST1CB          /ILLEGAL INTERRUPT,
1313 1316          CHECK1          /SCOPE LOOP PRESS CONTINUE TO ENTER,
1314 2132          ISZ             /LOOP ADDRESS,
1315 5266          JMP             TSTCNT /NEXT TEST
1316 7200  CHECK1, CLA             /TEST LOOP COUNTER,
1317 1375          TAD              /LOOP,
1320 7421          MQL             TST1C
1321 1774'        TAD              (1
1322 7640          SEA             /LOAD CURRENT TEST
1323 5200          JMP             /NUMBER INTO MO REGISTER,
1324 5773'        JMP             /ARE ALL TESTS BEING RUN?
1373 1400          JMP             /YES, GO TO NEXT TEST,
1374 0276          JMP             /NO, CONTINUE CURRENT TEST,
1375 0001          JMP             /NXT TEST,
1376 1310
1377 1262
1400          PAGE

```

//TST2-TRANSMIT TIMING TEST//

/TST2A-CHECKS THE ABILITY OF-  
/TPC TO SET THE TRANSMIT FLAG,  
/TL5 TO CLEAR THE TRANSMIT FLAG,  
/TL5 TO SET THE TRANSMIT FLAG,

```

1400 4043  TST2,  SETCNT          /SETUP TEST LOOP COUNTER,
1401 4513          SET2A           /SETUP HALT LOCATIONS,
1402 7300  TST2A,  CLA CLL
1403 1777'        TAD              DOUBLE
1403 1777'        TAD              /SET DELAY ROUTINE TO DELAY TWICE AS

```

```

1404 3124          DCA      NDELAY          /LONG AS TIME NEEDED;
1405 4503          UTCF          /CLEAR TRANSMIT FLAG;
1406 4504          UTPC          /TRANSMIT
1407 4020          DELAY        /DELAY TWICE MAX TIME;
1410 4502          UTSF          /FLAG SET?
1411 7410          SKP
1412 5217          JMP          ,+5          /YES, CONTINUE;
1413 7402  HALT8,  HLT          /NO, TPC FAILED TO SET FLAG;
1414 4544          ERROR        /SCOPE LOOP, PRESS CONTINUE TO ENTER;
1415 1402          TST2A        /LOOP ADDRESS;
1416 1417          TST2AB       /NEXT TEST;
1417 7300  TST2AB,  CLA CLL
1420 4501          USPF          /SET TRANSMIT FLAG;
1421 4506          UTLS          /CLEAR AND SET TRANSMIT FLAG;
1422 4502          UTSF          /TRANSMIT FLAG CLEAR?
1423 5230          JMP          ,+5          /YES, CONTINUE
1424 7402  HALT9,  HLT          /NO, TFS FAILED TO CLEAR FLAG;
1425 4544          ERROR        /SCOPE LOOP, PRESS CONTINUE TO ENTER;
1426 1417          TST2AB       /LOOP ADDRESS;
1427 1442          TST2B=2      /NEXT TEST;
1430 4020          DELAY        /DELAY TWICE MAX TIME;
1431 4502          UTSF          /TRANSMIT FLAG SET?
1432 7410          SKP
1433 5240          JMP          ,+5          /YES, CONTINUE;
1434 7402  HALT10, HLT         /NO, TFS FAILED TO SET FLAG;
1435 4544          ERROR        /SCOPE LOOP, PRESS CONTINUE TO ENTER;
1436 1417          TST2AB       /LOOP ADDRESS;
1437 1442          TST2B=2      /NEXT TEST;
1440 2132          ISZ          TSTCNT      /TEST LOOP COUNTER;
1441 5202          JMP          TST2A      /LOOP,

```

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

```

1442 4043          SETCNT          /SETUP TEST LOOP COUNTER;
1443 4514          SET2B          /SETUP HALT LOCATIONS;
1444 7300  TST2B,  CLA CLL
1445 1776          TAD          LORATE      /SET DELAY TO LOWER BAUD LIMIT;
1446 3124          DCA          NDELAY
1447 4506          UTLS          /INITIALIZE TRANSMIT FLAG;
1448 4502          UTSF          /FOR UPCOMING TIMING TEST;
1451 5230          JMP          ,=1
1452 4506          UTLS
1453 4502          UTSF
1454 5253          JMP          ,=1
1455 4506          UTLS
1456 4020          DELAY        /WAIT,
1457 4502          UTSF          /FLAG STILL CLEAR?
1460 5265          JMP          ,+5          /YES, CONTINUE;
1461 7402  HALT11, HLT         /NO, FLAG SET TOO SOON;
1462 4544          ERROR        /SCOPE LOOP, PRESS CONTINUE TO ENTER;
1463 1444          TST2B       /LOOP ADDRESS;
1464 1475          TST2BB      /NEXT TEST;
1465 4020          DELAY        /WAIT AGAIN, TO INSURE THAT FLAG WILL SET;

```



```

1466 4502          UTSF          /FLAG STILL CLEAR?
1467 7410          SKP
1470 5275          JMP          ,+5          /NO, FLAG SET, CONTINUE.
1471 7402 HALT12, HLT          /YES, TAKING TOO LONG TO SET,
1472 4544          ERROR        /SCOPE LOOP, PRESS CONTINUE TO ENTER.
1473 1444          TST2B        /LOOP ADDRESS,
1474 1475          TST2BB       /NEXT TEST,
1475 7300 TST2BB, CLA CLL
1476 1775'        TAD          ONRATE
1477 3124          DCA          NDELAY          /SET DELAY ROUTINE TO WAIT THE
1500 4506          UTLS          /EXACT TIME REQUIRED TO SET THE FLAG,
1501 4502          UTSF          /INITIALIZE TRANSMIT FLAG,
1502 5301          JMP          ,=1          /FOR UPCOMING TIMING TEST,
1503 4506          UTLS
1504 4502          UTSF
1505 5304          JMP          ,=1
1506 4506          UTLS          /TRANSMIT
1507 4020          DELAY        /WAIT
1510 4502          UTSF          /IS FLAG SET?
1511 7410          SKP
1512 5317          JMP          ,+5          /YES, CONTINUE,

1513 7402 HALT13, HLT          /NO, TLS FAILED OR FLAG IS BEING SET TOO LATE,
1514 4544          ERROR        /SCOPE LOOP, PRESS CONTINUE TO ENTER
1515 1475          TST2BB       /LOOP ADDRESS
1516 1521          CHECK2       /NEXT TEST,
1517 2132          ISZ          TSTCNT   /TEST LOOP COUNTER
1520 5244          JMP          TST2B    /LOOP,
1521 7200 CHECK2, CLA
1522 1374          TAD          (2          /LOAD CURRENT TEST
1523 7421          MQL          /NUMBER INTO MO REGISTER,
1524 1773'        TAD          TESTNO   /ARE ALL TESTS BEING RUN?
1525 7640          SZA          CLA          /YES, GO TO NEXT TEST,
1526 5200          JMP          TST2A=2  /NO, CONTINUE CURRENT TEST
1527 5772'        JMP          TST3          /NXT TEST,

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

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PAGE

//TST3 - BASIC TEST OF RECEIVE LOGIC//

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

```

1600 4043 TST3, SETCNT          /SETUP LOOP COUNTER,
1601 4515          SET3A        /SETUP HALT LOCATIONS,
1602 7240 TST3A, CLA CMA     /SET AC=7777
1603 4475          UKCC        /CLEAR AC
1604 7450          SNA          /IS AC CLEAR?
1605 5212          JMP          ,+5          /YES, CONTINUE

```

```

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

/TST3B - CHECKS THE ABILITY OF-
/TLS 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,
1614 4043 SETCNI /SETUP TEST COUNTER,
1615 4516 SET3B /SETUP HALT LOCATIONS,
1616 7300 TST3B, CLA CLL
1617 1777 TAD DOUBLE /SET DELAY ROUTINE TO DELAY TWICE AS
1620 3124 DCA NDELAY /LONG AS TIME NEEDED,
1621 6007 CAF /CLEAR ALL FLAGS,
1622 4506 UTLS
1623 4502 UTSF
1624 5223 JMP ,=1
1625 4506 UTLS /TRANSMIT
1626 4020 DELAY /DELAY TWICE MAX TIME,
1627 4502 UTSF /TRANSMIT FLAG SET,
1630 5227 JMP ,=1 /WAIT FOR IT
1631 4474 UKSF /NOW RECEIVE FLAG SHOULD ALSO BE SET,
1632 7410 SKP
1633 5240 JMP ,+5 /RECEIVE FLAG SET, CONTINUE,
1634 7402 HALT15, HLT /RECEIVE FLAG OR KSF FAILED,
1635 4544 ERROR /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1636 1616 TST3B /LOOP ADDRESS
1637 1647 TST3BB /NEXT TEST,
1640 4475 UKCC /CLEAR RECEIVE FLAG,
1641 4474 UKSF /SKIP ON RECEIVE FLAG=1,
1642 5247 JMP ,+5 /RECEIVE FLAG CLEAR CONTINUE,
1643 7402 HALT16, HLT /KCC OR KSF FAILED,
1644 4544 ERROR /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1645 1616 TST3B /LOOP ADDRESS,
1646 1647 TST3BB /NEXT TEST,

1647 7300 TST3BB, CLA CLL
1650 4475 UKCC /CLEAR RECEIVE FLAG,
1651 4506 UTLS /TRANSMIT,
1652 4020 DELAY /DELAY TWICE MAX TIME,
1653 4474 UKSF /SKIP ON RECEIVE FLAG,
1654 7410 SKP
1655 5262 JMP ,+5 /FLAG SET CONTINUE
1656 7402 HALT17, HLT /RECEIVE FLAG OR KSF FAILED,
1657 4544 ERROR /SCOPE LOOP, PRESS CONTINUE TO ENTER,
1660 1647 TST3BB /LOOP ADDRESS,
1661 1673 TST3C=2 /NEXT TEST,
1662 4473 UKCF /CLEAR RECEIVE FLAG,
1663 4474 UKSF /RECEIVE FLAG CLEARED?
1664 5271 JMP ,+5 /YES, CONTINUE

```

1665	7402	HALT18, HLT	/NO, KCF OF KSF FAILED;
1666	4544	ERROR	/SCOPE LOOP, PRESS CONTINUE TO ENTER,
1667	1647	TST3BH	/LOOP ADDRESS;
1670	1673	TST3C=2	/NEXT TEST
1671	2132	ISE TSTCNT	/TEST LOOP COUNTER;
1672	5216	JMP TST3B	/LOOP;

/TST3C - CHECKS THE ABILITY OF=  
 /KIE TO DISABLE INTERRUPT ENABLE F/F,  
 /KIE TO ENABLE INTERRUPT ENABLE F/F;

1673	4043	SETCNT	/SETUP TEST LOOP COUNTER,
1674	4517	SET3C	/SETUP HALT LOCATIONS;
1675	7300	TST3C, CLA CLL	
1676	6007	CAF	/CLEAR ALL FLAGS, ENABLE INT, ENABLE F/F,
1677	4477	UKIE	/DISABLE INTERRUPT ENABLE F/F;
1700	4501	USPF	/SET TRANSMIT FLAG;
1701	4505	USPI	/INTERRUPT REQUEST SET?
1702	5307	JMP ,+5	/NO, CONTINUE;
1703	7402	HALT19, HLT	/YES, KIE FAILED;
1704	4544	ERROR	/SCOPE LOOP, PRESS CONTINUE TO ENTER;
1705	1675	TST3C	/LOOP ADDRESS;
1706	1707	TST3CB	/NEXT TEST;
1707	7201	TST3CB, CLA IAC	/AC11=1
1710	4477	UKIE	/ENABLE INTERRUPT ENABLE F/F
1711	4501	USPF	/SET TRANSMIT FLAG
1712	4505	USPI	/INTERRUPT REQUEST SET?
1713	7410	SKP	
1714	5321	JMP ,+5	/YES, CONTINUE
1715	7402	HALT20, HLT	/NO, KIE FAILED;
1716	4544	ERROR	/SCOPE LOOP, PRESS CONTINUE TO ENTER
1717	1707	TST3CB	/LOOP ADDRESS;
1720	1725	TST3D	/NEXT TEST;
1721	2132	ISE TSTCNT	/TEST LOOP COUNT;
1722	5275	JMP TST3C	/LOOP;

/TST3D - CHECKS THAT THE RECEIVE FLAG WILL CAUSE AN INTERRUPT,

1723	4043	SETCNT	/SETUP LOOP COUNTER,
1724	4520	SET3D	/SETUP HALT LOCATIONS;
1725	7300	TST3D, CLA CLL	
1726	6007	CAF	/CLEAR ALL FLAGS;
1727	1376	TAD (RINTOK	/GET RETURN ADDRESS,
1730	3002	DCA RETURN	/SAVE IT,
1731	4506	UTLS	
1732	4502	UTSF	
1733	5332	JMP ,=1	
1734	4506	UTLS	/TRANSMIT,
1735	4020	DELAY	/DELAY TWICE MAX TIME;
1736	4502	UTSF	/WAIT FOR TRANSMIT FLAG, AT WHICH TIME
1737	5336	JMP ,=1	/RECEIVE FLAG SHOULD ALSO BE UP,
1740	4503	UTCF	/CLEAR TRANSMIT FLAG
1741	6001	ION	/TURN INTERRUPT ON;
1742	7000	NOP	/WAIT

1743	6022		IOF		/TURN INTERRUPT OFF,
1744	7402	HALT21,	HLT		/FAILED, NO INTERRUPT
1745	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER,
1746	1725		TST3D		/LOOP ADDRESS,
1747	1752		CHECK3		/NEXT TEST;
1750	2132	RINTOK,	ISZ	TSTCNT	/TEST LOOP COUNT
1751	5325		JMP	TST3D	/LOOP,
1752	7200	CHECK3,	CLA		
1753	1375		TAD	(3	/LOAD CURRENT TEST
1754	7421		MQL		/NUMBER INTO MQ REGISTER,
1755	1774'		TAD	TESTNO	/ARE ALL TESTS BEING RUN?
1756	7640		SZA	CLA	/YES, GO TO NEXT TEST;
1757	5200		JMP	TST3A=2	/NO, CONTINUE CURRENT TEST;
1760	5773'		JMP	TST4	/NXT TEST,
1773	2000				
1774	0276				
1775	0003				
1776	1750				
1777	0301				
	2000				

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//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		/SETUP TEST LOOP COUNTER,
2001	4521		SET4A		/SETUP HALT LOCATIONS;
2002	7300	TST4A,	CLA	CLL	
2003	1777'		TAD	LORATE	/SET DELAY TO LOWER BAUD LIMIT;
2004	3124		DCA	NDELAY	
2005	4475		UKCC		/CLEAR RECEIVE FLAG,
2006	4506		UTLS		/TRANSMIT,
2007	4020		DELAY		/WAIT;
2010	4474		UKSF		/FLAG STILL CLEAR?
2011	5216		JMP	,+3	/YES, CONTINUE;
2012	7402	HALT22,	HLT		/NO, FLAG SET TOO SOON;
2013	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER;
2014	2002		TST4A		/LOOP ADDRESS;
2015	2026		TST4AB		/NEXT TEST;
2016	4020		DELAY		/WAIT AGAIN, TO INSURE FLAG WILL SET,
2017	4474		UKSF		/FLAG STILL CLEAR?
2020	7410		SKP		
2021	5226		JMP	,+5	/NO, FLAG NOW A ONE, CONTINUE,
2022	7402	HALT23,	HLT		/YES, TAKING TOO LONG TO SET,
2023	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2024	2002		TST4A		/LOOP ADDRESS;
2025	2026		TST4AB		/NEXT TEST;
2026	7300	TST4AB,	CLA	CLL	
2027	1776'		TAD	ONRATE	/SET DELAY ROUTINE TO WAIT THE



2216	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2217	2204		TST5A		/LOOP ADDRESS,
2220	2221		TST5AB		/NEXT TEST;
2221	7300	TST5AB,	CLA CLL		
2222	1274		TAD	LOBKCT	/GET LOWER TIME LIMIT;
2223	3124		DCA	NDELAY	/SAVE IT;
2224	4503		UTCF		/CLEAR TRANSMIT FLAG;
2225	4507		UTPK		/GENERATE BREAK,
2226	4020		DELAY		/WAIT,
2227	4502		UTSF		/TRANSMIT FLAG SET?
2230	5235		JMP	,+5	/NO, CONTINUE;
2231	7402	HALT26,	HLT		/YES, FLAG SET TOO SOON,
2232	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2233	2221		TST5AB		/LOOP ADDRESS;
2234	2235		TST5AC		/NEXT TEST;
2235	7300	TST5AC,	CLA CLL		
2236	1275		TAD	BRKCNT	/SET DELAY ROUTINE TO WAIT THE
2237	3124		DCA	NDELAY	/EXACT TIME REQUIRED TO SET THE FLAG,
2240	4503		UTCF		/CLEAR TRANSMIT FLAG;
2241	4507		UTPK		/GENERATE BREAK,
2242	4020		DELAY		/WAIT,
2243	4502		UTSF		/TRANSMIT FLAG SET?
2244	7410		SKP		
2245	5252		JMP	,+5	/YES, CONTINUE;
2246	7402	HALT27,	HLT		/NO, FLAG NOT SET OR SET TOO LATE;
2247	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER;
2250	2235		TST5AC		/LOOP ADDRESS;
2251	2252		TST5AD		/NEXT TEST;
2252	4503	TST5AD,	UTCF		/CLEAR TRANSMIT AND BRK FLAGS;
2253	4020		DELAY		
2254	4502		UTSF		/TRANSMIT FLAG SET?
2255	5262		JMP	,+5	/NO, CONTINUE;
2256	7402	HALT28,	HLT		/YES, TRANSMIT AND/OR BRK FLAG STILL SET;
2257	4544		ERROR		/SCOPE LOOP, PRESS CONTINUE TO ENTER;
2260	2235		TST5AC		/LOOP ADDRESS;
2261	2264		CHECK5		/NEXT TEST;
2262	2132		ISZ	TSTCNT	/TEST LOOP COUNTER;
2263	5204		JMP	TST5A	/LOOP,
2264	7200	CHECK5,	CLA		
2265	1376		TAD	(5	/LOAD CURRENT TEST
2266	7421		MOVL		/NUMBER INTO MO REGISTER,
2267	1775'		TAD	TESTNO	/ARE ALL TESTS BEING RUN?
2270	7640		SZA CLA		/YES, GO TO NEXT TEST,
2271	5202		JMP	TST5A=2	/NO, CONTINUE CURRENT TEST;
2272	5774'		JMP	TST6	/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	4043	TST6,	SETCNT	/SETUP TEST COUNTER,
2401	4475	TST6A,	UKCC	/CLEAR AC AND RECEIVE FLAG;
2402	3133		DCA XMTCH	/INITIALIZE TRANSMIT AND RECEIVE;
2403	3142		DCA TOLD	/DATA HOLDING LOCATIONS;
2404	3143		DCA TLAST	
2405	4506		UTLS	/TRANSMIT;
2406	4474	LOOP6A,	UKSF	/IS RECEIVE FLAG SET?
2407	7410		SKP	/NO, CHECK TRANSMIT;
2410	5226		JMP RCV6A	/YES, GO AND CHECK DATA RECEIVED.
2411	4502		UTSF	/IS TRANSMIT FLAG SET?
2412	5206		JMP LOOP6A	/NO, CHECK FLAGS AGAIN;
2413	7300		CLA CLL	
2414	1143		TAD TLAST	/GET LAST CHARACTER TRANSMITTED.
2415	3142		DCA TOLD	/SAVE IT FOR COMPARISON.
2416	2133		ISZ XMTCH	/SETUP NEXT CHARACTER;
2417	7000		NOP	
2420	1133		TAD XMTCH	
2421	3143		DCA TLAST	/SAVE IT;
2422	1143		TAD TLAST	
2423	4506		UTLS	/TRANSMIT NEXT CHARACTER.
2424	7200		CLA	
2425	5206		JMP LOOP6A	
2426	4500	RCV6A,	UKRB	/RECEIVE;
2427	0134		AND BITMSK	/MASK OUT UNWANTED BITS.
2430	3140		DCA TEMP1	/SAVE DATA;
2431	1140		TAD TEMP1	/GET IT BACK FOR COMPARISON.
2432	7041		CIA	
2433	3137		DCA HOLD1	/SAVE COMPLEMENT;
2434	1142		TAD TOLD	/COMPARE TRANSMIT AND RECEIVE DATA;
2435	0134		AND BITMSK	/MASK OUT UNWANTED BITS.
2436	1137		TAD HOLD1	/GET COMPLEMENT AND COMPARE.
2437	7650		SNA CLA	/DOES TRANSMIT = RECEIVE?
2440	5250		JMP UPDATE	/YES, CONTINUE;
2441	1140		TAD TEMP1	/BAD DATA TO AC.
2442	7402	HALT29,	HLT	
2443	7200		CLA	
2444	1142		TAD TOLD	/GOOD DATA TO AC;
2445	0134		AND BITMSK	/MASK OUT UNWANTED BITS.
2446	7402	HALT30,	HLT	
2447	4545		DATERR	/SCOPE LOOP, PRESS CONTINUE TO ENTER.
2450	2132	UPDATE,	ISZ TSTCNT	/TEST LOOP COUNTER;
2451	5206		JMP LOOP6A	/LOOP
2452	4474		UKSF	/WAIT FOR RECEIVE FLAG
2453	5252		JMP	/TO SET, BEFORE GOING ON.

/TST6B - RANDOM DATA PATTERN,

2454	4043	TST6B,	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	LOOP6B,	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	RCV6B,	UKRB		/RECEIVE;
2476	0134		AND	BITMSK	/MASK OUT UNWANTED BITS;
2477	3140		DCA	TEMP1	/SAVE DATA;
2500	1140		TAD	TEMP1	/GET IT BACK FOR COMPARISON,
2501	7041		CIA		
2502	1142		TAD	TOLD	/COMPARE TRANSMIT AND RECEIVE;
2503	7650		SNA	CLA	/DOES TRANSMIT=RECEIVE?
2504	5313		JMP	,+7	/YES, CONTINUE;
2505	1140		TAD	TEMP1	/BAD DATA TO AC,
2506	7402	HALT31,	HLT		
2507	7200		CLA		
2510	1142		TAD	TOLD	/GOOD DATA TO AC;
2511	7402	HALT32,	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		
2516	1375		TAD	(6	/LOAD CURRENT TEST
2517	7421		MQL		/NUMBER INTO MQ REGISTER,
2520	1774		TAD	TESTNO	/ARE ALL TESTS BEING RUN?
2521	7640		SEA	CLA	/YES, GO TO NEXT TEST;
2522	5200		JMP	TST6	/NO, CONTINUE CURRENT TEST;
2523	5773		JMP	TST7	/NEXT TEST;

//RANDOM NUMBER GENERATORS//

2524	0000	RAN1,	0		
2525	7300		CLA	CLL	
2526	1142		TAD	TOLD	
2527	3143		DCA	TLAST	
2530	1350		TAD	TNEW	
2531	3142		DCA	TOLD	
2532	1135		TAD	RP1B	
2533	7006		RTL		
2534	1136		TAD	RP2B	
2535	3135		DCA	RP1B	



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2536 1135      TAD      RP1B
2537 7006      RTL
2540 1136      TAD      RP2B
2541 7006      RTL
2542 3136      DCA      RP2B
2543 1135      TAD      RP1B
2544 0134      AND      BITMSK      /MASK OUT UNWANTED BITS,
2545 3390      DCA      TNEW
2546 1350      TAD      TNEW
2547 5724      JMP      RAN1

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2550 0000      TNEW, 0
2573 2600
2574 0276
2575 0006
2576 7622
2577 1233
2600

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//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,  SETCNT      /SETUP TEST COUNTER,
2601 4523      SET7A      /SETUP HALT LOCATIONS,
2602 4475      TST7A,  UKCC      /CLEAR AC AND RECEIVE FLAG,
2603 1377      TAD      (0002      /ENABLE SWE,
2604 4477      UKIE
2605 4754      JMS      I RANGEN      /GET RANDOM DATA,
2606 3140      DCA      TEMP1      /SAVE RANDOM NUMBER JUST
2607 1140      TAD      TEMP1      /IN CASE IT IS NEEDED FOR SCOPE LOOP,
2610 4506      LOOP7A,  UTLS      /TRANSMIT,
2611 4502      UTSF      /SKIP ON TRANSMIT FLAG,
2612 5211      JMP      ,=1
2613 4506      UTLS      /REPEAT TRANSMIT TWICE MORE
2614 4502      UTSF      /TO FORCE OVERRUN,
2615 5214      JMP      ,=1
2616 4506      UTLS
2617 4502      UTSF
2620 5217      JMP      ,=1
2621 4500      UKRB
2622 0376      AND      (5000      /RECEIVE AND READ ERROR BITS,
2623 3137      DCA      HOLD1      /MASK FOR ANY ERROR AND OVERRUN,
2624 1137      TAD      HOLD1      /SAVE ERROR BITS,
2625 0375      AND      (1000
2626 7640      SZA      CLA      /MASK FOR OVERRUN ERROR BIT,
2627 7410      SKP      /OVERRUN ERROR=1?
2630 5235      JMP      ,=5
2631 7402      HALT33, HLT
2632 4544      ERROR      /YES, CONTINUE,
                          /FAILED, OVERRUN ERROR DID NOT OCCUR,
                          /SCOPE LOOP, PRESS CONTINUE TO ENTER,

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2633 2607          LOOP7A          /LOOP ADDRESS;
2634 2650          TST7B          /NEXT TEST;
2635 1137          TAD           HOLD1
2636 0374          AND           (4000          /MASK FOR ERROR BIT 0;
2637 7650          SNA CLA
2640 7410          SKP
2641 5246          JMP           ,+5
2642 7402  HALT34, HLT          /BIT 0 FAILED TO COME UP ON ERROR;
2643 4544          ERROR          /SCOPE LOOP, PRESS CONTINUE TO ENTER;
2644 2607          LOOP7A          /LOOP ADDRESS;
2645 2650          TST7B          /NEXT TEST;
2646 2132          ISZ           TSTCNT      /TEST LOOP COUNTER;
2647 5202          JMP           TST7A          /LOOP;

```

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

```

2650 4043  TST7B, SETCNT          /SETUP TEST COUNTER;
2651 1377          TAD           (0002          /SETUP SWE BIT;
2652 4477          UKIE          /SET SWE;
2653 4475          UKCC          /CLEAR AC AND RECEIVE FLAG;
2654 3133          DCA           XMTCH
2655 3142          DCA           TOLD
2656 3143          DCA           TLAST
2657 4506          UTLS
2660 4474  LOOP7B, UKSF          /TRANSMIT;
2661 7410          SKP           /IS RECEIVE FLAG SET?
2662 5300          JMP           RCV7B      /NO, CHECK TRANSMIT;
2663 4502          UTSF          /YES, GO AND CHECK FOR STATUS ERRORS;
2664 5200          JMP           LOOP7B      /IS TRANSMIT FLAG SET?
2665 7300          CLA CLL          /NO, CHECK FLAGS AGAIN;
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          /TRANSMIT;
2676 7200          CLA
2677 5200          JMP           LOOP7B
2700 4500  RCV7B, UKRB          /RECEIVE;
2701 3140          DCA           TEMP1      /SAVE STATUS WORD;
2702 1140          TAD           TEMP1
2703 0373          AND           (2000          /MASK FOR PARITY ERROR;
2704 7640          SZA CLA
2705 7410          SKP
2706 5312          JMP           ,+4
2707 1140          TAD           TEMP1      /FAILING STATUS BIT AND DATA
                                          /WORD TO THE AC,
                                          /PARITY ERROR;
2710 7402  HALT35, HLT          /SCOPE LOOP, PRESS CONTINUE TO ENTER;
2711 4545          DATERR
2712 1140          TAD           TEMP1
2713 0375          AND           (1000          /MASK FOR OVERRUN ERROR;

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2714 7640 SZA CLA  
 2715 7410 SKP  
 2716 5322 JMP ,+4  
 2717 1140 TAD TEMP1

/FAILING STATUS BIT AND DATA  
 /WORD TO AC,

2720 7402 HALT36, HLT  
 2721 4545 DATERR  
 2722 1140 TAD TEMP1  
 2723 0372 AND (0400  
 2724 7640 SZA CLA  
 2725 7410 SKP  
 2726 5332 JMP ,+4  
 2727 1140 TAD TEMP1

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

2730 7402 HALT37, HLT  
 2731 4545 DATERR  
 2732 1140 TAD TEMP1  
 2733 0374 AND (4000  
 2734 7640 SZA CLA  
 2735 7410 SKP  
 2736 5342 JMP ,+4  
 2737 1140 TAD TEMP1

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

2740 7402 HALT38, HLT  
 2741 4545 DATERR  
 2742 2132 ISZ TS1CNT  
 2743 5260 JMP LOOP7B  
 2744 7200 CLA  
 2745 1371 TAD (7  
 2746 7421 MQL  
 2747 1770 TAD TESTNO  
 2750 7640 SZA CLA  
 2751 5200 JMP TS17  
 2752 4020 DELAY  
 2753 5767 JMP TS11

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

2754 2524 RANGEN, RAN1

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

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/EXACT BAUD RATE TABLES  
 /USED WHEN TESTING FLAGS TO SET WITHIN SPECS

3000 6544 ON110, -1234  
 3001 6405 -1373  
 3002 6245 -1533

/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
/134,5 BAUD				
3006	6737	ON134,	-1041	/7 BIT TIME
3007	6620		-1160	/8 BIT TIME
3010	6502		-1276	/9 BIT TIME
3011	6364		-1414	/10 BIT TIME
3012	6246		-1532	/11 BIT TIME
3013	6127		-1651	/12 BIT TIME
/150 BAUD				
3014	7027	ON150,	-751	/7 BIT TIME
3015	6720		-1060	/8 BIT TIME
3016	6613		-1165	/9 BIT TIME
3017	6505		-1273	/10 BIT TIME
3020	6376		-1402	/11 BIT TIME
3021	6271		-1507	/12 BIT TIME
/150 BAUD				
3022	7413	ON300,	-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
/600 BAUD				
3030	7606	ON600,	-172	/7 BIT TIME
3031	7564		-214	/8 BIT TIME
3032	7544		-234	/9 BIT TIME
3033	7522		-256	/10 BIT TIME
3034	7500		-300	/11 BIT TIME
3035	7457		-321	/12 BIT TIME
/1200 BAUD				
3036	7703	ON1200,	-75	/7 BIT TIME
3037	7672		-106	/8 BIT TIME
3040	7661		-117	/9 BIT TIME
3041	7651		-127	/10 BIT TIME
3042	7637		-141	/11 BIT TIME
3043	7627		-151	/12 BIT TIME
/1800 BAUD				
3044	7727	ON1800,	-51	/7 BIT TIME
3045	7722		-56	/8 BIT TIME
3046	7713		-65	/9 BIT TIME
3047	7705		-73	/10 BIT TIME
3050	7700		-100	/11 BIT TIME
3051	7672		-106	/12 BIT TIME
/2400 BAUD				
3052	7742	ON2400,	-36	/7 BIT TIME
3053	7735		-43	/8 BIT TIME

3054	7731	-47
3055	7724	-54
3056	7720	-60
3057	7713	-65

/9 BIT TIME  
/10 BIT TIME  
/11 BIT TIME  
/12 BIT TIME

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

3060	7003	LO110,	-775
3061	6672		-1106
3062	6562		-1216
3063	6451		-1327
3064	6340		-1440
3065	6227		-1551

/110 BAUD  
/7 BIT TIME  
/8 BIT TIME  
/9 BIT TIME  
/10 BIT TIME  
/11 BIT TIME  
/12 BIT TIME

3066	7141	LO134,	-637
3067	7045		-733
3070	6751		-1027
3071	6656		-1122
3072	6562		-1216
3073	6466		-1312

/134.5 BAUD  
/7 BIT TIME  
/8 BIT TIME  
/9 BIT TIME  
/10 BIT TIME  
/11 BIT TIME  
/12 BIT TIME

3074	7213	LO150,	-565
3075	7126		-652
3076	7041		-737
3077	6953		-1029
3100	6666		-1112
3101	6601		-1177

/150 BAUD  
/7 BIT TIME  
/8 BIT TIME  
/9 BIT TIME  
/10 BIT TIME  
/11 BIT TIME  
/12 BIT TIME

3102	7505	LO300,	-273
3103	7453		-325
3104	7420		-360
3105	7366		-412
3106	7333		-445
3107	7300		-500

/300 BAUD  
/7 BIT TIME  
/8 BIT TIME  
/9 BIT TIME  
/10 BIT TIME  
/11 BIT TIME  
/12 BIT TIME

3110	7643	LO600,	-135
3111	7626		-152
3112	7611		-167
3113	7573		-205
3114	7556		-222
3115	7541		-237

/600 BAUD  
/7 BIT TIME  
/8 BIT TIME  
/9 BIT TIME  
/10 BIT TIME  
/11 BIT TIME  
/12 BIT TIME

3116	7722	LO1200,	-56
3117	7712		-66
3120	7704		-74
3121	7676		-102

/1200 BAUD  
/7 BIT TIME  
/8 BIT TIME  
/9 BIT TIME  
/10 BIT TIME

3122	7666		-112	/11 BIT TIME
3123	7660		-120	/12 BIT TIME

				/1800 BAUD
3124	7741	L01800,	-37	/7 BIT TIME
3125	7735		-43	/8 BIT TIME
3126	7730		-50	/9 BIT TIME
3127	7723		-55	/10 BIT TIME
3130	7717		-61	/11 BIT TIME
3131	7712		-66	/12 BIT TIME

				/2400 BAUD
3132	7751	L02400,	-27	/7 BIT TIME
3133	7746		-32	/8 BIT TIME
3134	7742		-36	/9 BIT TIME
3135	7736		-42	/10 BIT TIME
3136	7733		-45	/11 BIT TIME
3137	7730		-50	/12 BIT TIME

0177 0302 S



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	0146	HALT36	2720	RKIE	0623	TST18B	1246
BEGIN	3200	HALT37	2730	RKRB	0627	TST1C	1266
BITMSK	0134	HALT38	2740	RKRS	0617	TST1CB	1300
BITNO	0275	HALT4	1242	RKSF	0605	TST2	1400
BRKCNT	2275	HALT5	1256	RP1B	0135	TST2A	1402
CAF	6007	HALT6	1274	RP2B	0136	TST2AB	1417
CHECK1	1316	HALT7	1310	RSPF	0633	TST2B	1444
CHECK2	1521	HALT8	1413	RSPI	0655	TST2BB	1475
CHECK3	1752	HALT9	1424	RTCF	0645	TST3	1600
CHECK4	2053	HIBKCT	2273	RTLS	0663	TST3A	1602
CHECK5	2264	HOLD1	0137	RTPC	0651	TST3B	1616
CON100	0126	INTOK	1262	RTPK	0667	TST3BB	1647
COUNT	0043	LO110	3060	RTSF	0637	TST3C	1675
DATERR	4545	LO1200	3116	SCOPE	0332	TST3CB	1707
DECODE	0250	LO134	3066	SET1A	4510	TST3D	1725
DELAY	4020	LO150	3074	SET1B	4511	TST4	2000
DELAYN	0125	LO1800	3124	SET1C	4512	TST4A	2002
DELLAY	0020	LO2400	3132	SET2A	4513	TST4AB	2026
DELOOP	0024	LO300	3102	SET2B	4514	TST5	2200
DOUBLE	0301	LO600	3110	SET3A	4515	TST5A	2204
ERROR	4544	LOBAUD	0063	SET3B	4516	TST5AB	2221
FAIL	0312	LOBKCT	2274	SET3C	4517	TST5AC	2235
GETBAK	0130	LOOP6A	2406	SET3D	4520	TST5AD	2252
HALT1	1207	LOOP6B	2464	SET4A	4521	TST6	2400
HALT10	1434	LOOP7A	2607	SET5A	4522	TST6A	2401
HALT11	1461	LOOP7B	2660	SET7A	4523	TST6B	2454
HALT12	1471	LORATE	0300	SETCNT	4043	TST7	2600
HALT13	1513	MASK7	0466	SETIOT	0400	TST7A	2602
HALT14	1606	MQL	7421	SETT1A	1000	TST7B	2650
HALT15	1634	NDELAY	0124	SETT1B	1010	TSTBL	0302
HALT16	1643	NXTST	0131	SETT1C	1016	TSTCNT	0132
HALT17	1656	ON110	3000	SETT2A	1024	UKCC	4475
HALT18	1665	ON1200	3036	SETT2B	1034	UKCF	4473
HALT19	1703	ON134	3006	SETT3A	1044	UKIE	4477
HALT2	1216	ON150	3014	SETT3B	1050	UKRB	4500
HALT20	1715	ON1800	3044	SETT3C	1062	UKRS	4476
HALT21	1744	ON2400	3052	SETT3D	1070	UKSF	4474
HALT22	2012	ON300	3022	SETT4A	1074	UPDATE	2450
HALT23	2022	ON600	3030	SETT5A	1104	US100	0127
HALT24	2045	ONBAUD	0053	SETT7A	1116	USPF	4501
HALT25	2215	ONRATE	0277	SWITCH	0274	USPI	4505
HALT26	2231	RAN1	2524	TEMP1	0140	UTCF	4503
HALT27	2246	RANGEN	2754	TEST	0237	UTLS	4506
HALT28	2256	RCV6A	2426	TESTNO	0276	UTPC	4504
HALT29	2442	RCV6B	2475	TLAST	0143	UTPK	4507
HALT3	1226	RCV7B	2700	TNEW	2550	UTSF	4502
HALT30	2446	RCVD	0344	TNOW	0141	XFAIL	0144
HALT31	2506	RCVIOI	0470	TOLD	0142	XKCC	0612
HALT32	2511	RETURN	0002	TST1	1200	XKCF	0600
HALT33	2631	RINTOK	1750	TST1A	1202	XKIE	0622
HALT34	2642	RKCC	0613	TST1AB	1222	XKRB	0626
HALT35	2710	RKCF	0601	TST1B	1236	XKRS	0616

X4SF	0604
XATCH	0133
XAYLOT	0467
XSCOPE	0145
XSET1A	0110
XSET1B	0111
XSET1C	0112
XSET2A	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
XXKJE	0077
XXKRB	0100
XXKRS	0076
XXKSF	0074
XXSPF	0101
XXSPI	0105
XXTCF	0103
XXTLS	0106
XXTPC	0104
XXTPK	0107
XXTSF	0102

ERRORS DETECTED: 0

LINKS GENERATED: 67

RUN-TIME: 13 SECONDS

3K CORE USED