DH11

SPEED SELECT LOGIC

MD-11-DZDHD-C

EP-DZDHD-C-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN U.S.A

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDHD-C-D

PRODUCT NAME: DH11 SPEED SELECTION LOGIC TEST

DATE: JUNE 1976

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: MICHAEL DAVIS

1. ABSTRACT

THE DH11 SPEED SELECTION LOGIC TEST VERIFIES
THAT THE SPEED SELECTION FUNCTIONS
OF THE LINE PARAMETER REGISTER OPERATE PROPERLY
FOR EACH TRANSMITTER AND RECEIVER LINE. TRANSMITTER
TIMING IS CHECKED FIRST, AND THEN RECEIVER TIMING IS
TESTED. THE PROGRAM USES A RELATIVE TIMING COMPARISION
TO DETERMINE IF LINE SPEED SELECTION IS CORRECT.

NOTE: THE EXTERNAL CLOCK FUNCTIONS (SPEED CODES 16 AND 17)
ARE NOT TESTED.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 FAMILY STANDARD COMPUTER WITH 4KW OF MEMORY
ASR-33 TELETYPE OR EQUIVALENT
DH11 ASYNCHRONOUS MULTIPLEXER
DM11 MAINTENANCE CARD INSTALLED

2.2 STORAGE

THE PROGRAM LOADS INTO 4KW OF MEMORY

3. LOADING PROCEDURE

THE STANDART PROCEDURE FOR LOADING ABSOLUTE BINARY TAPES
IS TO BE USED

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

4.1.1 AFTER PROGRAM LOAD (INITIAL PROGRAM START)

ALL CONSOLE SWITCHES DOWN

4.1.2 TO MODIFY DEVICE VECTOR AND CONTROL REGISTER ADDRESSES
AFTER PROGRAM RESTART

SW00=1

4.1.3 TO START PROGRAM AT SELECTED TEST AFTER PROGRAM RESTART

SW01=1

4.2 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200

THE RESTART ADDRESS FOR ALL TESTS I 0002000

THE STARTING ADDRESS TO ENTER A SELECTED TEST IS 000200

4.3 PROGRAM AND/OR OPERATOR ACTION

4.3.1 INITIAL PROGRAM START

4.3.1.1 LOAD PROGRAM INTO MEMORY
4.3.1.2 LOAD ADDRESS 000200
4.3.1.3 CLEAR CONSOLE SWITCHES
4.3.1.4 PRESS START
4.3.1.5 THE PROGRAM WILL TYPE "DH11 SPEED SELECTION LOGIC TEST"
AND WILL THEN TYPE "VECTOR ADDRESS-" AND WAIT FOR AN
INPUT FROM THE TELETYPE KEYBOARD.

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                        4.3 (CONT'D)

                        4.3.1.6 TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
                                FOR THE DH11 TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>

                        NOTE:   WORDS IN ANGLE BRACKETS, I.E. <CARRIAGE RETURN> MEAN THAT
                                THE TELETYPE KEY WITH THE NAMED FUNCTION SHOULD BE STRUCK

                                IF AN INCORRECT ADDRESS IS ENTERED, THE PROGRAM
                                WILL TYPE "?" AND WILL REPEAT THE SECOND MESSAGE OF 4.3.1.5
                        4.3.1.7 THE PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
                                AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

                        4.3.1.8 TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER OF THE
                                DH11 TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>

                                IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL TYPE
                                "?" AND WILL THEN REPEAT THE MESSAGE OF 4.3.1.7
                        4.3.1.9 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT IS
                                ABOUT TO START TESTING, AND THEN TESTING WILL BEGIN

                        4.3.2   PROGRAM RESTART WITH ALL SWITCHES DOWN

                        4.3.2.1 PERFORM 4.3.1.2 TO 4.3.1.5
                        4.3.2.2 THE PROGRAM WILL TYPE "DH11 SPEED SELECTION LOGIC TEST"
                                AND WILL THEN CONTINUE AS DESCRIBED IN 4.3.1.9

                        4.3.3   PROGRAM RESTART WITH SW00=1

                        4.3.3.1 LOAD ADDRESS 000200
                        4.3.3.2 SET SW01=1
                        4.3.3.3 PRESS START
                        4.3.3.4 THE PROGRAM WILL PERFORM AS DESCRIBED IN 4.3.1.5 TO 4.3.1.9

                        4.3.4   PROGRAM RESTART WITH SW01=1

                        4.3.4.1 LOAD ADDRESS 000200
                        4.3.4.2 SET SW01=1
                        4.3.4.3 PRESS START
                        4.3.4.4 THE PROGRAM WILL TYPE "DH11 SPEED SELECTION LOGIC TEST"
                                AND WILL THEN TYPE "TEST PC-" AND WILL WAIT FOR AN INPUT
                                FROM THE TELETYPE KEYBOARD
                        4.3.4.5 TYPE IN THE ADDRESS OF THE TEST AT WHICH THE PROGRAM IS TO
                                BE STARTED FOLLOWED BY <CARRIAGE RETURN>
                        4.3.4.6 THE PROGRAM WILL TYPE R TO INDICATE THAT IT HAS STARTED
                                AND WILL START TESTING AT THE SELECTED TEST.

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

                        NOTE:   IF IT IS DESIRED TO LOOP ON THE TEST THAT IS SELECTED
                                SET SW14=1 BEFORE ENTERING THE TEST ADDRESS
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                                5.      OPERATING PROCEDURE

                                5.1     OPERATIONAL SWITCH SETTINGS

                                        SW15=1, HALT ON ERROR
                                        SW14=1, LOOP ON CURRENT TEST
                                        SW13=1, SUPPRESS ERROR TYPEOUT
                                        SW11=1, INHIBIT ITERATIONS
                                        SW10=1, ESCAPE TO NEXT TEST ON ERROR
                                        SW09=1, FREEZE VARIABLE PARAMETER IN CURRENT TEST
                                        SW01=1, START PROGRAM AT SELECTED TEST
                                        SW00=1, CHANGE PARAMETERS AT PROGRAM RESTART

                                5.2     SUBROUTINE ABSTRACTS

                                5.2.1   TRAPCATCHER (LOCATIONS 000000-000776)

                                        THIS ROUTINE IS USED TO INTERCEPT UNEXPECTED INTERRUPTS
                                        AND TRAPS.  THE AREA FROM 000000-000776 IS LOADED
                                        WITH THE FOLLOWING SEQUENCE

                                                2
                                                0
                                                4
                                                0

                                                .
                                                .
                                                .
                                                772
                                                0
                                                776
                                                0

                                        IF AN UNEXPECTED INTERRUPT OR TRAP OCCURS, THE PROGRAM
                                        WILL HALT WITH THE PC 2 GREATER THAN THE ADDRESS TO
                                        WHICH THE PROGRAM TRAPPED.  THE PROCESSOR STACK MAY
                                        BE EXAMINED TO DETERMINE WHERE THE PROGRAM WAS WHEN THE
                                        TRAP OR INTERRUPT OCCURED.

                                5.2.2   START   (PROGRAM INITIALIZATION)

                                        THIS ROUTINE INITIALIZES ALL PROGRAM FLAGS AND COUNTERS,
                                        TYPES THE PROGRAM TITLE MESSAGE, AND INPUTS THE VECTOR
                                        AND CONTROL REGISTER ADDRESSES OF THE DH11 TO BE TESTED.

                                5.2.3   BEGIN   (PROGRAM START AND RESTART)

                                        THIS ROUTINE IS ENTERED IMMEDIATLY AFTER "START"
                                        AND EACH TIME A PROGRAM PASS HAS BEEN COMPLETED.
                                        THE ROUTINE SETS UP THE PROCESSOR STACK AND STATUS WORD
                                        AND THEN TRANSFERS CONTROL TO THE TEST AT WHICH
                                        TESTING WILL BEGIN.  IF SW01=0 WHEN THIS ROUTINE IS ENTERD
                                        TESTING WILL START AT T1 (TEST 1).  IF SW01=1 WHEN
                                        THIS ROUTINE IS ENTERED, TESTING WILL START AT THE PC
                                        ENTERED FROM THE TELETYPE KEYBOARD.
```

5.2.4 EOP (END OF PASS)

THIS ROUTINE IS ENTERED ONCE PER PASS AFTER ALL TESTS HAVE BEEN COMPLETED. THIS ROUTINE TYPES THE MAINDEC IDENTIFICATION CODE OF THE PROGRAM, CLEARS ERROR FLAGS AND UPDATES THE PASS COUNT. IF THE PROGRAM WAS LOADED UNDER ACT11 OR DDP, THE ROUTINE CHECKS FOR RETURN TO THE ACT11 OR DDP MONITOR. IF THE PROGRAM IS NOT UNDER MONITOR CONTROL, THE ROUTINE TRANSFERS TO BEGIN.

5.2.5 SCOPER (SCOPE LOOP AND ITERATION HANDLER)

THIS ROUTINE IS ENTERED EACH TIME A TEST IS COMPLETED. THE ROUTINE CHECKS FOR THE FOLLOWING UPON ENTRY
A) IF SW10=1, THE ROUTINE WILL TRANSFER TO THE NEXT TEST IN SEQUENCE, AFTER CLEARING ERROR FLAGS.
B) IF SW11=1, THE ROUTINE WILL TRANSFER TO THE NEXT TEST SEQUENCE, AFTER CLEARING ERROR FLAGS.
C) IF SW14=1, THE ROUTINE WILL LOOP ON THE CURRENT TEST REGARDLESS OF THE ITERATION COUNT.

IF NONE OF THE ABOVE IS TRUE, THE ROUTINE WILL ADD 1 TO THE COUNT OF TEST ITERATIONS, AND COMPARE THIS VALUE TO THE NUMBER OF ITERATIONS THAT SHOULD BE PERFORMED. IF THESE NUMBERS ARE EQUAL, THE ROUTINE WILL TRANSFER TO THE NEXT TEST IN SEQUENCE. THE THE NUMBERS ARE NOT EQUAL, THE TEST CURRENTLY IN PROGRESS WILL BE REPEATED.

5.2.6 SCOP1R (FREEZE ON CURRENT DATA)

THE CALL TO THIS ROUTINE FOLLOWS IMMEDIATLY AFTER THE THE CALL TO THE ERROR HANDLER IN THOSE TESTS THAT HAVE VARIABLE PARAMETERS. THIS ROUTINE IS ALWAYS ENTERED IN THOSE TESTS, WHETHER OR NOT AN ERROR OCCURS.
IF SW09=1, THE ROUTINE WILL TRANSFER CONTROL BACK TO THE TEST AT A POINT WHICH WILL ALLOW REPEATING THE FUNCTION UNDER TEST CONTINUOUSLY WITH THE SAME DATA. IF THIS OPTION IS SELECTED, THE ROUTINE "SCOPER" IS NEVER ENTERED AND ITERATION COUNTS WILL NOT BE UPDATED.

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267
268                                5.2.7   ERRORS  (ERROR HANDLER)
269
270                                        THIS ROUTINE IS ENTERED UPON ERROR DETECTION ONLY.
271                                        WITH ALL CONSOLE SWITCHES DOWN, THE ROUTINE PROCEDES AS FOLLOWS:
272                                        A) THE PC OF THE INSTRUCTION THAT CALLED THE ERROR HANDLER
273                                           IS ACCESSED THRU THE STACK, AND THEN THE EMT INSTRUCTION
274                                           ITSELF IS FETCHED.  THE 8 LSB OF THE EMT
275                                           INSTRUCTION ARE THE ERROR CODE.  THIS CODE IS
276                                           USED TO ACCESS A TABLE OF ERROR MESSAGES AND ERROR
277                                           DATA STORAGE LOCATIONS.
278                                        B) IF THE TEST THAT FAILED DID NOT FAIL PREVIOUSLY
279                                           DURING THIS PASS,  A COMPLETE ERROR REPORT IS MADE
280                                           IF THE TEST THAT FAILED FAILED MOR THAT ONCE DURING
281                                           THE CURRENT PASS, ONLY THE DATA RELATING TO THE FAILUER
282                                           IS TYPED.  IF SW13=1, NO ERROR TYPEOUT IS MADE.
283                                        C) THE ROUTINE NOW CHECKS FOR HALT ON ERROR.  IF SW15=1
284                                           THE PROGRAM WILL HALT WITH THE PC OF THE CALL TO
285                                           THE ERROR ROUTINE IN R0.  IF SW15=0, THE PROGRAM WILL
286                                           NOT HALT, BUT WILL CHECK FOR ESCAPE TO NEXT TEST.
287                                        D) IF SW10=0, THE ROUTINE WILL RETURN
288                                           TO THE TEST IN PROGRESS.  IF SW10=1, THE ROUTINE WILL
289                                           ABORT THE CURRENT TEST, AND TRANSFER TO THE NEXT
290                                           TEST IN SEQUENCE, THRU THE ROUTINE "SCOPER".
291
292                                5.2.8   TRPSRV  (TRAP DECODE AND DISPATCH)
293
294                                        THIS ROUTINE DECODES THE 8 LSB OF THE TRAP INSTRUCTION
295                                        THAT CAUSED TH PROGRAM INTERRUPT, AND TRANSFERS CONTROL
296                                        TO THE ROUTINE THRU THE TABLE "TRPTAB" USING THE 8 LSB
297                                        OF THE TRAP INSTRUCTION AS  AN OFFSET TO THE POINTER TO
298                                        THE ROUTINE TO BE ENTERED.
299
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300
301                             5.3     PROGRAM AND OR OPERATOR ACTION
302
303                             5.3.1   PROGRAM START WITH ALL SWITCHES DOWN
304
305                             5.3.1.1 REFER TO SECTIONS 4.3.1 AND 4.3.2 FOR INITIAL PROGRAM
306                                     BEHAVIOR.
307
308                             5.3.1.2 AFTER "R" HAS BEEN TYPED BY THE PROGRAM, TEST EXECUTION
309                                     WILL BEGIN.  EACH TEST WILL BE REPEATED A SELECTED NUMBER
310                                     OF ITERATIONS (SEE LISTING FOR EXACT NUMBER FOR EACH TEST)
311                                     AND THEN THE PROGRAM WILL PROCEED TO THE NEXT TEST.
312
313                             5.3.1.3 WHEN ALL ITERATIONS HAVE BEEN COMPLETED, THE PROGRAM
314                                     WILL TYPE "DZDHD" AND THEN RESTART TESTING AT TEST 1
315                                     (LOCATION T1 IN THE PROGRAM).
316
317                             5.3.1.4 IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE
318                                     ERROR MESSAGE, AND THEN CONTINUE THE TEST IN PROGRESS.
319
320                             5.3.2   PROGRAM START WITH SW00=1
321
322                                     THE PROGRAM WILL PERFORM AS DESCRIBED IN 4.3.1 AND 5.3.1
323
324                             5.3.3   PROGRAM START WITH SW01=1
325
326                             5.3.3.1 REFER TO SECTION 4.3.4 FOR INITIAL PROGRAM BEHAVIOR
327
328                             5.3.3.2 TEST EXECUTION WILL START AT THE ADDRESS SPECIFIED
329                                     AND WILL CONTINUE AS DESCRIBED IN 5.3.1.2
330
331                             5.3.3.3 AFTER "DZDHD" HAS BEEN TYPED, THE PROGRAM WILL
332                                     RESUME TESTING AT TEST 1
333
334                             5.3.4   PROGRAM OPERATION WITH SW15=1
335
336                                     SAME AS 5.3.1, EXCEPT THAT IN THE CASE OF AN ERROR,
337                                     THE PROGRAM WILL HALT AFTER THE ERROR TYPEOUT, AND
338                                     THE PC+2 OF THE CALL TO THE ERROR ROUTINE WILL BE
339                                     DISPLAYED IN R0.
340
341                             5.3.5   PROGRAM OPERATION WITH SW13=1
342
343                                     SAME AS 5.3.1 EXCEPT THAT NO ERROR TYPEOUTS WILL OCCUR
344
345                             5.3.6   PROGRAM OPERATION WITH SW11=1
346
347                                     SAME AS 5.3.1 EXCEPT THAT EACH TEST WILL BE REPEATED ONCE
348                                     ONLY
349
350                             5.3.7   PROGRAM OPERATION WITH SW10=1
351
352                                     SAME AS 5.3.1, EXCEPT THAT IN THE CASE OF AN ERROR
353                                     THE CURRENT TEST WILL BE ABORTED, AND THE PROGRAM
354                                     WILL PROCEED TO THE NEXT TEST IN SEQUENCE.
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355
356                          5.      (CONT'D)
357
358                          5.3.8   PROGRAM OPERATION WITH SW14=1, OR SW09=1
359
360                                  THESE FUNCTIONS ARE NORMALLY USED FOR TROUBLE SHOOTING.
361                                  SEE SECTION 6.3 FOR THEIR USE.
362
363                          6.      ERRORS
364
365                          6.1     ERROR HALTS
366
367                                  THE ERROR MESSAGE FORMAT FOR ALL ERROR TYPEOUTS
368                                  IS AS FOLLOWS
369
370                                  PC+2    MESSAGE
371                                          HEADER (IF APPLICABLE)
372                                          DATA    (IF APPLICABLE)
373
374                                  WHERE
375                                  PC+2 IS THE ADDRESS OF THE CALL TO THE ERROR HANDLER + 2
376                                  MESSAGE IS AN ASCII MESSAGE DESCRIBING (BRIEFLY) THE FAILURE
377                                  HEADER IS A DESCRIPTION OF THE DATA TO FOLLOW
378                                  DATA IS OCTAL INFORMATION RELATING TO THE CAUSE OF THE FAILURE
379                                  IF THE SAME ERROR OCCURS IN A GIVEN TEST ON THE SAME
380                                  PASS, AND IF DATA IS ASSOCIATED WITH THAT ERROR, ONLY
381                                  DATA IS TYPE ON SUCCEEDING ERROR TYPEOUTS
382
383                                  IF NO DATA IS ASSOCIATED WITH THE ERROR
384                                  THE COMPLETE ERROR MESSAGE IS TYPED.
385
386                          6.1.1   ERROR DESCRIPTIONS
387
388                                  SEE LISTING FOR DETAILS OF ERRORS
389
390                          6.2     ERROR RECOVERY
391
392                          6.2.1   SW15=0
393
394                                  IF THE PROGRAM IS RUN WITH SW15=0, NO OPERATOT ACTION IS
395                                  REQUIRED TO CONTINUE TESTING
396                          6.2.2   SW15=1
397
398                                  IF THE PROGRAM IS RUN WITH SW15=1, TO CONTINUE TESTING
399                                  AFTER THE PROGRAM HAS HALTED, PRESS THE PROCESSOR
400                                  CONSOLE CONTINUE SWITCH
401
402                          6.2.3   ILLEGAL INTERRUPTS
403
404                                  IF AN INTERRUPT OCCURS TO A VECTOR ADDRESS NOT
405                                  SELECTED DURING PROGRAM INITIALIZATION, THE PROGRAM WILL
406                                  HALT IN THE TRAPCATCHER. THE ADDRESS AT WHICH
407                                  THE PROGRAM HALTS IS 2 GREATER THAN THE ADDRESS
408                                  TO WHICH THE INTERRUPT OCCURED.  THE PROGRAM MUST BE
409                                  RESTARTED AT 200 TO RECOVER FROM THIS ERROR.
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                                6.3     SCOPE LOOPING

                                6.3.1   TO SCOPE ON A SPECIFIC TEST, SET SW14=1 AND SW13=1
                                        THIS WILL CAUSE THE PROGRAM TO CONTINUOUSLY LOOP ON THE
                                        SAME TEST, AND WILL CAUSE ALL ERROR TYPEOUTS TO BE INHIBITED

                                6.3.2   TO SCOPE ON A SPECIFIC VALUE OF A PARAMETER WITHIN
                                        A TEST, SET SW09=1 TO FREEZE THE DATA
                                        (SEE LISTING FOR THOSE TESTS THAT INCORPORATE THIS FEATURE)

                                6.      (CONT'D)

                                6.3.3   PROGRAM START TO SCOPE LOOP ON SELECTED TEST

                                        PERFORM SECTION 4.3.4 WITH SW14=1

                                7.      RESTRICTIONS

                                7.1     STARTING

                                        THE DH11 TEST CARD MUST BE INSTALLED

                                7.2     RUNNING

                                        NONE

                                8.      MISCELLANEOUS

                                8.1     EXECUTION TIME

                                        THE TIME FOR ONE PASS OF THE PROGRAM (END OF
                                        TYPEOUT OF DZDHD TO END OF TYPEOUT OF DZDHD)
                                        IS GIVEN FOR VARIOUS PROCESSORS IN THE TABLE BELOW

                                                        TIME
                                        PROCESSOR

                                        PDP-11/05,10

                                        PDP-11/20

                                        PDP-11/40

                                        PDP-11/45
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                                9.      PROGRAM DESCRIPTION

                                        TRANSMITTER LINE SPEED SELECTION IS TESTED ON A LINE BY
                                        LINE BASIS USING A RELATIVE TIMING TECHNIQUE TO DETERMINE
                                        IF SPEED SELECTION FOR A SELECTED LINE IS CORRECT.

                                        THE TEST PROCEEDS AS FOLLOWS:

                                        A SPEED OF 50 BAUD IS SET FOR A SELECTED LINE, AND
                                        A COUNT IS RECORDED FROM THE TIME THAT THE BAR BIT IS
                                        SET FOR THAT LINE TO THE TIME THAT TRANSMITTER DONE IS SET.
                                        THREE CHARACTERS ARE TRANSMITTED.  AT THE SAME
                                        TIME, A TIMEOUT COUNTER IS STARTED.  IF THE TIMEOUT
                                        COUNTER DECREMENTS TO 0 BEFORE TRANSMITTER DONE IS
                                        RECEIVED, AN ERROR MESSAGE IS REPORTED.  IF THE TIMEOUT
                                        DOES NOT OCCUR, THE TIME COUNT IS STORED, AND THE
                                        NEXT LINE SPEED IS SELECTED.  TRANSMISSION IS RESTARTED
                                        AND THE TIME COUNT, AND TIMEOUT ARE RESTARTED.
                                        WHEN TRANSMITTER DONE IS RECEIVED, THE TIME COUNTS
                                        FOR THE CURRENT SPEED AND THE PREVIOUS SPEED ARE
                                        COMPARED.  IF THE TIME COUNT FOR THE CURRENT SPEED IS
                                        GREATER THAN OR EQUAL TO THE COUNT FOR THE PREVIOUS
                                        SPEED, A TIMING ERROR HAS OCCURED, SINCE A HIGHER
                                        SELECTED BAUD RATE SHOULD MEAN THAT THE NUMBER
                                        OF COUNTS RECORDED IS LESS THAN AT A LOWER
                                        BAUD RATE. THIS PROCEDURE IS REPEATED FOR ALL SPEED
                                        CODES 1-15.

                                        THE NEXT GROUP OF TESTS VERIFIES THAT RECEIVER
                                        SPEED SELECTION IS CORRECT, BY USING A RELATIVE TIMING
                                        COMPARISION AS DESCRIBED ABOVE.  A CHARACTER IS TRANSMITTED
                                        AS ABOVE AND THE TIME FROM THE START OF TRANSMISSION
                                        TO THE TIME THAT CHARACTER AVAILABLE IS RECEIVED
                                        IS RECORDED.  ALSO, THE TIMEOUT COUNT IS DECREMENTED.
                                        IF THE TIMEOUT COUNTER DECREMENTS TO 0 BEFORE CHARACTER
                                        AVAILABLE OCCURS, AN ERROR HAS OCCURED.
                                        THE PROCEDURE IS REPEATED AT THE NEXT HIGHEST BAUD RATE
                                        AND A COMPARISION IS MADE AS IN THE TRANSMITTER TESTS
                                        IF THE TIME COUNT AT THE PRESENT BAUD RATE IS GREATER THAN
                                        OR EQUAL TO THE PREVIOUS BAUD RATE, AN ERROR HAS OCCURED.

                                10.     LISTING

                                        !


                                ;DH11 SPEED SELECTION LOGIC TEST
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                                        ;STARTING PROCEDURE
                                        ;LOAD PROGRAM
                                        ;LOAD ADDRESS 000200
                                        ;PRESS START
                                        ;PROGRAM WILL TYPE DH11 SPEED SELECTION LOGIC TEST
                                        ;PROGRAM WILL TYPE "VECTOR ADDRESS-"
                                        ;TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
```

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                                        ;FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                        ;PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
                                        ;TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
                                        ;FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                        ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                        ;AT THE END OF A PASS, PROGRAM WILL TYPE " DZDHD "
                                        ;AND THEN RESUM TESTING


                                ;SWITCH REGISTER OPTIONS

        100000                  SW15=100000             ;=1,HALT ON ERROR
        040000                  SW14=40000              ;=1,LOOP ON CURRENT TEST
        020000                  SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
        010000                  SW12=10000
        004000                  SW11=4000               ;=1,INHIBIT ITERATIONS
        002000                  SW10=2000               ;=1,ESCAPE TO NEXT TEST ON ERROR
        001000                  SW09=1000               ;=1,LOOP WITH CURRENT DATA
        000400                  SW08=400
        000100                  SW06=100
        000040                  SW05=40
        000020                  SW04=20
        000010                  SW03=10
        000004                  SW02=4
        000002                  SW01=2                  ;RESTART PROGRAM AT SELECTED TEST
        000001                  SW00=1                  ;RESELECT VECTOR AND CONTROL REGISTER
                                                        ;ADDRESS AFTER PROGRAM RESTART
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```
                                ;REGISTER DEFINITIONS

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

                                ;LOCATION EQUIVALENCIES

177570                          SWR=177570      ;CONSOLE SWITCH REGISTER
177570                          LIGHTS=177570   ;PDP-11/45 DISPLAY REGISTER
177776                          PS=177776       ;PROCESSOR STATUS WORD
014734.                         STACK=ENDCOD+200;START OF PROCESSOR STACK

                                ;INSTRUCTION DEFINITIONS

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


100000                          BIT15=100000
040000                          BIT14=40000
020000                          BIT13=20000
010000                          BIT12=10000
004000                          BIT11=4000
002000                          BIT10=2000
001000                          BIT09=1000
000400                          BIT08=400
000200                          BIT07=200
000100                          BIT06=100
000040                          BIT05=40
000020                          BIT04=20
000010                          BIT03=10
000004                          BIT02=4
000002                          BIT01=2
000001                          BIT00=1
```

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                                        ;TRAPCATCHER FOR ILLEGAL INTERRUPTS
                        000000          .=0
000000  000002                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000002  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000004  000006                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000006  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000010  000012                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000012  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000014  000016                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000016  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000020  000022                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000022  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000024  000026                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000026  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000030  000032                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000032  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000034  000036                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000036  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000040  000042                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000042  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000044  000046                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000046  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000050  000052                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000052  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000054  000056                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000056  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000060  000062                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000062  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000064  000066                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000066  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000070  000072                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000072  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000074  000076                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000076  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000100  000102                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000102  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000104  000106                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000106  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000110  000112                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000112  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000114  000116                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000116  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000120  000122                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000122  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000124  000126                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000126  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000130  000132                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000132  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000134  000136                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000136  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000140  000142                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000142  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000144  000146                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000146  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
000150  000152                          .+2             ;UNEXPECTED TRAP TO THIS LOCATION
000152  000000                          HALT            ;EXAMINE STACK TO FIND CAUSE
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   642  000154  000156                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   643  000156  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   644  000160  000162                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   645  000162  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   646  000164  000166                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   647  000166  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   648  000170  000172                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   649  000172  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   650  000174  000176                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   651  000176  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   652  000200  000202                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   653  000202  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   654  000204  000206                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   655  000206  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   656  000210  000212                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   657  000212  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   658  000214  000216                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   659  000216  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   660  000220  000222                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   661  000222  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   662  000224  000226                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   663  000226  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   664  000230  000232                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   665  000232  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   666  000234  000236                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   667  000236  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   668  000240  000242                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   669  000242  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   670  000244  000246                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   671  000246  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   672  000250  000252                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   673  000252  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   674  000254  000256                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   675  000256  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   676  000260  000262                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   677  000262  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   678  000264  000266                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   679  000266  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   680  000270  000272                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   681  000272  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   682  000274  000276                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   683  000276  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   684  000300  000302                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   685  000302  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   686  000304  000306                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   687  000306  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   688  000310  000312                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   689  000312  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   690  000314  000316                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   691  000316  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   692  000320  000322                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   693  000322  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   694  000324  000326                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   695  000326  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
   696  000330  000332                    .+2         ;UNEXPECTED TRAP TO THIS LOCATION
   697  000332  000000                    HALT        ;EXAMINE STACK TO FIND CAUSE
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   698  000334  000336                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   699  000336  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   700  000340  000342                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   701  000342  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   702  000344  000346                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   703  000346  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   704  000350  000352                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   705  000352  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   706  000354  000356                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   707  000356  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   708  000360  000362                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   709  000362  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   710  000364  000366                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   711  000366  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   712  000370  000372                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   713  000372  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   714  000374  000376                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   715  000376  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   716  000400  000402                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   717  000402  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   718  000404  000406                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   719  000406  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   720  000410  000412                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   721  000412  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   722  000414  000416                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   723  000416  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   724  000420  000422                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   725  000422  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   726  000424  000426                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   727  000426  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   728  000430  000432                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   729  000432  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   730  000434  000436                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   731  000436  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   732  000440  000442                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   733  000442  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   734  000444  000446                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   735  000446  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   736  000450  000452                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   737  000452  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   738  000454  000456                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   739  000456  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   740  000460  000462                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   741  000462  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   742  000464  000466                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   743  000466  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   744  000470  000472                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   745  000472  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   746  000474  000476                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   747  000476  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   748  000500  000502                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   749  000502  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   750  000504  000506                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   751  000506  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   752  000510  000512                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   753  000512  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
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  754  000514  000516                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  755  000516  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  756  000520  000522                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  757  000522  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  758  000524  000526                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  759  000526  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  760  000530  000532                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  761  000532  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  762  000534  000536                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  763  000536  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  764  000540  000542                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  765  000542  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  766  000544  000546                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  767  000546  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  768  000550  000552                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  769  000552  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  770  000554  000556                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  771  000556  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  772  000560  000562                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  773  000562  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  774  000564  000566                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  775  000566  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  776  000570  000572                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  777  000572  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  778  000574  000576                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  779  000576  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  780  000600  000602                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  781  000602  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  782  000604  000606                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  783  000606  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  784  000610  000612                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  785  000612  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  786  000614  000616                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  787  000616  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  788  000620  000622                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  789  000622  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  790  000624  000626                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  791  000626  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  792  000630  000632                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  793  000632  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  794  000634  000636                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  795  000636  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  796  000640  000642                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  797  000642  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  798  000644  000646                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  799  000646  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  800  000650  000652                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  801  000652  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  802  000654  000656                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  803  000656  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  804  000660  000662                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  805  000662  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  806  000664  000666                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  807  000666  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
  808  000670  000672                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
  809  000672  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
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   810  000674  000676                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   811  000676  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   812  000700  000702                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   813  000702  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   814  000704  000706                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   815  000706  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   816  000710  000712                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   817  000712  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   818  000714  000716                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   819  000716  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   820  000720  000722                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   821  000722  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   822  000724  000726                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   823  000726  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   824  000730  000732                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   825  000732  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   826  000734  000736                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   827  000736  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   828  000740  000742                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   829  000742  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   830  000744  000746                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   831  000746  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   832  000750  000752                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   833  000752  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   834  000754  000756                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   835  000756  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   836  000760  000762                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   837  000762  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   838  000764  000766                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   839  000766  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   840  000770  000772                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   841  000772  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
   842  000774  000776                    .+2          ;UNEXPECTED TRAP TO THIS LOCATION
   843  000776  000000                    HALT         ;EXAMINE STACK TO FIND CAUSE
```

```
                                        ;STANDARD INTERRUPT VECTORS


                000024          .=24
000024  013732                  PFAIL                   ;POWER FAIL HANDLER
000026  000340                  340                     ;SERVICE AT LEVEL 7
000030  012564                  ERRORS                  ;ERROR HANDLER
000032  000340                  340                     ;SERVICE AT LEVEL 7
000034  012766                  TRPSRV                  ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                  340                     ;SERVICE AT LEVEL 7
                000200          .=200
000200  000167  000574          JMP     START           ;GO TO START OF PROGRAM


                                        ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
                                        ;POINTERS TO SUBROUTINES CAN BE FOUND STARTING
                                        ;AT LOCATION "TRPTAB"

                104400                  SCOPE=TRAP+Y            ;SCOPE LOOP AND ITERATION HANDLER
                104401                  TYPE=TRAP+Y             ;TELETYPE OUTPUT ROUTINE
                104402                  OCTASC=TRAP+Y           ;OCTAL TO ASCII CONVERSION
                104403                  INSTR=TRAP+Y            ;INPUT ASCII STRING
                104404                  INSTER=TRAP+Y           ;STRING INPUT ERROR
                104405                  PARAM=TRAP+Y            ;CONVERT STRING TO OCTAL, CHECK LIMITS
                104406                  SAVOSP=TRAP+Y           ;SAVE R0-R5, PC
                104407                  RESOS=TRAP+Y            ;RESTORE R0-R5
                104410                  SCOPE1=TRAP+Y           ;CHECK FOR FREEZE ON CURRENT DATA
```

```
                001000                  .=1000

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

001000  012767  000340  176770  START:  MOV     #340,PS                 ;LOCK OUT INTERRUPTS
001006  012706  014734                  MOV     #STACK,SP               ;SET UP PROCESSOR STACK
001012  012737  013732  000024          MOV     #PFAIL,@#24             ;SET UP POWER FAIL TRAP
001020  005067  012670                  CLR     STFLG                   ;CLEAR TEST START FLAG
001024  005067  012624                  CLR     PASCNT                  ;CLEAR PASS COUNT
001030  005067  012622                  CLR     ERRCNT                  ;CLEAR ERROR COUNT
001034  005067  012612                  CLR     ERRFLG                  ;CLEAR ERROR FLAG
001040  005067  012606                  CLR     ERRFLG                  ;CLEAR LAST ERROR PC
001044  104401  014076                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
001050  005767  012636                  TST     INIFLG                  ;CHECK INITIALIZATION FLAG
001054  001001                          BNE     VEC1                    ;IF NOT 0, CHECK SWITCHES
                                                                        ;FOR REINITIALIZATION
001056  000404                          BR      VEC2
001060  032767  000001  176502  VEC1:   BIT     #SW00,SWR               ;IF SW00=1, GET NEW VECTOR
001066  001445                          BEQ     BEGIN                   ;AND CSR
001070  012701  000300          VEC2:   MOV     #300,R1
001074  012702  000302                  MOV     #302,R2
001100  012703  000004                  MOV     #4,R3
001104  010211                  1$:     MOV     R2,(R1)                 ;RESTORE TRAPCATCHER
001106  005012                          CLR     (R2)                    ;IN FLOATING VECTOR AREA
001110  060301                          ADD     R3,R1
001112  060302                          ADD     R3,R2
001114  020127  001000                  CMP     R1,#1000
001120  001371                          BNE     1$
001122  104403                          INSTR                           ;INPUT ADDRESS OF DEVICE VECTOR
001124  014144                          MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
001126  104405                          PARAM                           ;CONVERT STRING TO OCTAL
001130  000300                          300                             ;LOW LIMIT
001132  000770                          770                             ;HIGH  LIMIT
001134  013642                          DHRVEC                          ;LOCATIONS TO BE FILLED
001136     003                  .BYTE   3                               ;NUMBER OF LOCATIONS
001137     004                  .BYTE   4                               ;LSB MASK
001140  104403                          INSTR                           ;INPUT ADDRESS OF DEVICE CSR
001142  014166                          MREGAD                          ;MESSAGE "CONTROL REGISTER ADDRESS-"
001144  104405                          PARAM                           ;CONVERT STRING TO OCTAL
001146  000000                          0                               ;LOW LIMIT
001150  177776                          177776                          ;HIGH LIMIT
001152  013620                          DHSCR                           ;LOCATIONS TO BE FILLED
001154     007                  .BYTE   7                               ;NUMBER OF LOCATIONS
001155     010                  .BYTE   10                              ;LSB MASK
001156  016767  012454  012454          MOV     DHSSR,DHSLR             ;SET UP ADDRESS OF SILO
001164  005267  012450                  INC     DHSLR                   ;STATUS REGISTER HIGH BYTE
001170  005767  012516                  TST     INIFLG                  ;IF INITIALIZATION FLAG
001174  001002                          BNE     BEGIN                   ;IS CLEARED
001176  005167  012510                  COM     INIFLG                  ;SET IT

                                        ;PROGRAM START
```

```
                                                ;CHECK FOR PROGRAM START AT SELECTED ADDRESS
                                                ;
001202  012767  000340  176566  BEGIN:  MOV     #340,PS         ;LOCK OUT INTERRUPTS
001210  012706  014734                  MOV     #STACK,SP       ;SET UP PROCESSOR STACK
001214  032767  000002  176346          BIT     #SW01,SWR       ;IF SW01=1
001222  001410                          BEQ     1$              ;GET PC FOR PROGRAM START
001224  104403                          INSTR                   ;GET PC
001226  014332                          MTSTPC                  ;MESSAGE "TEST PC"
001230  104405                          PARAM                   ;CONVERT STRING TO OCTAL
001232  000000                          0
001234  017500                          17500
001236  000207                          RETURN
001240     001                  .BYTE   1
001241     001                  .BYTE   1
001242  000410                          BR      2$
001244  012767  001274  012406  1$:     MOV     #T1,RETURN      ;NORMAL START, TEST 1
001252  005767  012436                  TST     STFLG           ;IF LOOPING, BYPASS TYPEOUT
001256  001004                          BNE     3$
001260  005167  012430                  COM     STFLG
001264  104401  014326          2$:     TYPE    ,MR             ;TYPE "R" TO INDICATE START
001270  000177  012364          3$:     JMP     @RETURN         ;START TESTING
```

```
                                        ;TRANSMITTER LINE SPEED SELECTION TEST
                                        ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 0
                                        ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
                                        ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
                                        ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED

001274  012767  000340  176474  T1:   MOV   #340,PS                  ;DISABLE ALL INTERRUPTS
001302  012767  000010  012356        MOV   #10,ICOUNT               ;SET UP FOR 10 ITERATIONS
001310  012767  001514  012344        MOV   #5$,ESCAPE               ;SET UP TO ESCAPE TO NEXT TEST
001316  012767  001352  012340        MOV   #1$,FREEZ1               ;SET UP TO LOOP WITH DATA
001324  012705  000000                MOV   #0,R5          ;LINE 0 WILL BE TESTED
001330  012700  002000                MOV   #2000,R0                 ;CONSTANT FOR SELECTION
                                                                     ;OF INITIAL (LOWEST) SPEED
001334  012701  000015                MOV   #15,R1                   ;15 DIFFERENT SPEEDS WILL BE TESTED
001340  012704  000001                MOV   #1,R4                    ;BINARY CODE FOR INITIAL SPEED
001344  012767  177777  012350        MOV   #-1,TIME1                ;INITIALIZE COMPARISION VALUE
001352  012777  004000  012240  1$:   MOV   #BIT11,@DHSCR            ;CLEAR INTERFACE
001360  010577  012234                MOV   R5,@DHSCR                ;SELECT LINE 0 FOR TESTING
001364  005077  012236                CLR   @DHBA                    ;CLEAR BUS ADDRESS
001370  012777  177775  012232        MOV   #-3,@DHBC                ;SET UP TO TRANSMIT
                                                                     ;3 CHARACTERS
001376  010077  012222                MOV   R0,@DHLPR                ;SELECT LINE SPEED
001402  005067  012316                CLR   TIME2                    ;CLEAR TRANSMITTER TIME TIMER
001406  005067  012314                CLR   TEMP1                    ;SET UP NO CLOCK TIMER
001412  012767  000010  012310        MOV   #10,TEMP2
001420  012777  000001  012204        MOV   #1,@DHBAR                ;SET BAR BIT FOR LINE 0
                                                                     ;TO START TRANSMISSION
001426  005777  012166          2$:   TST   @DHSCR                   ;WAIT FOR TRANSMITTER
                                                                     ;TO FINISH
001432  100412                      BMI   3$
001434  005267  012264              INC   TIME2                    ;UPDATE TRANSMITTER TIMER
001440  005267  012262              INC   TEMP1                    ;UPDATE NO CLOCK TIMER
001444  001370                      BNE   2$
001446  005367  012256              DEC   TEMP2
001452  001365                      BNE   2$
001454  104001                      HLT   1                        ;TRANSMITTER DID NOT FINISH, ERROR
001456  000405                      BR    4$
001460  026767  012240  012234  3$:   CMP   TIME2,TIME1              ;VERIFY THAT TRANSMITTER
001466  103401                      BLO   4$                       ;WAS FASTER AT THIS SELECTED SPEED
                                                                     ;(NUMBER OF COUNTS IN TIME2
                                                                     ;LESS THAN TIME1)
001470  104002                      HLT   2                        ;TRANSMITTER TIMING ERROR FOR
                                                                     ;LINE 0
001472  104410                4$:   SCOPE1                         ;CHECK FOR FREEZE ON CURRENT DATA
001474  016767  012224  012220        MOV   TIME2,TIME1              ;SET UP FOR NEXT COMPARISION
001502  005204                      INC   R4                       ;SELECT NEXT SPEED
001504  062700  002000              ADD   #2000,R0
001510  005301                      DEC   R1
001512  001317                      BNE   1$
001514  104400                5$:   SCOPE                          ;CHECK FOR ITERATIONS, LOOP

                                        ;TRANSMITTER LINE SPEED SELECTION TEST
                                        ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 1
                                        ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
                                        ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
```

```
1005                                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1006
1007  001516  012767  000340  176252  T2:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1008  001524  012767  000010  012134          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1009  001532  012767  001736  012122          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1010  001540  012767  001574  012116          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1011  001546  012705  000001                  MOV     #1,R5           ;LINE 1 WILL BE TESTED
1012  001552  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1013                                                                          ;OF INITIAL (LOWEST) SPEED
1014  001556  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1015  001562  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1016  001566  012767  177777  012126          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1017  001574  012777  004000  012016  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1018  001602  010577  012012                  MOV     R5,@DHSCR               ;SELECT LINE 1 FOR TESTING
1019  001606  005077  012014                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1020  001612  012777  177775  012010          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1021                                                                          ;3 CHARACTERS
1022  001620  010077  012000                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1023  001624  005067  012074                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1024  001630  005067  012072                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1025  001634  012767  000010  012066          MOV     #10,TEMP2
1026  001642  012777  000002  011762          MOV     #2,@DHBAR               ;SET BAR BIT FOR LINE 1
1027                                                                          ;TO START TRANSMISSION
1028  001650  005777  011744          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1029                                                                          ;TO FINISH
1030  001654  100412                  BMI     3$
1031  001656  005267  012042                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1032  001662  005267  012040                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1033  001666  001370                  BNE     2$
1034  001670  005367  012034                  DEC     TEMP2
1035  001674  001365                  BNE     2$
1036  001676  104001                  HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1037  001700  000405                  BR      4$
1038  001702  026767  012016  012012  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1039  001710  103401                  BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1040                                                                          ;(NUMBER OF COUNTS IN TIME2
1041                                                                          ;LESS THAN TIME1)
1042  001712  104002                  HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1043                                                                          ;LINE 1
1044  001714  104410          4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1045  001716  016767  012002  011776          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1046  001724  005204                  INC     R4                      ;SELECT NEXT SPEED
1047  001726  062700  002000                  ADD     #2000,R0
1048  001732  005301                  DEC     R1
1049  001734  001317                  BNE     1$
1050  001736  104400          5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1051
1052                                                ;TRANSMITTER LINE SPEED SELECTION TEST
1053                                                ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 2
1054                                                ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1055                                                ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1056                                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1057
1058  001740  012767  000340  176030  T3:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1059  001746  012767  000010  011712          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1060  001754  012767  002160  011700          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
```

```
1061  001762  012767  002016  011674          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1062  001770  012705  000002                  MOV     #2,R5           ;LINE 2 WILL BE TESTED
1063  001774  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1064                                                                            ;OF INITIAL (LOWEST) SPEED
1065  002000  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1066  002004  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1067  002010  012767  177777  011704          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1068  002016  012777  004000  011574  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1069  002024  010577  011570                  MOV     R5,@DHSCR               ;SELECT LINE 2 FOR TESTING
1070  002030  005077  011572                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1071  002034  012777  177775  011566          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1072                                                                            ;3 CHARACTERS
1073  002042  010077  011556                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1074  002046  005067  011652                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1075  002052  005067  011650                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1076  002056  012767  000010  011644          MOV     #10,TEMP2
1077  002064  012777  000004  011540          MOV     #4,@DHBAR               ;SET BAR BIT FOR LINE 2
1078                                                                            ;TO START TRANSMISSION
1079  002072  005777  011522          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1080                                                                            ;TO FINISH
1081  002076  100412                          BMI     3$
1082  002100  005267  011620                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1083  002104  005267  011616                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1084  002110  001370                          BNE     2$
1085  002112  005367  011612                  DEC     TEMP2
1086  002116  001365                          BNE     2$
1087  002120  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1088  002122  000405                          BR      4$
1089  002124  026767  011574  011570  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1090  002132  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1091                                                                            ;(NUMBER OF COUNTS IN TIME2
1092                                                                            ;LESS THAN TIME1)
1093  002134  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1094                                                                            ;LINE 2
1095  002136  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1096  002140  016767  011560  011554          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1097  002146  005204                          INC     R4                      ;SELECT NEXT SPEED
1098  002150  062700  002000                  ADD     #2000,R0
1099  002154  005301                          DEC     R1
1100  002156  001317                          BNE     1$
1101  002160  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1102
1103                                          ;TRANSMITTER LINE SPEED SELECTION TEST
1104                                          ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 3
1105                                          ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1106                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1107                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1108
1109  002162  012767  000340  175606  T4:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1110  002170  012767  000010  011470          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1111  002176  012767  002402  011456          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1112  002204  012767  002240  011452          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1113  002212  012705  000003                  MOV     #3,R5           ;LINE 3 WILL BE TESTED
1114  002216  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1115                                                                            ;OF INITIAL (LOWEST) SPEED
1116  002222  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
```

```
1117  002226  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1118  002232  012767  177777  011462        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1119  002240  012777  004000  011352  1$:   MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1120  002246  010577  011346                MOV     R5,@DHSCR               ;SELECT LINE 3 FOR TESTING
1121  002252  005077  011350                CLR     @DHBA                   ;CLEAR BUS ADDRESS
1122  002256  012777  177775  011344        MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1123                                                                        ;3 CHARACTERS
1124  002264  010077  011334                MOV     R0,@DHLPR               ;SELECT LINE SPEED
1125  002270  005067  011430                CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1126  002274  005067  011426                CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1127  002300  012767  000010  011422        MOV     #10,TEMP2
1128  002306  012777  000010  011316        MOV     #10,@DHBAR              ;SET BAR BIT FOR LINE 3
1129                                                                        ;TO START TRANSMISSION
1130  002314  005777  011300          2$:   TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1131                                                                        ;TO FINISH
1132  002320  100412                BMI     3$
1133  002322  005267  011376                INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1134  002326  005267  011374                INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1135  002332  001370                BNE     2$
1136  002334  005367  011370                DEC     TEMP2
1137  002340  001365                BNE     2$
1138  002342  104001                HLT     1                               ;TRANSMITTER DID NOT FINISH, ERROR
1139  002344  000405                BR      4$
1140  002346  026767  011352  011346  3$:   CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1141  002354  103401                BLO     4$                              ;WAS FASTER AT THIS SELECTED SPEED
1142                                                                        ;(NUMBER OF COUNTS IN TIME2
1143                                                                        ;LESS THAN TIME1)
1144  002356  104002                HLT     2                               ;TRANSMITTER TIMING ERROR FOR
1145                                                                        ;LINE 3
1146  002360  104410          4$:   SCOPE1                                  ;CHECK FOR FREEZE ON CURRENT DATA
1147  002362  016767  011336  011332        MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1148  002370  005204                INC     R4                              ;SELECT NEXT SPEED
1149  002372  062700  002000                ADD     #2000,R0
1150  002376  005301                DEC     R1
1151  002400  001317                BNE     1$
1152  002402  104400          5$:   SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
1153
1154                                ;TRANSMITTER LINE SPEED SELECTION TEST
1155                                ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 4
1156                                ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1157                                ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1158                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEE
1159
1160  002404  012767  000340  175364  T5:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1161  002412  012767  000010  011246        MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1162  002420  012767  002624  011234        MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1163  002426  012767  002462  011230        MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1164  002434  012705  000004                MOV     #4,R5           ;LINE 4 WILL BE TESTED
1165  002440  012700  002000                MOV     #2000,R0                ;CONSTANT FOR SELECTION
1166                                                                        ;OF INITIAL (LOWEST) SPEED
1167  002444  012701  000015                MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1168  002450  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1169  002454  012767  177777  011240        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1170  002462  012777  004000  011130  1$:   MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1171  002470  010577  011124                MOV     R5,@DHSCR               ;SELECT LINE 4 FOR TESTING
1172  002474  005077  011126                CLR     @DHBA                   ;CLEAR BUS ADDRESS
```

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1173  002500  012777  177775  011122          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1174                                                                          ;3 CHARACTERS
1175  002506  010077  011112                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1176  002512  005067  011206                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1177  002516  005067  011204                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1178  002522  012767  000010  011200          MOV     #10,TEMP2
1179  002530  012777  000020  011074          MOV     #20,@DHBAR              ;SET BAR BIT FOR LINE 4
1180                                                                          ;TO START TRANSMISSION
1181  002536  005777  011056          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1182                                                                          ;TO FINISH
1183  002542  100412                  BMI     3$
1184  002544  005267  011154                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1185  002550  005267  011152                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1186  002554  001370                  BNE     2$
1187  002556  005367  011146                  DEC     TEMP2
1188  002562  001365                  BNE     2$
1189  002564  104001                  HLT     1                               ;TRANSMITTER DID NOT FINISH, ERROR
1190  002566  000405                  BR      4$
1191  002570  026767  011130  011124  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1192  002576  103401                  BLO     4$                              ;WAS FASTER AT THIS SELECTED SPEED
1193                                                                          ;(NUMBER OF COUNTS IN TIME2
1194                                                                          ;LESS THAN TIME1)
1195  002600  104002                  HLT     2                               ;TRANSMITTER TIMING ERROR FOR
1196                                                                          ;LINE 4
1197  002602  104410          4$:     SCOPE1                                  ;CHECK FOR FREEZE ON CURRENT DATA
1198  002604  016767  011114  011110          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1199  002612  005204                  INC     R4                              ;SELECT NEXT SPEED
1200  002614  062700  002000                  ADD     #2000,R0
1201  002620  005301                  DEC     R1
1202  002622  001317                  BNE     1$
1203  002624  104400          5$:     SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
1204
1205                                  ;TRANSMITTER LINE SPEED SELECTION TEST
1206                                  ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 5
1207                                  ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1208                                  ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1209                                  ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1210
1211  002626  012767  000340  175142  T6:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1212  002634  012767  000010  011024          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1213  002642  012767  003046  011012          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1214  002650  012767  002704  011006          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1215  002656  012705  000005                  MOV     #5,R5           ;LINE 5 WILL BE TESTED
1216  002662  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1217                                                                          ;OF INITIAL (LOWEST) SPEED
1218  002666  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1219  002672  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1220  002676  012767  177777  011016          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1221  002704  012777  004000  010706  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1222  002712  010577  010702                  MOV     R5,@DHSCR               ;SELECT LINE 5 FOR TESTING
1223  002716  005077  010704                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1224  002722  012777  177775  010700          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1225                                                                          ;3 CHARACTERS
1226  002730  010077  010670                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1227  002734  005067  010764                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1228  002740  005067  010762                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
```

```
1229  002744  012767  000010  010756          MOV     #10,TEMP2
1230  002752  012777  000040  010652          MOV     #40,@DHBAR              ;SET BAR BIT FOR LINE 5
1231                                                                          ;TO START TRANSMISSION
1232  002760  005777  010634          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1233                                                                          ;TO FINISH
1234  002764  100412                          BMI     3$
1235  002766  005267  010732                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1236  002772  005267  010730                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1237  002776  001370                          BNE     2$
1238  003000  005367  010724                  DEC     TEMP2
1239  003004  001365                          BNE     2$
1240  003006  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1241  003010  000405                          BR      4$
1242  003012  026767  010706  010702  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1243  003020  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1244                                                                          ;(NUMBER OF COUNTS IN TIME2
1245                                                                          ;LESS THAN TIME1)
1246  003022  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1247                                                                          ;LINE 5
1248  003024  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1249  003026  016767  010672  010666          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1250  003034  005204                          INC     R4                      ;SELECT NEXT SPEED
1251  003036  062700  002000                  ADD     #2000,R0
1252  003042  005301                          DEC     R1
1253  003044  001317                          BNE     1$
1254  003046  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1255
1256                                          ;TRANSMITTER LINE SPEED SELECTION TEST
1257                                          ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 6
1258                                          ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1259                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1260                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1261
1262  003050  012767  000340  174720  T7:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1263  003056  012767  000010  010602          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1264  003064  012767  003270  010570          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1265  003072  012767  003126  010564          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1266  003100  012705  000006                  MOV     #6,R5           ;LINE 6 WILL BE TESTED
1267  003104  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1268                                                                          ;OF INITIAL (LOWEST) SPEED
1269  003110  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1270  003114  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1271  003120  012767  177777  010574          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1272  003126  012777  004000  010464  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1273  003134  010577  010460                  MOV     R5,@DHSCR               ;SELECT LINE 6 FOR TESTING
1274  003140  005077  010462                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1275  003144  012777  177775  010456          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1276                                                                          ;3 CHARACTERS
1277  003152  010077  010446                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1278  003156  005067  010542                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1279  003162  005067  010540                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1280  003166  012767  000010  010534          MOV     #10,TEMP2
1281  003174  012777  000100  010430          MOV     #100,@DHBAR             ;SET BAR BIT FOR LINE 6
1282                                                                          ;TO START TRANSMISSION
1283  003202  005777  010412          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1284                                                                          ;TO FINISH
```

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1285  003206  100412                        BMI     3$
1286  003210  005267  010510                INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1287  003214  005267  010506                INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1288  003220  001370                        BNE     2$
1289  003222  005367  010502                DEC     TEMP2
1290  003226  001365                        BNE     2$
1291  003230  104001                        HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1292  003232  000405                        BR      4$
1293  003234  026767  010464  010460  3$:   CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1294  003242  103401                        BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1295                                                                        ;(NUMBER OF COUNTS IN TIME2
1296                                                                        ;LESS THAN TIME1)
1297  003244  104002                        HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1298                                                                        ;LINE 6
1299  003246  104410                4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1300  003250  016767  010450  010444        MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1301  003256  005204                        INC     R4                      ;SELECT NEXT SPEED
1302  003260  062700  002000                ADD     #2000,R0
1303  003264  005301                        DEC     R1
1304  003266  001317                        BNE     1$
1305  003270  104400                5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1306
1307                                        ;TRANSMITTER LINE SPEED SELECTION TEST
1308                                        ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 7
1309                                        ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1310                                        ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1311                                        ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1312
1313  003272  012767  000340  174476  T10:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1314  003300  012767  000010  010360        MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1315  003306  012767  003512  010346        MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1316  003314  012767  003350  010342        MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1317  003322  012705  000007                MOV     #7,R5           ;LINE 7 WILL BE TESTED
1318  003326  012700  002000                MOV     #2000,R0                ;CONSTANT FOR SELECTION
1319                                                                        ;OF INITIAL (LOWEST) SPEED
1320  003332  012701  000015                MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1321  003336  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1322  003342  012767  177777  010352        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1323  003350  012777  004000  010242  1$:   MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1324  003356  010577  010236                MOV     R5,@DHSCR               ;SELECT LINE 7 FOR TESTING
1325  003362  005077  010240                CLR     @DHBA                   ;CLEAR BUS ADDRESS
1326  003366  012777  177775  010234        MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1327                                                                        ;3 CHARACTERS
1328  003374  010077  010224                MOV     R0,@DHLPR               ;SELECT LINE SPEED
1329  003400  005067  010320                CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1330  003404  005067  010316                CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1331  003410  012767  000010  010312        MOV     #10,TEMP2
1332  003416  012777  000200  010206        MOV     #200,@DHBAR             ;SET BAR BIT FOR LINE 7
1333                                                                        ;TO START TRANSMISSION
1334  003424  005777  010170          2$:   TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1335                                                                        ;TO FINISH
1336  003430  100412                        BMI     3$
1337  003432  005267  010266                INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1338  003436  005267  010264                INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1339  003442  001370                        BNE     2$
1340  003444  005367  010260                DEC     TEMP2
```

```
1341   003450  001365                          BNE     2$
1342   003452  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1343   003454  000405                          BR      4$
1344   003456  026767  010242  010236  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1345   003464  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1346                                                                           ;(NUMBER OF COUNTS IN TIME2
1347                                                                           ;LESS THAN TIME1)
1348   003466  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1349                                                                           ;LINE 7
1350   003470  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1351   003472  016767  010226  010222          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1352   003500  005204                          INC     R4                      ;SELECT NEXT SPEED
1353   003502  062700  002000                  ADD     #2000,R0
1354   003506  005301                          DEC     R1
1355   003510  001317                          BNE     1$
1356   003512  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1357
1358                                           ;TRANSMITTER LINE SPEED SELECTION TEST
1359                                           ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 10
1360                                           ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1361                                           ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1362                                           ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1363
1364   003514  012767  000340  174254  T11:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1365   003522  012767  000010  010136          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1366   003530  012767  003734  010124          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1367   003536  012767  003572  010120          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1368   003544  012705  000010                  MOV     #10,R5          ;LINE 10 WILL BE TESTED
1369   003550  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1370                                                                           ;OF INITIAL (LOWEST) SPEED
1371   003554  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1372   003560  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1373   003564  012767  177777  010130          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1374   003572  012777  004000  010020  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1375   003600  010577  010014                  MOV     R5,@DHSCR               ;SELECT LINE 10 FOR TESTING
1376   003604  005077  010016                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1377   003610  012777  177775  010012          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1378                                                                           ;3 CHARACTERS
1379   003616  010077  010002                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1380   003622  005067  010076                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1381   003626  005067  010074                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1382   003632  012767  000010  010070          MOV     #10,TEMP2
1383   003640  012777  000400  007764          MOV     #400,@DHBAR             ;SET BAR BIT FOR LINE 10
1384                                                                           ;TO START TRANSMISSION
1385   003646  005777  007746          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1386                                                                           ;TO FINISH
1387   003652  100412                          BMI     3$
1388   003654  005267  010044                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1389   003660  005267  010042                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1390   003664  001370                          BNE     2$
1391   003666  005367  010036                  DEC     TEMP2
1392   003672  001365                          BNE     2$
1393   003674  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1394   003676  000405                          BR      4$
1395   003700  026767  010020  010014  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1396   003706  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
```

```
1397                                                                    ;(NUMBER OF COUNTS IN TIME2
1398                                                                    ;LESS THAN TIME1)
1399  003710  104002                      HLT     2                     ;TRANSMITTER TIMING ERROR FOR
1400                                                                    ;LINE 10
1401  003712  104410              4$:     SCOPE1                        ;CHECK FOR FREEZE ON CURRENT DATA
1402  003714  016767  010004  010000      MOV     TIME2,TIME1           ;SET UP FOR NEXT COMPARISION
1403  003722  005204                      INC     R4                    ;SELECT NEXT SPEED
1404  003724  062700  002000              ADD     #2000,R0
1405  003730  005301                      DEC     R1
1406  003732  001317                      BNE     1$
1407  003734  104400              5$:     SCOPE                         ;CHECK FOR ITERATIONS, LOOP
1408
1409                                      ;TRANSMITTER LINE SPEED SELECTION TEST
1410                                      ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 11
1411                                      ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1412                                      ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1413                                      ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1414
1415  003736  012767  000340  174032  T12:  MOV     #340,PS               ;DISABLE ALL INTERRUPTS
1416  003744  012767  000010  007714      MOV     #10,ICOUNT            ;SET UP FOR 10 ITERATIONS
1417  003752  012767  004156  007702      MOV     #5$,ESCAPE            ;SET UP TO ESCAPE TO NEXT TEST
1418  003760  012767  004014  007676      MOV     #1$,FREEZ1            ;SET UP TO LOOP WITH DATA
1419  003766  012705  000011              MOV     #11,R5          ;LINE 11 WILL BE TESTED
1420  003772  012700  002000              MOV     #2000,R0              ;CONSTANT FOR SELECTION
1421                                                                    ;OF INITIAL (LOWEST) SPEED
1422  003776  012701  000015              MOV     #15,R1                ;15 DIFFERENT SPEEDS WILL BE TESTED
1423  004002  012704  000001              MOV     #1,R4                 ;BINARY CODE FOR INITIAL SPEED
1424  004006  012767  177777  007706      MOV     #-1,TIME1             ;INITIALIZE COMPARISION VALUE
1425  004014  012777  004000  007576  1$:  MOV     #BIT11,@DHSCR         ;CLEAR INTERFACE
1426  004022  010577  007572              MOV     R5,@DHSCR             ;SELECT LINE 11 FOR TESTING
1427  004026  005077  007574              CLR     @DHBA                 ;CLEAR BUS ADDRESS
1428  004032  012777  177775  007570      MOV     #-3,@DHBC             ;SET UP TO TRANSMIT
1429                                                                    ;3 CHARACTERS
1430  004040  010077  007560              MOV     R0,@DHLPR             ;SELECT LINE SPEED
1431  004044  005067  007654              CLR     TIME2                 ;CLEAR TRANSMITTER TIME TIMER
1432  004050  005067  007652              CLR     TEMP1                 ;SET UP NO CLOCK TIMER
1433  004054  012767  000010  007646      MOV     #10,TEMP2
1434  004062  012777  001000  007542      MOV     #1000,@DHBAR          ;SET BAR BIT FOR LINE 11
1435                                                                    ;TO START TRANSMISSION
1436  004070  005777  007524          2$:  TST     @DHSCR                ;WAIT FOR TRANSMITTER
1437                                                                    ;TO FINISH
1438  004074  100412                      BMI     3$
1439  004076  005267  007622              INC     TIME2                 ;UPDATE TRANSMITTER TIMER
1440  004102  005267  007620              INC     TEMP1                 ;UPDATE NO CLOCK TIMER
1441  004106  001370                      BNE     2$
1442  004110  005367  007614              DEC     TEMP2
1443  004114  001365                      BNE     2$
1444  004116  104001                      HLT     1                     ;TRANSMITTER DID NOT FINISH, ERROR
1445  004120  000405                      BR      4$
1446  004122  026767  007576  007572  3$:  CMP     TIME2,TIME1           ;VERIFY THAT TRANSMITTER
1447  004130  103401                      BLO     4$                    ;WAS FASTER AT THIS SELECTED SPEED
1448                                                                    ;(NUMBER OF COUNTS IN TIME2
1449                                                                    ;LESS THAN TIME1)
1450  004132  104002                      HLT     2                     ;TRANSMITTER TIMING ERROR FOR
1451                                                                    ;LINE 11
1452  004134  104410              4$:     SCOPE1                        ;CHECK FOR FREEZE ON CURRENT DATA
```

```
1453  004136  016767  007562  007556          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1454  004144  005204                          INC     R4                      ;SELECT NEXT SPEED
1455  004146  062700  002000                  ADD     #2000,R0
1456  004152  005301                          DEC     R1
1457  004154  001317                          BNE     1$
1458  004156  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1459
1460                                          ;TRANSMITTER LINE SPEED SELECTION TEST
1461                                          ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 12
1462                                          ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1463                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1464                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1465
1466  004160  012767  000340  173610  T13:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1467  004166  012767  000010  007472          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1468  004174  012767  004400  007460          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1469  004202  012767  004236  007454          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1470  004210  012705  000012                  MOV     #12,R5          ;LINE 12 WILL BE TESTED
1471  004214  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1472                                                                          ;OF INITIAL (LOWEST) SPEED
1473  004220  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1474  004224  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1475  004230  012767  177777  007464          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1476  004236  012777  004000  007354  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1477  004244  010577  007350                  MOV     R5,@DHSCR               ;SELECT LINE 12 FOR TESTING
1478  004250  005077  007352                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1479  004254  012777  177775  007346          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1480                                                                          ;3 CHARACTERS
1481  004262  010077  007336                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1482  004266  005067  007432                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1483  004272  005067  007430                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1484  004276  012767  000010  007424          MOV     #10,TEMP2
1485  004304  012777  002000  007320          MOV     #2000,@DHBAR            ;SET BAR BIT FOR LINE 12
1486                                                                          ;TO START TRANSMISSION
1487  004312  005777  007302          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1488                                                                          ;TO FINISH
1489  004316  100412                          BMI     3$
1490  004320  005267  007400                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1491  004324  005267  007376                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1492  004330  001370                          BNE     2$
1493  004332  005367  007372                  DEC     TEMP2
1494  004336  001365                          BNE     2$
1495  004340  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1496  004342  000405                          BR      4$
1497  004344  026767  007354  007350  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1498  004352  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1499                                                                          ;(NUMBER OF COUNTS IN TIME2
1500                                                                          ;LESS THAN TIME1)
1501  004354  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1502                                                                          ;LINE 12
1503  004356  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1504  004360  016767  007340  007334          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1505  004366  005204                          INC     R4                      ;SELECT NEXT SPEED
1506  004370  062700  002000                  ADD     #2000,R0
1507  004374  005301                          DEC     R1
1508  004376  001317                          BNE     1$
```

```
1509  004400  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1510
1511                                          ;TRANSMITTER LINE SPEED SELECTION TEST
1512                                          ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 13
1513                                          ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1514                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1515                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1516
1517  004402  012767  000340  173366  T14:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1518  004410  012767  000010  007250          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1519  004416  012767  004622  007236          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1520  004424  012767  004460  007232          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1521  004432  012705  000013                  MOV     #13,R5          ;LINE 13 WILL BE TESTED
1522  004436  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1523                                                                          ;OF INITIAL (LOWEST) SPEED
1524  004442  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1525  004446  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1526  004452  012767  177777  007242          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1527  004460  012777  004000  007132  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1528  004466  010577  007126                  MOV     R5,@DHSCR               ;SELECT LINE 13 FOR TESTING
1529  004472  005077  007130                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1530  004476  012777  177775  007124          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1531                                                                          ;3 CHARACTERS
1532  004504  010077  007114                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1533  004510  005067  007210                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1534  004514  005067  007206                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1535  004520  012767  000010  007202          MOV     #10,TEMP2
1536  004526  012777  004000  007076          MOV     #4000,@DHBAR            ;SET BAR BIT FOR LINE 13
1537                                                                          ;TO START TRANSMISSION
1538  004534  005777  007060          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1539                                                                          ;TO FINISH
1540  004540  100412                          BMI     3$
1541  004542  005267  007156                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1542  004546  005267  007154                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1543  004552  001370                          BNE     2$
1544  004554  005367  007150                  DEC     TEMP2
1545  004560  001365                          BNE     2$
1546  004562  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1547  004564  000405                          BR      4$
1548  004566  026767  007132  007126  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1549  004574  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1550                                                                          ;(NUMBER OF COUNTS IN TIME2
1551                                                                          ;LESS THAN TIME1)
1552  004576  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1553                                                                          ;LINE 13
1554  004600  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1555  004602  016767  007116  007112          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1556  004610  005204                          INC     R4                      ;SELECT NEXT SPEED
1557  004612  062700  002000                  ADD     #2000,R0
1558  004616  005301                          DEC     R1
1559  004620  001317                          BNE     1$
1560  004622  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1561
1562                                          ;TRANSMITTER LINE SPEED SELECTION TEST
1563                                          ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 14
1564                                          ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
```

```
1565                                            ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1566                                            ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1567
1568  004624  012767  000340  173144  T15:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1569  004632  012767  000010  007026          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1570  004640  012767  005044  007014          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1571  004646  012767  004702  007010          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1572  004654  012705  000014                  MOV     #14,R5          ;LINE 14 WILL BE TESTED
1573  004660  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1574                                                                          ;OF INITIAL (LOWEST) SPEED
1575  004664  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1576  004670  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1577  004674  012767  177777  007020          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1578  004702  012777  004000  006710  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1579  004710  010577  006704                  MOV     R5,@DHSCR               ;SELECT LINE 14 FOR TESTING
1580  004714  005077  006706                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1581  004720  012777  177775  006702          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1582                                                                          ;3 CHARACTERS
1583  004726  010077  006672                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1584  004732  005067  006766                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1585  004736  005067  006764                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1586  004742  012767  000010  006760          MOV     #10,TEMP2
1587  004750  012777  010000  006654          MOV     #10000,@DHBAR           ;SET BAR BIT FOR LINE 14
1588                                                                          ;TO START TRANSMISSION
1589  004756  005777  006636          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1590                                                                          ;TO FINISH
1591  004762  100412                          BMI     3$
1592  004764  005267  006734                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1593  004770  005267  006732                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1594  004774  001370                          BNE     2$
1595  004776  005367  006726                  DEC     TEMP2
1596  005002  001365                          BNE     2$
1597  005004  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1598  005006  000405                          BR      4$
1599  005010  026767  006710  006704  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1600  005016  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1601                                                                          ;(NUMBER OF COUNTS IN TIME2
1602                                                                          ;LESS THAN TIME1)
1603  005020  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1604                                                                          ;LINE 14
1605  005022  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1606  005024  016767  006674  006670          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1607  005032  005204                          INC     R4                      ;SELECT NEXT SPEED
1608  005034  062700  002000                  ADD     #2000,R0
1609  005040  005301                          DEC     R1
1610  005042  001317                          BNE     1$
1611  005044  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1612
1613                                          ;TRANSMITTER LINE SPEED SELECTION TEST
1614                                          ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 15
1615                                          ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1616                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1617                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1618
1619  005046  012767  000340  172722  T16:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1620  005054  012767  000010  006604          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
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1621  005062  012767  005266  006572          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1622  005070  012767  005124  006566          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1623  005076  012705  000015                  MOV     #15,R5          ;LINE 15 WILL BE TESTED
1624  005102  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1625                                                                          ;OF INITIAL (LOWEST) SPEED
1626  005106  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1627  005112  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1628  005116  012767  177777  006576          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1629  005124  012777  004000  006466  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1630  005132  010577  006462                  MOV     R5,@DHSCR               ;SELECT LINE 15 FOR TESTING
1631  005136  005077  006464                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1632  005142  012777  177775  006460          MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1633                                                                          ;3 CHARACTERS
1634  005150  010077  006450                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1635  005154  005067  006544                  CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1636  005160  005067  006542                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1637  005164  012767  000010  006536          MOV     #10,TEMP2
1638  005172  012777  020000  006432          MOV     #20000,@DHBAR           ;SET BAR BIT FOR LINE 15
1639                                                                          ;TO START TRANSMISSION
1640  005200  005777  006414          2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1641                                                                          ;TO FINISH
1642  005204  100412                          BMI     3$
1643  005206  005267  006512                  INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1644  005212  005267  006510                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1645  005216  001370                          BNE     2$
1646  005220  005367  006504                  DEC     TEMP2
1647  005224  001365                          BNE     2$
1648  005226  104001                          HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1649  005230  000405                          BR      4$
1650  005232  026767  006466  006462  3$:     CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1651  005240  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1652                                                                          ;(NUMBER OF COUNTS IN TIME2
1653                                                                          ;LESS THAN TIME1)
1654  005242  104002                          HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1655                                                                          ;LINE 15
1656  005244  104410          4$:     SCOPE1                                  ;CHECK FOR FREEZE ON CURRENT DATA
1657  005246  016767  006452  006446          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1658  005254  005204                          INC     R4                      ;SELECT NEXT SPEED
1659  005256  062700  002000                  ADD     #2000,R0
1660  005262  005301                          DEC     R1
1661  005264  001317                          BNE     1$
1662  005266  104400          5$:     SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
1663
1664                                  ;TRANSMITTER LINE SPEED SELECTION TEST
1665                                  ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 16
1666                                  ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1667                                  ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1668                                  ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1669
1670  005270  012767  000340  172500  T17:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1671  005276  012767  000010  006362          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1672  005304  012767  005510  006350          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1673  005312  012767  005346  006344          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1674  005320  012705  000016                  MOV     #16,R5          ;LINE 16 WILL BE TESTED
1675  005324  012700  002000                  MOV     #2000,R0                ;CONSTANT FOR SELECTION
1676                                                                          ;OF INITIAL (LOWEST) SPEED
```

```
1677  005330  012701  000015                MOV     #15,R1          ;15 DIFFERENT SPEEDS WILL BE TESTED
1678  005334  012704  000001                MOV     #1,R4           ;BINARY CODE FOR INITIAL SPEED
1679  005340  012767  177777  006354        MOV     #-1,TIME1       ;INITIALIZE COMPARISION VALUE
1680  005346  012777  004000  006244  1$:   MOV     #BIT11,@DHSCR   ;CLEAR INTERFACE
1681  005354  010577  006240                MOV     R5,@DHSCR       ;SELECT LINE 16 FOR TESTING
1682  005360  005077  006242                CLR     @DHBA           ;CLEAR BUS ADDRESS
1683  005364  012777  177775  006236        MOV     #-3,@DHBC       ;SET UP TO TRANSMIT
1684                                                                ;3 CHARACTERS
1685  005372  010077  006226                MOV     R0,@DHLPR       ;SELECT LINE SPEED
1686  005376  005067  006322                CLR     TIME2           ;CLEAR TRANSMITTER TIME TIMER
1687  005402  005067  006320                CLR     TEMP1           ;SET UP NO CLOCK TIMER
1688  005406  012767  000010  006314        MOV     #10,TEMP2
1689  005414  012777  040000  006210        MOV     #40000,@DHBAR   ;SET BAR BIT FOR LINE 16
1690                                                                ;TO START TRANSMISSION
1691  005422  005777  006172          2$:   TST     @DHSCR          ;WAIT FOR TRANSMITTER
1692                                                                ;TO FINISH
1693  005426  100412                BMI     3$
1694  005430  005267  006270                INC     TIME2           ;UPDATE TRANSMITTER TIMER
1695  005434  005267  006266                INC     TEMP1           ;UPDATE NO CLOCK TIMER
1696  005440  001370                BNE     2$
1697  005442  005367  006262                DEC     TEMP2
1698  005446  001365                BNE     2$
1699  005450  104001                HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1700  005452  000405                BR      4$
1701  005454  026767  006244  006240  3$:   CMP     TIME2,TIME1     ;VERIFY THAT TRANSMITTER
1702  005462  103401                BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1703                                                                ;(NUMBER OF COUNTS IN TIME2
1704                                                                ;LESS THAN TIME1)
1705  005464  104002                HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1706                                                                ;LINE 16
1707  005466  104410          4$:   SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1708  005470  016767  006230  006224        MOV     TIME2,TIME1     ;SET UP FOR NEXT COMPARISION
1709  005476  005204                INC     R4                      ;SELECT NEXT SPEED
1710  005500  062700  002000                ADD     #2000,R0
1711  005504  005301                DEC     R1
1712  005506  001317                BNE     1$
1713  005510  104400          5$:   SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1714
1715                                ;TRANSMITTER LINE SPEED SELECTION TEST
1716                                ;TRANSMIT 3 CHARACTERS AT A SELECTED SPEED ON LINE 17
1717                                ;VERIFY THAT TRANSMITTER DONE OCCURS AT THE SELECTED SPEED
1718                                ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1719                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1720
1721  005512  012767  000340  172256  T20:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1722  005520  012767  000010  006140        MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1723  005526  012767  005732  006126        MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1724  005534  012767  005570  006122        MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1725  005542  012705  000017                MOV     #17,R5          ;LINE 17 WILL BE TESTED
1726  005546  012700  002000                MOV     #2000,R0                ;CONSTANT FOR SELECTION
1727                                                                  ;OF INITIAL (LOWEST) SPEED
1728  005552  012701  000015                MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1729  005556  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1730  005562  012767  177777  006132        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1731  005570  012777  004000  006022  1$:   MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1732  005576  010577  006016                MOV     R5,@DHSCR               ;SELECT LINE 17 FOR TESTING
```

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1733  005602  005077  006020                CLR     @DH3A                   ;CLEAR BUS ADDRESS
1734  005606  012777  177775  006014        MOV     #-3,@DHBC               ;SET UP TO TRANSMIT
1735                                                                          ;3 CHARACTERS
1736  005614  010077  006004                MOV     R0,@DHLPR               ;SELECT LINE SPEED
1737  005620  005067  006100                CLR     TIME2                   ;CLEAR TRANSMITTER TIME TIMER
1738  005624  005067  006076                CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1739  005630  012767  000010  006072        MOV     #10,TEMP2
1740  005636  012777  100000  005766        MOV     #100000,@DHBAR          ;SET BAR BIT FOR LINE 17
1741                                                                          ;TO START TRANSMISSION
1742  005644  005777  005750        2$:     TST     @DHSCR                  ;WAIT FOR TRANSMITTER
1743                                                                          ;TO FINISH
1744  005650  100412                BMI     3$
1745  005652  005267  006046        INC     TIME2                   ;UPDATE TRANSMITTER TIMER
1746  005656  005267  006044        INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1747  005662  001370                BNE     2$
1748  005664  005367  006040        DEC     TEMP2
1749  005670  001365                BNE     2$
1750  005672  104001                HLT     1                       ;TRANSMITTER DID NOT FINISH, ERROR
1751  005674  000405                BR      4$
1752  005676  026767  006022  006016  3$:   CMP     TIME2,TIME1             ;VERIFY THAT TRANSMITTER
1753  005704  103401                BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1754                                                                  ;(NUMBER OF COUNTS IN TIME2
1755                                                                  ;LESS THAN TIME1)
1756  005706  104002                HLT     2                       ;TRANSMITTER TIMING ERROR FOR
1757                                                                  ;LINE 17
1758  005710  104410        4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1759  005712  016767  006006  006002        MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1760  005720  005204                INC     R4                      ;SELECT NEXT SPEED
1761  005722  062700  002000        ADD     #2000,R0
1762  005726  005301                DEC     R1
1763  005730  001317                BNE     1$
1764  005732  104400        5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1765
1766                                ;RECEIVER LINE SPEED SELECTION TEST
1767                                ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 0
1768                                ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
1769                                ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1770                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1771
1772  005734  012767  000340  172034  T21:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1773  005742  012767  000010  005716        MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1774  005750  012767  006154  005704        MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1775  005756  012767  006012  005700        MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1776  005764  012705  000000                MOV     #0,R5           ;LINE 0 WILL BE TESTED
1777  005770  012700  002100                MOV     #2100,R0                ;CONSTANT FOR SELECTION
1778                                                                          ;OF INITIAL (LOWEST) SPEED
1779  005774  012701  000015                MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1780  006000  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1781  006004  012767  177777  005710        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1782  006012  012777  004000  005600  1$:    MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1783  006020  010577  005574                MOV     R5,@DHSCR               ;SELECT LINE 0 FOR TESTING
1784  006024  005077  005576                CLR     @DHBA                   ;CLEAR BUS ADDRESS
1785  006030  012777  177777  005572        MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
1786                                                                          ;1 CHARACTERS
1787  006036  010077  005562                MOV     R0,@DHLPR               ;SELECT LINE SPEED
1788  006042  005067  005656                CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
```

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1789  006046  005067  005654                CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1790  006052  012767  000010  005650        MOV     #10,TEMP2
1791  006060  012777  000001  005544        MOV     #1,@DHBAR               ;SET BAR BIT FOR LINE 0
1792                                                                          ;TO START TRANSMISSION
1793  006066  105777  005526          2$:   TSTB    @DHSCR                  ;WAIT FOR RECEIVER
1794                                                                          ;TO FINISH
1795  006072  100412                BMI     3$
1796  006074  005267  005624        INC     TIME2                   ;UPDATE RECEIVER TIMER
1797  006100  005267  005622        INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1798  006104  001370                BNE     2$
1799  006106  005367  005616        DEC     TEMP2
1800  006112  001365                BNE     2$
1801  006114  104001                HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
1802  006116  000405                BR      4$
1803  006120  026767  005600  005574  3$:   CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
1804  006126  103401                BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1805                                                                  ;(NUMBER OF COUNTS IN TIME2
1806                                                                  ;LESS THAN TIME1)
1807  006130  104002                HLT     2                       ;RECEIVER TIMING ERROR FOR
1808                                                                  ;LINE 0
1809  006132  104410          4$:   SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1810  006134  016767  005564  005560        MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1811  006142  005204                INC     R4                      ;SELECT NEXT SPEED
1812  006144  062700  002100        ADD     #2100,R0
1813  006150  005301                DEC     R1
1814  006152  001317                BNE     1$
1815  006154  104400          5$:   SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1816
1817                                ;RECEIVER LINE SPEED SELECTION TEST
1818                                ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 1
1819                                ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
1820                                ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1821                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1822
1823  006156  012767  000340  171612  T22:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1824  006164  012767  000010  005474        MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1825  006172  012767  006376  005462        MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1826  006200  012767  006234  005456        MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1827  006206  012705  000001                MOV     #1,R5           ;LINE 1 WILL BE TESTED
1828  006212  012700  002100                MOV     #2100,R0                ;CONSTANT FOR SELECTION
1829                                                                  ;OF INITIAL (LOWEST) SPEED
1830  006216  012701  000015                MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1831  006222  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1832  006226  012767  177777  005466        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1833  006234  012777  004000  005356  1$:   MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1834  006242  010577  005352                MOV     R5,@DHSCR               ;SELECT LINE 1 FOR TESTING
1835  006246  005077  005354                CLR     @DHBA                   ;CLEAR BUS ADDRESS
1836  006252  012777  177777  005350        MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
1837                                                                  ;1 CHARACTERS
1838  006260  010077  005340                MOV     R0,@DHLPR               ;SELECT LINE SPEED
1839  006264  005067  005434                CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
1840  006270  005067  005432                CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1841  006274  012767  000010  005426        MOV     #10,TEMP2
1842  006302  012777  000002  005322        MOV     #2,@DHBAR               ;SET BAR BIT FOR LINE 1
1843                                                                  ;TO START TRANSMISSION
1844  006310  105777  005304          2$:   TSTB    @DHSCR                  ;WAIT FOR RECEIVER
```

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1845
1846  006314  100412                          BMI     3$                      ;TO FINISH
1847  006316  005267  005402                  INC     TIME2                   ;UPDATE RECEIVER TIMER
1848  006322  005267  005400                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1849  006326  001370                          BNE     2$
1850  006330  005367  005374                  DEC     TEMP2
1851  006334  001365                          BNE     2$
1852  006336  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
1853  006340  000405                          BR      4$
1854  006342  026767  005356  005352  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
1855  006350  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1856                                                                          ;(NUMBER OF COUNTS IN TIME2
1857                                                                          ;LESS THAN TIME1)
1858  006352  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
1859                                                                          ;LINE 1
1860  006354  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1861  006356  016767  005342  005336          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1862  006364  005204                          INC     R4                      ;SELECT NEXT SPEED
1863  006366  062700  002100                  ADD     #2100,R0
1864  006372  005301                          DEC     R1
1865  006374  001317                          BNE     1$
1866  006376  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1867
1868                                          ;RECEIVER LINE SPEED SELECTION TEST
1869                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 2
1870                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
1871                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1872                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1873
1874  006400  012767  000340  171370  T23:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1875  006406  012767  000010  005252          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1876  006414  012767  006620  005240          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1877  006422  012767  006456  005234          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1878  006430  012705  000002                  MOV     #2,R5           ;LINE 2 WILL BE TESTED
1879  006434  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
1880                                                                          ;OF INITIAL (LOWEST) SPEED
1881  006440  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1882  006444  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1883  006450  012767  177777  005244          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1884  006456  012777  004000  005134  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1885  006464  010577  005130                  MOV     R5,@DHSCR               ;SELECT LINE 2 FOR TESTING
1886  006470  005077  005132                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1887  006474  012777  177777  005126          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
1888                                                                          ;1 CHARACTERS
1889  006502  010077  005116                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1890  006506  005067  005212                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
1891  006512  005067  005210                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1892  006516  012767  000010  005204          MOV     #10,TEMP2
1893  006524  012777  000004  005100          MOV     #4,@DHBAR               ;SET BAR BIT FOR LINE 2
1894                                                                          ;TO START TRANSMISSION
1895  006532  105777  005062          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
1896                                                                          ;TO FINISH
1897  006536  100412                          BMI     3$
1898  006540  005267  005160                  INC     TIME2                   ;UPDATE RECEIVER TIMER
1899  006544  005267  005156                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
1900  006550  001370                          BNE     2$
```

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 1901  006552  005367  005152                    DEC     TEMP2
 1902  006556  001365                            BNE     2$
 1903  006560  104001                            HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
 1904  006562  000405                            BR      4$
 1905  006564  026767  005134  005130  3$:       CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
 1906  006572  103401                            BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
 1907                                                                            ;(NUMBER OF COUNTS IN TIME2
 1908                                                                            ;LESS THAN TIME1)
 1909  006574  104002                            HLT     2                       ;RECEIVER TIMING ERROR FOR
 1910                                                                            ;LINE 2
 1911  006576  104410                  4$:       SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
 1912  006600  016767  005120  005114            MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
 1913  006606  005204                            INC     R4                      ;SELECT NEXT SPEED
 1914  006610  062700  002100                    ADD     #2100,R0
 1915  006614  005301                            DEC     R1
 1916  006616  001317                            BNE     1$
 1917  006620  104400                  5$:       SCOPE                           ;CHECK FOR ITERATIONS, LOOP
 1918
 1919                                            ;RECEIVER LINE SPEED SELECTION TEST
 1920                                            ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 3
 1921                                            ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
 1922                                            ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
 1923                                            ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
 1924
 1925  006622  012767  000340  171146  T24:      MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
 1926  006630  012767  000010  005030            MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
 1927  006636  012767  007042  005016            MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
 1928  006644  012767  006700  005012            MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
 1929  006652  012705  000003                    MOV     #3,R5           ;LINE 3 WILL BE TESTED
 1930  006656  012700  002100                    MOV     #2100,R0                ;CONSTANT FOR SELECTION
 1931                                                                            ;OF INITIAL (LOWEST) SPEED
 1932  006662  012701  000015                    MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
 1933  006666  012704  000001                    MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
 1934  006672  012767  177777  005022            MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
 1935  006700  012777  004000  004712  1$:       MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
 1936  006706  010577  004706                    MOV     R5,@DHSCR               ;SELECT LINE 3 FOR TESTING
 1937  006712  005077  004710                    CLR     @DHBA                   ;CLEAR BUS ADDRESS
 1938  006716  012777  177777  004704            MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
 1939                                                                            ;1 CHARACTERS
 1940  006724  010077  004674                    MOV     R0,@DHLPR               ;SELECT LINE SPEED
 1941  006730  005067  004770                    CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
 1942  006734  005067  004766                    CLR     TEMP1                   ;SET UP NO CLOCK TIMER
 1943  006740  012767  000010  004762            MOV     #10,TEMP2
 1944  006746  012777  000010  004656            MOV     #10,@DHBAR              ;SET BAR BIT FOR LINE 3
 1945                                                                            ;TO START TRANSMISSION
 1946  006754  105777  004640          2$:       TSTB    @DHSCR                  ;WAIT FOR RECEIVER
 1947                                                                            ;TO FINISH
 1948  006760  100412                            BMI     3$
 1949  006762  005267  004736                    INC     TIME2                   ;UPDATE RECEIVER TIMER
 1950  006766  005267  004734                    INC     TEMP1                   ;UPDATE NO CLOCK TIMER
 1951  006772  001370                            BNE     2$
 1952  006774  005367  004730                    DEC     TEMP2
 1953  007000  001365                            BNE     2$
 1954  007002  104001                            HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
 1955  007004  000405                            BR      4$
 1956  007006  026767  004712  004706  3$:       CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
```

```
1957  007014  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
1958                                                                          ;(NUMBER OF COUNTS IN TIME2
1959                                                                          ;LESS THAN TIME1)
1960  007016  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
1961                                                                          ;LINE 3
1962  007020  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
1963  007022  016767  004676  004672          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
1964  007030  005204                          INC     R4                      ;SELECT NEXT SPEED
1965  007032  062700  002100                  ADD     #2100,R0
1966  007036  005301                          DEC     R1
1967  007040  001317                          BNE     1$
1968  007042  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
1969
1970                                          ;RECEIVER LINE SPEED SELECTION TEST
1971                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 4
1972                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
1973                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
1974                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
1975
1976  007044  012767  000340  170724  T25:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1977  007052  012767  000010  004606          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
1978  007060  012767  007264  004574          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
1979  007066  012767  007122  004570          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
1980  007074  012705  000004                  MOV     #4,R5           ;LINE 4 WILL BE TESTED
1981  007100  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
1982                                                                          ;OF INITIAL (LOWEST) SPEED
1983  007104  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
1984  007110  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
1985  007114  012767  177777  004600          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
1986  007122  012777  004000  004470  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
1987  007130  010577  004464                  MOV     R5,@DHSCR               ;SELECT LINE 4 FOR TESTING
1988  007134  005077  004466                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
1989  007140  012777  177777  004462          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
1990                                                                          ;1 CHARACTERS
1991  007146  010077  004452                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
1992  007152  005067  004546                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
1993  007156  005067  004544                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
1994  007162  012767  000010  004540          MOV     #10,TEMP2
1995  007170  012777  000020  004434          MOV     #20,@DHBAR              ;SET BAR BIT FOR LINE 4
1996                                                                          ;TO START TRANSMISSION
1997  007176  105777  004416          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
1998                                                                          ;TO FINISH
1999  007202  100412                          BMI     3$
2000  007204  005267  004514                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2001  007210  005267  004512                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
2002  007214  001370                          BNE     2$
2003  007216  005367  004506                  DEC     TEMP2
2004  007222  001365                          BNE     2$
2005  007224  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2006  007226  000405                          BR      4$
2007  007230  026767  004470  004464  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
2008  007236  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2009                                                                          ;(NUMBER OF COUNTS IN TIME2
2010                                                                          ;LESS THAN TIME1)
2011  007240  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
2012                                                                          ;LINE 4
```

```
2013  007242  104410                    4$:   SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2014  007244  016767  004454  004450          MOV   TIME2,TIME1               ;SET UP FOR NEXT COMPARISION
2015  007252  005204                          INC   R4                        ;SELECT NEXT SPEED
2016  007254  062700  002100                  ADD   #2100,R0
2017  007260  005301                          DEC   R1
2018  007262  001317                          BNE   1$
2019  007264  104400                    5$:   SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2020
2021                                        ;RECEIVER LINE SPEED SELECTION TEST
2022                                        ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 5
2023                                        ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2024                                        ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2025                                        ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2026
2027  007266  012767  000340  170502  T26:  MOV   #340,PS                      ;DISABLE ALL INTERRUPTS
2028  007274  012767  000010  004364        MOV   #10,ICOUNT                  ;SET UP FOR 10 ITERATIONS
2029  007302  012767  007506  004352        MOV   #5$,ESCAPE                  ;SET UP TO ESCAPE TO NEXT TEST
2030  007310  012767  007344  004346        MOV   #1$,FREEZ1                  ;SET UP TO LOOP WITH DATA
2031  007316  012705  000005                MOV   #5,R5           ;LINE 5 WILL BE TESTED
2032  007322  012700  002100                MOV   #2100,R0                    ;CONSTANT FOR SELECTION
2033                                                                          ;OF INITIAL (LOWEST) SPEED
2034  007326  012701  000015                MOV   #15,R1                      ;15 DIFFERENT SPEEDS WILL BE TESTED
2035  007332  012704  000001                MOV   #1,R4                       ;BINARY CODE FOR INITIAL SPEED
2036  007336  012767  177777  004356        MOV   #-1,TIME1                   ;INITIALIZE COMPARISION VALUE
2037  007344  012777  004000  004246  1$:   MOV   #BIT11,@DHSCR               ;CLEAR INTERFACE
2038  007352  010577  004242                MOV   R5,@DHSCR                   ;SELECT LINE 5 FOR TESTING
2039  007356  005077  004244                CLR   @DHBA                       ;CLEAR BUS ADDRESS
2040  007362  012777  177777  004240        MOV   #-1,@DHBC                   ;SET UP TO TRANSMIT
2041                                                                          ;1 CHARACTERS
2042  007370  010077  004230                MOV   R0,@DHLPR                   ;SELECT LINE SPEED
2043  007374  005067  004324                CLR   TIME2                       ;CLEAR RECEIVER TIME TIMER
2044  007400  005067  004322                CLR   TEMP1                       ;SET UP NO CLOCK TIMER
2045  007404  012767  000010  004316        MOV   #10,TEMP2
2046  007412  012777  000040  004212        MOV   #40,@DHBAR                  ;SET BAR BIT FOR LINE 5
2047                                                                          ;TO START TRANSMISSION
2048  007420  105777  004174          2$:   TSTB  @DHSCR                      ;WAIT FOR RECEIVER
2049                                                                          ;TO FINISH
2050  007424  100412                        BMI   3$
2051  007426  005267  004272                INC   TIME2                       ;UPDATE RECEIVER TIMER
2052  007432  005267  004270                INC   TEMP1                       ;UPDATE NO CLOCK TIMER
2053  007436  001370                        BNE   2$
2054  007440  005367  004264                DEC   TEMP2
2055  007444  001365                        BNE   2$
2056  007446  104001                        HLT   !                           ;RECEIVER DID NOT FINISH, ERROR
2057  007450  000405                        BR    4$
2058  007452  026767  004246  004242  3$:   CMP   TIME2,TIME1                 ;VERIFY THAT RECEIVER
2059  007460  103401                        BLO   4$                          ;WAS FASTER AT THIS SELECTED SPEED
2060                                                                          ;(NUMBER OF COUNTS IN TIME2
2061                                                                          ;LESS THAN TIME1)
2062  007462  104002                        HLT   2                           ;RECEIVER TIMING ERROR FOR
2063                                                                          ;LINE 5
2064  007464  104410                    4$:   SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2065  007466  016767  004232  004226        MOV   TIME2,TIME1                 ;SET UP FOR NEXT COMPARISION
2066  007474  005204                        INC   R4                          ;SELECT NEXT SPEED
2067  007476  062700  002100                ADD   #2100,R0
2068  007502  005301                        DEC   R1
```

```
2069  007504  001317                        BNE     1$
2070  007506  104400              5$:       SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2071
2072                                        ;RECEIVER LINE SPEED SELECTION TEST
2073                                        ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 6
2074                                        ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2075                                        ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2076                                        ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2077
2078  007510  012767  000340  170260  T27:  MOV     #340,PS                   ;DISABLE ALL INTERRUPTS
2079  007516  012767  000010  004142        MOV     #10,ICOUNT                ;SET UP FOR 10 ITERATIONS
2080  007524  012767  007730  004130        MOV     #5$,ESCAPE                ;SET UP TO ESCAPE TO NEXT TEST
2081  007532  012767  007566  004124        MOV     #1$,FREEZ1                ;SET UP TO LOOP WITH DATA
2082  007540  012705  000006                MOV     #6,R5           ;LINE 6 WILL BE TESTED
2083  007544  012700  002100                MOV     #2100,R0                  ;CONSTANT FOR SELECTION
2084                                                                          ;OF INITIAL (LOWEST) SPEED
2085  007550  012701  000015                MOV     #15,R1                    ;15 DIFFERENT SPEEDS WILL BE TESTED
2086  007554  012704  000001                MOV     #1,R4                     ;BINARY CODE FOR INITIAL SPEED
2087  007560  012767  177777  004134        MOV     #-1,TIME1                 ;INITIALIZE COMPARISION VALUE
2088  007566  012777  004000  004024  1$:   MOV     #BIT11,@DHSCR             ;CLEAR INTERFACE
2089  007574  010577  004020                MOV     R5,@DHSCR                 ;SELECT LINE 6 FOR TESTING
2090  007600  005077  004022                CLR     @DHBA                     ;CLEAR BUS ADDRESS
2091  007604  012777  177777  004016        MOV     #-1,@DHBC                 ;SET UP TO TRANSMIT
2092                                                                          ;1 CHARACTERS
2093  007612  010077  004006                MOV     R0,@DHLPR                 ;SELECT LINE SPEED
2094  007616  005067  004102                CLR     TIME2                     ;CLEAR RECEIVER TIME TIMER
2095  007622  005067  004100                CLR     TEMP1                     ;SET UP NO CLOCK TIMER
2096  007626  012767  000010  004074        MOV     #10,TEMP2
2097  007634  012777  000100  003770        MOV     #100,@DHBAR               ;SET BAR BIT FOR LINE 6
2098                                                                          ;TO START TRANSMISSION
2099  007642  105777  003752          2$:   TSTB    @DHSCR                    ;WAIT FOR RECEIVER
2100                                                                          ;TO FINISH
2101  007646  100412                        BMI     3$
2102  007650  005267  004050                INC     TIME2                     ;UPDATE RECEIVER TIMER
2103  007654  005267  004046                INC     TEMP1                     ;UPDATE NO CLOCK TIMER
2104  007660  001370                        BNE     2$
2105  007662  005367  004042                DEC     TEMP2
2106  007666  001365                        BNE     2$
2107  007670  104001                        HLT     1                         ;RECEIVER DID NOT FINISH, ERROR
2108  007672  000405                        BR      4$
2109  007674  026767  004024  004020  3$:   CMP     TIME2,TIME1               ;VERIFY THAT RECEIVER
2110  007702  103401                        BLO     4$                        ;WAS FASTER AT THIS SELECTED SPEED
2111                                                                          ;(NUMBER OF COUNTS IN TIME2
2112                                                                          ;LESS THAN TIME1)
2113  007704  104002                        HLT     2                         ;RECEIVER TIMING ERROR FOR
2114                                                                          ;LINE 6
2115  007706  104410                4$:     SCOPE1                            ;CHECK FOR FREEZE ON CURRENT DATA
2116  007710  016767  004010  004004        MOV     TIME2,TIME1               ;SET UP FOR NEXT COMPARISION
2117  007716  005204                        INC     R4                        ;SELECT NEXT SPEED
2118  007720  062700  002100                ADD     #2100,R0
2119  007724  005301                        DEC     R1
2120  007726  001317                        BNE     1$
2121  007730  104400                5$:     SCOPE                             ;CHECK FOR ITERATIONS, LOOP
2122
2123                                        ;RECEIVER LINE SPEED SELECTION TEST
2124                                        ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 7
```

```
2125                                            ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2126                                            ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2127                                            ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2128
2129  007732  012767  000340  170036  T30:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
2130  007740  012767  000010  003720          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2131  007746  012767  010152  003706          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2132  007754  012767  010010  003702          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2133  007762  012705  000007                  MOV     #7,R5           ;LINE 7 WILL BE TESTED
2134  007766  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
2135                                                                          ;OF INITIAL (LOWEST) SPEED
2136  007772  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2137  007776  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2138  010002  012767  177777  003712          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2139  010010  012777  004000  003602  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
2140  010016  010577  003576                  MOV     R5,@DHSCR               ;SELECT LINE 7 FOR TESTING
2141  010022  005077  003600                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
2142  010026  012777  177777  003574          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
2143                                                                          ;1 CHARACTERS
2144  010034  010077  003564                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
2145  010040  005067  003660                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
2146  010044  005067  003656                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
2147  010050  012767  000010  003652          MOV     #10,TEMP2
2148  010056  012777  000200  003546          MOV     #200,@DHBAR             ;SET BAR BIT FOR LINE 7
2149                                                                          ;TO START TRANSMISSION
2150  010064  105777  003530          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
2151                                                                          ;TO FINISH
2152  010070  100412                          BMI     3$
2153  010072  005267  003626                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2154  010076  005267  003624                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
2155  010102  001370                          BNE     2$
2156  010104  005367  003620                  DEC     TEMP2
2157  010110  001365                          BNE     2$
2158  010112  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2159  010114  000405                          BR      4$
2160  010116  026767  003602  003576  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
2161  010124  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2162                                                                          ;(NUMBER OF COUNTS IN TIME2
2163                                                                          ;LESS THAN TIME1)
2164  010126  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
2165                                                                          ;LINE 7
2166  010130  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2167  010132  016767  003566  003562          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
2168  010140  005204                          INC     R4                      ;SELECT NEXT SPEED
2169  010142  062700  002100                  ADD     #2100,R0
2170  010146  005301                          DEC     R1
2171  010150  001317                          BNE     1$
2172  010152  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2173
2174                                          ;RECEIVER LINE SPEED SELECTION TEST
2175                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 10
2176                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2177                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2178                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2179
2180  010154  012767  000340  167614  T31:    MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
```

```
2181  010162  012767  000010  003476          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2182  010170  012767  010374  003464          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2183  010176  012767  010232  003460          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2184  010204  012705  000010                  MOV     #10,R5          ;LINE 10 WILL BE TESTED
2185  010210  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
2186                                                                          ;OF INITIAL (LOWEST) SPEED
2187  010214  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2188  010220  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2189  010224  012767  177777  003470          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2190  010232  012777  004000  003360  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
2191  010240  010577  003354                  MOV     R5,@DHSCR               ;SELECT LINE 10 FOR TESTING
2192  010244  005077  003356                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
2193  010250  012777  177777  003352          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
2194                                                                          ;1 CHARACTERS
2195  010256  010077  003342                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
2196  010262  005067  003436                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
2197  010266  005067  003434                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
2198  010272  012767  000010  003430          MOV     #10,TEMP2
2199  010300  012777  000400  003324          MOV     #400,@DHBAR             ;SET BAR BIT FOR LINE 10
2200                                                                          ;TO START TRANSMISSION
2201  010306  105777  003306          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
2202                                                                          ;TO FINISH
2203  010312  100412                          BMI     3$
2204  010314  005267  003404                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2205  010320  005267  003402                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
2206  010324  001370                          BNE     2$
2207  010326  005367  003376                  DEC     TEMP2
2208  010332  001365                          BNE     2$
2209  010334  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2210  010336  000405                          BR      4$
2211  010340  026767  003360  003354  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
2212  010346  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2213                                                                          ;(NUMBER OF COUNTS IN TIME2
2214                                                                          ;LESS THAN TIME1)
2215  010350  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
2216                                                                          ;LINE 10
2217  010352  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2218  010354  016767  003344  003340          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
2219  010362  005204                          INC     R4                      ;SELECT NEXT SPEED
2220  010364  062700  002100                  ADD     #2100,R0
2221  010370  005301                          DEC     R1
2222  010372  001317                          BNE     1$
2223  010374  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2224
2225                                          ;RECEIVER LINE SPEED SELECTION TEST
2226                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 11
2227                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2228                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2229                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2230
2231  010376  012767  000340  167372  T32:     MOV     #340,@#177572           ;DISABLE ALL INTERRUPTS
2232  010404  012767  000010  003254          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2233  010412  012767  010616  003242          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2234  010420  012767  010454  003236          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2235  010426  012705  000011                  MOV     #11,R5          ;LINE 11 WILL BE TESTED
2236  010432  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
```

```
2237
2238  010436  012701  000015                    MOV     #15,R1          ;OF INITIAL (LOWEST) SPEED
2239  010442  012704  000001                    MOV     #1,R4           ;15 DIFFERENT SPEEDS WILL BE TESTED
2240  010446  012767  177777  003246            MOV     #-1,TIME1       ;BINARY CODE FOR INITIAL SPEED
2241  010454  012777  004000  003136  1$:       MOV     #BIT11,@DHSCR   ;INITIALIZE COMPARISION VALUE
2242  010462  010577  003132                    MOV     R5,@DHSCR       ;CLEAR INTERFACE
2243  010466  005077  003134                    CLR     @DHBA           ;SELECT LINE 11 FOR TESTING
2244  010472  012777  177777  003130            MOV     #-1,@DHBC       ;CLEAR BUS ADDRESS
2245                                                                    ;SET UP TO TRANSMIT
2246  010500  010077  003120                    MOV     R0,@DHLPR       ;1 CHARACTERS
2247  010504  005067  003214                    CLR     TIME2           ;SELECT LINE SPEED
2248  010510  005067  003212                    CLR     TEMP1           ;CLEAR RECEIVER TIME TIMER
2249  010514  012767  000010  003206            MOV     #10,TEMP2       ;SET UP NO CLOCK TIMER
2250  010522  012777  001000  003102            MOV     #1000,@DHBAR

2251                                                                    ;SET BAR BIT FOR LINE 11
2252  010530  105777  003064          2$:       TSTB    @DHSCR          ;TO START TRANSMISSION
2253                                                                    ;WAIT FOR RECEIVER
2254  010534  100412                            BMI     3$              ;TO FINISH

2255  010536  005267  003162                    INC     TIME2           ;UPDATE RECEIVER TIMER
2256  010542  005267  003160                    INC     TEMP1           ;UPDATE NO CLOCK TIMER
2257  010546  001370                            BNE     2$
2258  010550  005367  003154                    DEC     TEMP2
2259  010554  001365                            BNE     2$
2260  010556  104001                            HLT     1               ;RECEIVER DID NOT FINISH, ERROR
2261  010560  000405                            BR      4$
2262  010562  026767  003136  003132  3$:       CMP     TIME2,TIME1     ;VERIFY THAT RECEIVER
2263  010570  103401                            BLO     4$              ;WAS FASTER AT THIS SELECTED SPEED
2264                                                                    ;(NUMBER OF COUNTS IN TIME2
2265                                                                    ;LESS THAN TIME1)
2266  010572  104002                            HLT     2               ;RECEIVER TIMING ERROR FOR
2267                                                                    ;LINE 11
2268  010574  104410                  4$:       SCOPE1                  ;CHECK FOR FREEZE ON CURRENT DATA
2269  010576  016767  003122  003116            MOV     TIME2,TIME1     ;SET UP FOR NEXT COMPARISION
2270  010604  005204                            INC     R4              ;SELECT NEXT SPEED
2271  010606  062700  002100                    ADD     #2100,R0
2272  010612  005301                            DEC     R1
2273  010614  001317                            BNE     1$
2274  010616  104400                  5$:       SCOPE                   ;CHECK FOR ITERATIONS, LOOP
2275
2276                                    ;RECEIVER LINE SPEED SELECTION TEST
2277                                    ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 12
2278                                    ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2279                                    ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2280                                    ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2281
2282  010620  012767  000340  167150  T33:      MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
2283  010626  012767  000010  003032            MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2284  010634  012767  011040  003020            MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2285  010642  012767  010676  003014            MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2286  010650  012705  000012                    MOV     #12,R5          ;LINE 12 WILL BE TESTED
2287  010654  012700  002100                    MOV     #2100,R0                ;CONSTANT FOR SELECTION
2288                                                                    ;OF INITIAL (LOWEST) SPEED
2289  010660  012701  000015                    MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2290  010664  012704  000001                    MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2291  010670  012767  177777  003024            MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2292  010676  012777  004000  002714  1$:       MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
```

```
2293  010704  010577  002710                MOV     R5,@DHSCR       ;SELECT LINE 12 FOR TESTING
2294  010710  005077  002712                CLR     @DHBA           ;CLEAR BUS ADDRESS
2295  010714  012777  177777  002706        MOV     #-1,@DHBC       ;SET UP TO TRANSMIT
2296                                                                  ;1 CHARACTERS
2297  010722  010077  002676                MOV     R0,@DHLPR       ;SELECT LINE SPEED
2298  010726  005067  002772                CLR     TIME2           ;CLEAR RECEIVER TIME TIMER
2299  010732  005067  002770                CLR     TEMP1           ;SET UP NO CLOCK TIMER
2300  010736  012767  000010  002764        MOV     #10,TEMP2
2301  010744  012777  002000  002660        MOV     #2000,@DHBAR    ;SET BAR BIT FOR LINE 12
2302                                                                  ;TO START TRANSMISSION
2303  010752  105777  002642        2$:     TSTB    @DHSCR          ;WAIT FOR RECEIVER
2304                                                                  ;TO FINISH
2305  010756  100412                BMI     3$
2306  010760  005267  002740                INC     TIME2           ;UPDATE RECEIVER TIMER
2307  010764  005267  002736                INC     TEMP1           ;UPDATE NO CLOCK TIMER
2308  010770  001370                BNE     2$
2309  010772  005367  002732                DEC     TEMP2
2310  010776  001365                BNE     2$
2311  011000  104001                HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2312  011002  000405                BR      4$
2313  011004  026767  002714  002710  3$:   CMP     TIME2,TIME1     ;VERIFY THAT RECEIVER
2314  011012  103401                BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2315                                                                  ;(NUMBER OF COUNTS IN TIME2
2316                                                                  ;LESS THAN TIME1)
2317  011014  104002                HLT     2                       ;RECEIVER TIMING ERROR FOR
2318                                                                  ;LINE 12
2319  011016  104410                4$:     SCOPE1                  ;CHECK FOR FREEZE ON CURRENT DATA
2320  011020  016767  002700  002674        MOV     TIME2,TIME1     ;SET UP FOR NEXT COMPARISION
2321  011026  005204                INC     R4                      ;SELECT NEXT SPEED
2322  011030  062700  002100                ADD     #2100,R0
2323  011034  005301                DEC     R1
2324  011036  001317                BNE     1$
2325  011040  104400                5$:     SCOPE                   ;CHECK FOR ITERATIONS, LOOP
2326
2327                                ;RECEIVER LINE SPEED SELECTION TEST
2328                                ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 13
2329                                ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2330                                ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2331                                ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2332
2333  011042  012767  000340  166726  T34:   MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
2334  011050  012767  000010  002610        MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2335  011056  012767  011262  002576        MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2336  011064  012767  011120  002572        MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2337  011072  012705  000013                MOV     #13,R5          ;LINE 13 WILL BE TESTED
2338  011076  012700  002100                MOV     #2100,R0                ;CONSTANT FOR SELECTION
2339                                                                  ;OF INITIAL (LOWEST) SPEED
2340  011102  012701  000015                MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2341  011106  012704  000001                MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2342  011112  012767  177777  002602        MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2343  011120  012777  004000  002472  1$:   MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
2344  011126  010577  002466                MOV     R5,@DHSCR               ;SELECT LINE 13 FOR TESTING
2345  011132  005077  002470                CLR     @DHBA                   ;CLEAR BUS ADDRESS
2346  011136  012777  177777  002464        MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
2347                                                                  ;1 CHARACTERS
2348  011144  010077  002454                MOV     R0,@DHLPR               ;SELECT LINE SPEED
```

```
2349  011150  005067  002550                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
2350  011154  005067  002546                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
2351  011160  012767  000010  002542          MOV     #10,TEMP2
2352  011166  012777  004000  002436          MOV     #4000,@DHBAR            ;SET BAR BIT FOR LINE 13
2353                                                                          ;TO START TRANSMISSION
2354  011174  105777  002420          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
2355                                                                          ;TO FINISH
2356  011200  100412                          BMI     3$
2357  011202  005267  002516                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2358  011206  005267  002514                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
2359  011212  001370                          BNE     2$
2360  011214  005367  002510                  DEC     TEMP2
2361  011220  001365                          BNE     2$
2362  011222  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2363  011224  000405                          BR      4$
2364  011226  026767  002472  002466  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
2365  011234  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2366                                                                          ;(NUMBER OF COUNTS IN TIME2
2367                                                                          ;LESS THAN TIME1)
2368  011236  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
2369                                                                          ;LINE 13
2370  011240  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2371  011242  016767  002456  002452          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
2372  011250  005204                          INC     R4                      ;SELECT NEXT SPEED
2373  011252  062700  002100                  ADD     #2100,R0
2374  011256  005301                          DEC     R1
2375  011260  001317                          BNE     1$
2376  011262  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2377
2378                                          ;RECEIVER LINE SPEED SELECTION TEST
2379                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 14
2380                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2381                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2382                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2383
2384  011264  012767  000340  166504  T35:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
2385  011272  012767  000010  002366          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2386  011300  012767  011504  002354          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2387  011306  012767  011342  002350          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2388  011314  012705  000014                  MOV     #14,R5          ;LINE 14 WILL BE TESTED
2389  011320  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
2390                                                                          ;OF INITIAL (LOWEST) SPEED
2391  011324  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2392  011330  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2393  011334  012767  177777  002360          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2394  011342  012777  004000  002250  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
2395  011350  010577  002244                  MOV     R5,@DHSCR               ;SELECT LINE 14 FOR TESTING
2396  011354  005077  002246                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
2397  011360  012777  177777  002242          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
2398                                                                          ;1 CHARACTERS
2399  011366  010077  002232                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
2400  011372  005067  002326                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
2401  011376  005067  002324                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
2402  011402  012767  000010  002320          MOV     #10,TEMP2
2403  011410  012777  010000  002214          MOV     #10000,@DHBAR           ;SET BAR BIT FOR LINE 14
2404                                                                          ;TO START TRANSMISSION
```

```
2405  011416  105777  002176          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
2406                                                                          ;TO FINISH
2407  011422  100412                          BMI     3$
2408  011424  005267  002274                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2409  011430  005267  002272                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
2410  011434  001370                          BNE     2$
2411  011436  005367  002266                  DEC     TEMP2
2412  011442  001365                          BNE     2$
2413  011444  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2414  011446  000405                          BR      4$
2415  011450  026767  002250  002244  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
2416  011456  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2417                                                                          ;(NUMBER OF COUNTS IN TIME2
2418                                                                          ;LESS THAN TIME1)
2419  011460  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
2420                                                                          ;LINE 14
2421  011462  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2422  011464  016767  002234  002230          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
2423  011472  005204                          INC     R4                      ;SELECT NEXT SPEED
2424  011474  062700  002100                  ADD     #2100,R0
2425  011500  005301                          DEC     R1
2426  011502  001317                          BNE     1$
2427  011504  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2428
2429                                          ;RECEIVER LINE SPEED SELECTION TEST
2430                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 15
2431                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2432                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2433                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2434
2435  011506  012767  000340  166262  T3E:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
2436  011514  012767  000010  002144          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2437  011522  012767  011726  002132          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2438  011530  012767  011564  002126          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2439  011536  012705  000015                  MOV     #15,R5          ;LINE 15 WILL BE TESTED
2440  011542  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
2441                                                                          ;OF INITIAL (LOWEST) SPEED
2442  011546  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2443  011552  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2444  011556  012767  177777  002136          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2445  011564  012777  004000  002026  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
2446  011572  010577  002022                  MOV     R5,@DHSCR               ;SELECT LINE 15 FOR TESTING
2447  011576  005077  002024                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
2448  011602  012777  177777  002020          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
2449                                                                          ;1 CHARACTERS
2450  011610  010077  002010                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
2451  011614  005067  002104                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
2452  011620  005067  002102                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
2453  011624  012767  000010  002076          MOV     #10,TEMP2
2454  011632  012777  020000  001772          MOV     #20000,@DHBAR           ;SET BAR BIT FOR LINE 15
2455                                                                          ;TO START TRANSMISSION
2456  011640  105777  001754          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
2457                                                                          ;TO FINISH
2458  011644  100412                          BMI     3$
2459  011646  005267  002052                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2460  011652  005267  002050                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
```

```
2461  011656  001370                          BNE     2$
2462  011660  005367  002044                  DEC     TEMP2
2463  011664  001365                          BNE     2$
2464  011666  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2465  011670  000405                          BR      4$
2466  011672  026767  002026  002022  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
2467  011700  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
2468                                                                          ;(NUMBER OF COUNTS IN TIME2
2469                                                                          ;LESS THAN TIME1)
2470  011702  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
2471                                                                          ;LINE 15
2472  011704  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
2473  011706  016767  002012  002006          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
2474  011714  005204                          INC     R4                      ;SELECT NEXT SPEED
2475  011716  062700  002100                  ADD     #2100,R0
2476  011722  005301                          DEC     R1
2477  011724  001317                          BNE     1$
2478  011726  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
2479
2480                                          ;RECEIVER LINE SPEED SELECTION TEST
2481                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 16
2482                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
2483                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
2484                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
2485
2486  011730  012767  000340  166040  T37:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
2487  011736  012767  000010  001722          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
2488  011744  012767  012150  001710          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
2489  011752  012767  012006  001704          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
2490  011760  012705  000016                  MOV     #16,R5          ;LINE 16 WILL BE TESTED
2491  011764  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
2492                                                                          ;OF INITIAL (LOWEST) SPEED
2493  011770  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
2494  011774  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
2495  012000  012767  177777  001714          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
2496  012006  012777  004000  001604  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
2497  012014  010577  001600                  MOV     R5,@DHSCR               ;SELECT LINE 16 FOR TESTING
2498  012020  005077  001602                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
2499  012024  012777  177777  001576          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
2500                                                                          ;1 CHARACTERS
2501  012032  010077  001566                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
2502  012036  005067  001662                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
2503  012042  005067  001660                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
2504  012046  012767  000010  001654          MOV     #10,TEMP2
2505  012054  012777  040000  001550          MOV     #40000,@DHBAR           ;SET BAR BIT FOR LINE 16
2506                                                                          ;TO START TRANSMISSION
2507  012062  105777  001532          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
2508                                                                          ;TO FINISH
2509  012066  100412                          BMI     3$
2510  012070  005267  001630                  INC     TIME2                   ;UPDATE RECEIVER TIMER
2511  012074  005267  001626                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
2512  012100  001370                          BNE     2$
2513  012102  005367  001622                  DEC     TEMP2
2514  012106  001365                          BNE     2$
2515  012110  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
2516  012112  000405                          BR      4$
```

```
 2517  012114  026767  001604  001600  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
 2518  012122  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
 2519                                                                          ;(NUMBER OF COUNTS IN TIME2
 2520                                                                          ;LESS THAN TIME1)
 2521  012124  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
 2522                                                                          ;LINE 16
 2523  012126  104410                  4$:     SCOPE1                          ;CHECK FOR FREEZE ON CURRENT DATA
 2524  012130  016767  001570  001564          MOV     TIME2,TIME1             ;SET UP FOR NEXT COMPARISION
 2525  012136  005204                          INC     R4                      ;SELECT NEXT SPEED
 2526  012140  062700  002100                  ADD     #2100,R0
 2527  012144  005301                          DEC     R1
 2528  012146  001317                          BNE     1$
 2529  012150  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
 2530
 2531                                          ;RECEIVER LINE SPEED SELECTION TEST
 2532                                          ;TRANSMIT 1 CHARACTERS AT A SELECTED SPEED ON LINE 17
 2533                                          ;VERIFY THAT RECEIVER DONE OCCURS AT THE SELECTED SPEED
 2534                                          ;VERIFY THAT THE AMOUN OF TIME TAKEN IS LESS
 2535                                          ;AT THIS SPEED THAN AT THE PREVIOUSLY SELECTED SPEED
 2536
 2537  012152  012767  000340  165616  T40:     MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
 2538  012160  012767  000010  001500          MOV     #10,ICOUNT              ;SET UP FOR 10 ITERATIONS
 2539  012166  012767  012372  001466          MOV     #5$,ESCAPE              ;SET UP TO ESCAPE TO NEXT TEST
 2540  012174  012767  012230  001462          MOV     #1$,FREEZ1              ;SET UP TO LOOP WITH DATA
 2541  012202  012705  000017                  MOV     #17,R5          ;LINE 17 WILL BE TESTED
 2542  012206  012700  002100                  MOV     #2100,R0                ;CONSTANT FOR SELECTION
 2543                                                                          ;OF INITIAL (LOWEST) SPEED
 2544  012212  012701  000015                  MOV     #15,R1                  ;15 DIFFERENT SPEEDS WILL BE TESTED
 2545  012216  012704  000001                  MOV     #1,R4                   ;BINARY CODE FOR INITIAL SPEED
 2546  012222  012767  177777  001472          MOV     #-1,TIME1               ;INITIALIZE COMPARISION VALUE
 2547  012230  012777  004000  001362  1$:     MOV     #BIT11,@DHSCR           ;CLEAR INTERFACE
 2548  012236  010577  001356                  MOV     R5,@DHSCR               ;SELECT LINE 17 FOR TESTING
 2549  012242  005077  001360                  CLR     @DHBA                   ;CLEAR BUS ADDRESS
 2550  012246  012777  177777  001354          MOV     #-1,@DHBC               ;SET UP TO TRANSMIT
 2551                                                                          ;1 CHARACTERS
 2552  012254  010077  001344                  MOV     R0,@DHLPR               ;SELECT LINE SPEED
 2553  012260  005067  001440                  CLR     TIME2                   ;CLEAR RECEIVER TIME TIMER
 2554  012264  005067  001436                  CLR     TEMP1                   ;SET UP NO CLOCK TIMER
 2555  012270  012767  000010  001432          MOV     #10,TEMP2
 2556  012276  012777  100000  001326          MOV     #100000,@DHBAR          ;SET BAR BIT FOR LINE 17
 2557                                                                          ;TO START TRANSMISSION
 2558  012304  105777  001310          2$:     TSTB    @DHSCR                  ;WAIT FOR RECEIVER
 2559                                                                          ;TO FINISH
 2560  012310  100412                          BMI     3$
 2561  012312  005267  001406                  INC     TIME2                   ;UPDATE RECEIVER TIMER
 2562  012316  005267  001404                  INC     TEMP1                   ;UPDATE NO CLOCK TIMER
 2563  012322  001370                          BNE     2$
 2564  012324  005367  001400                  DEC     TEMP2
 2565  012330  001365                          BNE     2$
 2566  012332  104001                          HLT     1                       ;RECEIVER DID NOT FINISH, ERROR
 2567  012334  000405                          BR      4$
 2568  012336  026767  001362  001356  3$:     CMP     TIME2,TIME1             ;VERIFY THAT RECEIVER
 2569  012344  103401                          BLO     4$                      ;WAS FASTER AT THIS SELECTED SPEED
 2570                                                                          ;(NUMBER OF COUNTS IN TIME2
 2571                                                                          ;LESS THAN TIME1)
 2572  012346  104002                          HLT     2                       ;RECEIVER TIMING ERROR FOR
```

```
 2573
 2574  012350  104410                  4$:     SCOPE1                          ;LINE 17
 2575  012352  016767  001346  001342          MOV     TIME2,TIME1             ;CHECK FOR FREEZE ON CURRENT DATA
 2576  012360  005204                          INC     R4                      ;SET UP FOR NEXT COMPARISION
 2577  012362  062700  002100                  ADD     #2100,R0                ;SELECT NEXT SPEED
 2578  012366  005301                          DEC     R1
 2579  012370  001317                          BNE     1$
 2580  012372  104400                  5$:     SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
2581
2582                                            ;END OF PASS
2583                                            ;TYPE NAME OF TEST
2584                                            ;UPDATE PASS COUNT
2585                                            ;CHECK FOR EXIT TO ACT-11
2586                                            ;RESTART TEST
2587
2588  012374  104401                  EOP:      TYPE                                ;TYPE NAME OF TEST
2589  012376  014316                            MEPASS
2590  012400  005067  001312                   CLR       LAST                      ;CLEAR LAST ERROR PC
2591  012404  005067  001242                   CLR       ERRFLG                    ;CLEAR ERROR FLAG
2592  012410  005267  001240                   INC       PASCNT                    ;UPDATE PASS COUNT
2593  012414  016767  001234  165146           MOV       PASCNT,LIGHTS             ;DISPLAY PASS COUNT
2594  012422  013701  000042                   MOV       @#42,R1                   ;CHECK FOR ACT-11 OR DDP
2595  012426  001405                           BEQ       RESTRT                    ;IF NOT, CONTINUE TESTING
2596  012430  000005                           RESET
2597  012432  004711                  LOGICAL:           JSR       PC,(R1)
2598  012434  000240                           NOP
2599  012436  000240                           NOP
2600  012440  000240                           NOP
2601  012442  000167  166534           RESTRT: JMP       BEGIN
2602
2603                                            ;CHECK FOR LOOP ON CURRENT TEST
2604                                            ;CHECK FOR ITERATION SUPPRESSION
2605
2606  012446  032767  002000  165114   SCOPER: BIT       #SW10,SWR
2607  012454  001030                           BNE       4$
2608  012456  032767  040000  165104   1$:     BIT       #SW14,SWR
2609  012464  001021                           BNE       3$
2610  012466  032767  004000  165074           BIT       #SW11,SWR
2611  012474  001006                           BNE       2$
2612  012476  005267  001166                   INC       LPCNT
2613  012502  026767  001162  001156           CMP       LPCNT,ICOUNT
2614  012510  001007                           BNE       3$
2615  012512  005067  001152           2$:     CLR       LPCNT
2616  012516  005067  001130                   CLR       ERRFLG
2617  012522  011667  001132                   MOV       (SP),RETURN
2618  012526  000002                           RTI
2619  012530  016716  001124           3$:     MOV       RETURN,(SP)
2620  012534  000002                           RTI
2621  012536  005767  001110           4$:     TST       ERRFLG
2622  012542  001745                           BEQ       1$
2623  012544  000762                           BR        2$
2624
2625                                            ;CHECK FOR FREEZE ON CURRENT DATA
2626
2627  012546  032767  001000  165014   SCOP1R: BIT       #SW09,SWR
2628  012554  001402                           BEQ       1$
2629  012556  016716  001102                   MOV       FREEZ1,(SP)
2630  012562  000002           1$:     RTI
```

```
 2631
 2632                                                   ;ERROR HANDLER
 2633
 2634  012564  032767  020000  164776  ERRORS: BIT     #SW13,SWR
 2635  012572  001051                          BNE     HALTS
 2636  012574  021667  001116                  CMP     (SP),LAST
 2637  012600  001404                          BEQ     1$
 2638  012602  011667  001110                  MOV     (SP),LAST
 2639  012606  005067  001040                  CLR     ERRFLG
 2640  012612  104406                  1$:     SAVOSP
 2641  012614  011605                          MOV     (SP),R5
 2642  012616  162705  000002                  SUB     #2,R5
 2643  012622  011504                          MOV     (R5),R4
 2644  012624  006304                          ASL     R4
 2645  012626  006304                          ASL     R4
 2646  012630  042704  177001                  BIC     #177001,R4
 2647  012634  062704  014506                  ADD     #ERRTAB,R4
 2648  012640  012467  000034                  MOV     (R4)+,ERRMSG
 2649  012644  011467  000042                  MOV     (R4),DATABP
 2650  012650  005767  000776                  TST     ERRFLG
 2651  012654  001403                          BEQ     TYPMSG
 2652  012656  005767  000030                  TST     DATABP
 2653  012662  001007                          BNE     TYPDAT
 2654  012664  104402                  TYPMSG: OCTASC
 2655  012666  012760                          ERTABO
 2656  012670  012767  000001  000754          MOV     #1,ERRFLG
 2657  012676  104401                          TYPE
 2658  012700  000000                  ERRMSG: 0
 2659  012702  005767  000004          TYPDAT: TST     DATABP
 2660  012706  001402                          BEQ     RESREG
 2661  012710  104402                          OCTASC
 2662  012712  000000                  DATABP: 0
 2663  012714  104407                  RESREG: RESOS
 2664  012716  005767  164646          HALTS:  TST     SWR
 2665  012722  100005                          BPL     EXITER
 2666  012724  010046                          PUSHRO
 2667  012726  016600  000002                  MOV     2(SP),RO
 2668  012732  000000                          HALT
 2669  012734  012600                          POPRO
 2670  012736  005267  000714          EXITER: INC     ERRCNT
 2671  012742  032767  002000  164620          BIT     #SW10,SWR
 2672  012750  001402                          BEQ     1$
 2673  012752  016716  000704                  MOV     ESCAPE,(SP)
 2674  012756  000002                  1$:     RTI
 2675  012760  000001                  ERTABO: 1
 2676  012762     006     002                  .BYTE   6,2
 2677  012764  013710                          SAVPC
```

```
                                        ;TRAP DISPATCH SERVICE
                                        ;ARGUMENT OF TRAP IS EXTRACTED
                                        ;AND USED AS OFFSET TO OBTAIN POINTER
                                        ;TO SELECTED SUBROUTINE

012766  011646              TRPSRV: MOV     (SP),-(SP)          ;GET PC OF RETURN
012770  162716  000002              SUB     #2,(SP)             ;=PC OF TRAP
012774  017616  000000              MOV     @(SP),(SP)          ;GET TRP
013000  006316              TRPOK:  ASL     (SP)                ;MULTIPLY TRAP ARG BY 2
013002  042716  177001              BIC     #177001,(SP)        ;CLEAR UNWANTED BITS
013006  062716  014426              ADD     #TRPTAB,(SP)        ;POINTER TO SUBROUTINE ADDRESS
013012  017616  000000              MOV     @(SP),(SP)          ;SUBROUTINE ADDRESS
013016  000136                      JMP     @(SP)+              ;GO TO SUBROUTINE

                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5

013020  016667  000004  000662 SVOSP:  MOV     4(SP),SAVPC

                                        ;SAVE R0-R5

013026  010567  000652          SVO5:   MOV     R5,SAVR5
013032  010467  000644                  MOV     R4,SAVR4
013036  010367  000636                  MOV     R3,SAVR3
013042  010267  000630                  MOV     R2,SAVR2
013046  010167  000622                  MOV     R1,SAVR1
013052  010067  000614                  MOV     R0,SAVR0
013056  000002                          RTI
                                        ;RESTORE R0-R5

013060  016700  000606          RSO5:   MOV     SAVR0,R0
013064  016701  000604                  MOV     SAVR1,R1
013070  016702  000602                  MOV     SAVR2,R2
013074  016703  000600                  MOV     SAVR3,R3
013100  016704  000576                  MOV     SAVR4,R4
013104  016705  000574                  MOV     SAVR5,R5
013110  000002                          RTI
```

```
2714
2715                                                ;TELETYPE OUTPUT ROUTINE
2716
2717  013112  017605  000000          TYPER:  MOV     @(SP),R5
2718  013116  062716  000002                  ADD     #2,(SP)
2719  013122  105777  000466          1$:     TSTB    @TPCSR
2720  013126  100375                         BPL     1$
2721  013130  105715                         TSTB    (R5)
2722  013132  001001                         BNE     2$
2723  013134  000002                         RTI
2724  013136  112577  000454          2$:     MOVB    (R5)+,@TPDBR
2725  013142  000767                         BR      1$
2726
2727                                                ;ASCII STRING INPUT ROUTINE
2728
2729  013144  017667  000000  000006  INSTRG: MOV     @(SP),MSG
2730  013152  062716  000002                  ADD     #2,(SP)
2731  013156  104401                  INSTR1: TYPE
2732  013160  000000                  MSG:    0
2733  013162  012704  014450                  MOV     #INBUF,R4
2734  013166  012703  000007                  MOV     #7,R3
2735  013172  105777  000412          1$:     TSTB    @TKCSR
2736  013176  100375                         BPL     1$
2737  013200  117714  000406                  MOVB    @TKDBR,(R4)
2738  013204  142714  000200                  BICB    #200,(R4)
2739  013210  122427  000015                  CMPB    (R4)+,#15
2740  013214  001413                         BEQ     INSTR2
2741  013216  117777  000370  000372         MOVB    @TKDBR,@TPDBR
2742  013224  105777  000364          2$:     TSTB    @TPCSR
2743  013230  100375                         BPL     2$
2744  013232  005303                         DEC     R3
2745  013234  001356                         BNE     1$
2746  013236  104401                  INSTRE: TYPE
2747  013240  014222                          MQM
2748  013242  000745                         BR      INSTR1
2749  013244  000002                  INSTR2: RTI
```

```
2750
2751                                            ;CONVERT ASCII STRING TO OCTAL
2752
2753  013246  011605                PARAMS:  MOV     (SP),R5
2754  013250  012567  000146                 MOV     (R5)+,LOLIM
2755  013254  012567  000144                 MOV     (R5)+,HILIM
2756  013260  012567  000142                 MOV     (R5)+,DEVADR
2757  013264  112567  000140                 MOVB    (R5)+,LOBITS
2758  013270  112567  000135                 MOVB    (R5)+,ADRCNT
2759  013274  010516                         MOV     R5,(SP)
2760  013276  005005                PARAM1:  CLR     R5
2761  013300  012704  014450                 MOV     #INBUF,R4
2762  013304  122714  000015                 CMPB    #15,(R4)
2763  013310  001420                         BEQ     PARERR
2764  013312  121427  000060        1$:      CMPB    (R4),#60
2765  013316  002415                         BLT     PARERR
2766  013320  121427  000067                 CMPB    (R4),#67
2767  013324  003012                         BGT     PARERR
2768  013326  142714  000060                 BICB    #60,(R4)
2769  013332  152405                         BISB    (R4)+,R5
2770  013334  122714  000015                 CMPB    #15,(R4)
2771  013340  001406                         BEQ     LIMITS
2772  013342  006305                         ASL     R5
2773  013344  006305                         ASL     R5
2774  013346  006305                         ASL     R5
2775  013350  000760                         BR      1$
2776  013352  104404                PARERR:  INSTER
2777  013354  000750                         BR      PARAM1
2778
2779                                            ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
2780
2781  013356  020567  000042        LIMITS:  CMP     R5,HILIM
2782  013362  101373                         BHI     PARERR
2783  013364  020567  000032                 CMP     R5,LOLIM
2784  013370  103770                         BLO     PARERR
2785  013372  136705  000032                 BITB    LOBITS,R5
2786  013376  001365                         BNE     PARERR
2787
2788                                            ;STORE NUMBER AT SPECIFIED ADDRESS
2789
2790  013400  016704  000022                 MOV     DEVADR,R4
2791  013404  010524                1$:      MOV     R5,(R4)+
2792  013406  062705  000002                 ADD     #2,R5
2793  013412  105367  000013                 DECB    ADRCNT
2794  013416  001372                         BNE     1$
2795  013420  000002                         RTI
2796  013422  000000                LOLIM:   0
2797  013424  000000                HILIM:   0
2798  013426  000000                DEVADR:  0
2799  013430  000000                LOBITS:  0
2800          013431                ADRCNT=LOBITS+1
```

```
2801
2802                                        ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
2803
2804  013432  104401              OCTASN:   TYPE
2805  013434  014226                        MCRLF
2806  013436  017601  000000              MOV     @(SP),R1
2807  013442  062716  000002              ADD     #2,(SP)
2808  013446  012167  000130              MOV     (R1)+,WRDCNT
2809  013452  112167  000126      1$:     MOVB    (R1)+,CHRCNT
2810  013456  112167  000123              MOVB    (R1)+,SPACNT
2811  013462  013167  000120              MOV     @(R1)+,BINWRD
2812  013466  016704  000114      2$:     MOV     BINWRD,R4
2813  013472  116705  000106              MOVB    CHRCNT,R5
2814  013476  012700  014462              MOV     #TEMP,R0
2815  013502  010403                3$:     MOV     R4,R3
2816  013504  042703  177770              BIC     #177770,R3
2817  013510  062703  000260              ADD     #260,R3
2818  013514  110320                      MOVB    R3,(R0)+
2819  013516  006204                      ASR     R4
2820  013520  006204                      ASR     R4
2821  013522  006204                      ASR     R4
2822  013524  005305                      DEC     R5
2823  013526  001365                      BNE     3$
2824  013530  012703  014474              MOV     #MDATA,R3
2825  013534  114023                4$:     MOVB    -(R0),(R3)+
2826  013536  105367  000042              DECB    CHRCNT
2827  013542  001374                      BNE     4$
2828  013544  105767  000035              TSTB    SPACNT
2829  013550  001405                      BEQ     6$
2830  013552  112723  000240      5$:     MOVB    #240,(R3)+
2831  013556  105367  000023              DECB    SPACNT
2832  013562  001373                      BNE     5$
2833  013564  105013                6$:     CLRB    (R3)
2834  013566  104401                      TYPE
2835  013570  014474                      MDATA
2836  013572  005367  000004              DEC     WRDCNT
2837  013576  001325                      BNE     1$
2838  013600  000002                      RTI
2839  013602  000000              WRDCNT: 0
2840  013604  000000              CHRCNT: 0
2841          013605              SPACNT=CHRCNT+1
2842  013606  000000              BINWRD: 0
```

```
2843                                    ;INDIRECT POINTERS
2844
2845  013610  177560            TKCSR:  177560
2846  013612  177562            TKDBR:  177562
2847  013614  177564            TPCSR:  177564
2848  013616  177566            TPDBR:  177566
2849  013620  000000            DHSCR:  0
2850  013622  000000            DHNRC:  0
2851  013624  000000            DHLPR:  0
2852  013626  000000            DHBA:   0
2853  013630  000000            DHBC:   0
2854  013632  000000            DHBAR:  0
2855  013634  000000            DHBCR:  0
2856  013636  000000            DHSSR:  0
2857  013640  000000            DHSLR:  0
2858  013642  000000            DHRVEC: 0
2859  013644  000000            DHRLVL: 0
2860  013646  000000            DHTVEC: 0
2861  013650  000000            DHTLVL: 0
2862                                    ;PROGRAM VARIABLES
2863
2864  013652  000000            ERRFLG: 0               ;ERROR FLAG
2865  013654  000000            PASCNT: 0               ;PASS COUNT
2866  013656  000000            ERRCNT: 0               ;ERROR COUNT
2867  013660  000000            RETURN: 0               ;SCOPE RETURN ADDRESS FOR TEST LOOPING
2868  013662  000000            ESCAPE: 0               ;ADDRESS FOR ERROR ESCAPE
2869  013664  000000            FREEZI: 0               ;DATA LOOPING RETURN ADDRESS
2870  013666  000000            ICOUNT: 0               ;ITERATION COUNT FOR TEST IN PROGRESS
2871  013670  000000            LPCNT:  0               ;NUMBER OF ITERATIONS THIS TEST
2872  013672  000000            SAVR0:  0               ;R0 SAVE AREA
2873  013674  000000            SAVR1:  0               ;R1 SAVE AREA
2874  013676  000000            SAVR2:  0               ;R2 SAVE AREA
2875  013700  000000            SAVR3:  0               ;R3 SAVE ARE
2876  013702  000000            SAVR4:  0               ;R4 SAVE AREA
2877  013704  000000            SAVR5:  0               ;R5 SAVE AREA
2878  013706  000000            SAVSP:  0               ;STACK POINTER SAVE AREA
2879  013710  000000            SAVPC:  0               ;CALLING ROUTINE SAVE AREA
2880  013712  000000            INIFLG: 0               ;PROGRAM INITIALIZATION FLAG
2881  013714  000000            STFLG:  0               ;PROGRAM START FLAG
2882  013716  000000            LAST:   0               ;LAST ERROR PC
2883  013720  000000            TCONST: 0
2884  013722  000000            TIME1:  0
2885  013724  000000            TIME2:  0
2886  013726  000000            TEMP1:  0
2887  013730  000000            TEMP2:  0
```

```
                                        ;ENTER HERE ON POWER FAILURE
                                        ;
                                        ;
013732  010046              PFAIL:  MOV     R0,-(SP)            ;SAVE R0-R5 ON PROCESSOR STACK
013734  010146                      MOV     R1,-(SP)
013736  010246                      MOV     R2,-(SP)
013740  010346                      MOV     R3,-(SP)
013742  010446                      MOV     R4,-(SP)
013744  010546                      MOV     R5,-(SP)
013746  016746  164052              MOV     24,-(SP)
013752  010667  177730              MOV     SP,SAVSP            ;SAVE STACK POINTER
013756  012767  013770  164040      MOV     #RESTART,24         ;SET UP FOR POWER UP TRAP
013764  000000                      HALT                        ;HALT ON POWER DOWN NORMAL
013766  000777                      BR      .
                                        ;
                                        ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
                                        ;
013770  016706  177712      RESTAR: MOV     SAVSP,SP            ;RESTORE STACK POINTER
013774  012605                      MOV     (SP)+,R5            ;RESTORE R0-R5
013776  012604                      MOV     (SP)+,R4
014000  012603                      MOV     (SP)+,R3
014002  012602                      MOV     (SP)+,R2
014004  012601                      MOV     (SP)+,R1
014006  012600                      MOV     (SP)+,R0
014010  012767  013732  164006      MOV     #PFAIL,24           ;SET UP FOR POWER FAILURE
014016  012767  000340  163752      MOV     #340,PS
014024  012706  014734              MOV     #STACK,SP
014030  005067  000426              CLR     TEMP
014034  005267  000422              INC     TEMP
014040  001375                      BNE     .-4
014042  104402                      OCTASC
014044  014066                      PFTAB
014046  104401                      TYPE
014050  014231                      MPFAIL
014052  005067  177574              CLR     ERRFLG
014056  005067  177634              CLR     LAST
014062  000177  177572              JMP     @RETURN
014066  000001              PFTAB:  1
014070  000006  000002              6,2
014074  000207                      RETURN
```

```
2928  014076  005015  042012  030510  MTITLE: .ASCIZ  <15><12><12>/DH11 SPEED SELECTION LOGIC TEST /<15><12>
2929  014104  020061  050123  042505
2930  014112  020104  042523  042514
2931  014120  052103  047511  020116
2932  014126  047514  044507  020103
2933  014134  042524  052123  006440
2934  014142  000012
2935  014144  005015  042526  052103  MVECTO: .ASCIZ  <15><12>/VECTOR ADDRESS-/
2936  014152  051117  040440  042104
2937  014160  042522  051523  000055
2938  014166  005015  047503  052116  MREGAD: .ASCIZ  <15><12>/CONTROL REGISTER ADDRESS-/
2939  014174  047522  020114  042522
2940  014202  044507  052123  051105
2941  014210  040440  042104  042522
2942  014216  051523  000055
2943  014222  020040  000077          MQM:    .ASCIZ  /  ?/
2944  014226  005015     000          MCRLF:  .ASCIZ   <15><12>
2945  014231     040  050040  053517  MPFAIL: .ASCIZ  /  POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS/
2946  014236  051105  043040  044501
2947  014244  052514  042522  020054
2948  014252  051120  043517  040522
2949  014260  020115  042522  052123
2950  014266  051101  020124  052101
2951  014274  052040  051505  020124
2952  014302  047111  050040  047522
2953  014310  051107  051505  000123
2954  014316  005015  055104  044104  MEPASS: .ASCIZ  <15><12>/DZDHD/
2955  014324  000104
2956  014326  005015  000122          MR:     .ASCIZ  <15><12>/R/
2957  014332  005015  042524  052123  MTSTPC: .ASCIZ  <15><12>/TEST PC-/
2958  014340  050040  026503     000
2959  014345     116  020117  046103  EM1:    .ASCIZ  /NO CLOCK/<15><12>/LINE  SPEED/
2960  014352  041517  006513  046012
2961  014360  047111  020105  051440
2962  014366  042520  042105     000
2963  014373     124  046511  047111  EM2:    .ASCIZ  /TIMING ERROR/<15><12>/LINE  SPEED/
2964  014400  020107  051105  047522
2965  014406  006522  046012  047111
2966  014414  020105  051440  042520
2967  014422  042105     000
2968          014426                  .EVEN
2969
2970                                  ;TABLE OF POINTERS FOR TRAP DECODING
2971
2972  014426  012446                  TRPTAB: SCOPER
2973  014430  013112                          TYPER
2974  014432  013432                          OCTASN
2975  014434  013144                          INSTRG
2976  014436  013236                          INSTRE
2977  014440  013246                          PARAMS
2978  014442  013020                          SVOSP
2979  014444  013060                          RSOS
2980  014446  012546                          SCOP1R
2981
2982                                  ;BUFFERS FOR INPUT-OUTPUT
2983
```

```
2984  014450  000000                  INBUF:  0
2985          014462                  .=.+10
2986  014462  000000                  TEMP:   0
2987          014474                  .=.+10
2988  014474  000000                  MDATA:  0
2989          014506                  .=.+10
2990
2991                                  ;TABLE OF POINTERS TO ERROR MESSAGES AND DATA
2992
2993  014506                          ERRTAB:
2994  014506  000000                          0                       ;NO MESSAGE
2995  014510  000000                          0                       ;NO DATA
2996  014512  014345                  ET1:    EM1                     ;NO CLOCK ERROR
2997  014514  014522                          DT1
2998  014516  014373                  ET2:    EM2                     ;TIMING ERROR
2999  014520  014522                          DT1
3000
3001                                  ;DATA TABLES FOR ERROR OUTPUT
3002
3003  014522  000002                  DT1:    2                       ;2 DATA WORDS WILL BE TYPED
3004  014524     002      004         .BYTE   2,4                     ;TWO DIGITS, 4 SPACES
3005  014526  013704                          SAVR5           ;LINE UNDER TEST
3006  014530     002      000         .BYTE   2,0                     ;TWO DIGITS, NO SPACES
3007  014532  013702                          SAVR4                   ;SELECTED SPEED
3008  014534  000000                  ENDCOD: 0
3009          000001                  .END
```

```
ADRCNT= 013431          2758*   2793*   2800#
BEGIN   001202           895     924     930#   2601
BINWRD  013606          2811*   2812    2842#
BITX  = 000000           949#   1000#   1051#   1102#   1153#   1204#   1255#   1306#   1357#   1408#   1459#   1510#   1561#
                        1612#   1663#   1714#   1765#   1816#   1867#   1918#   1969#   2020#   2071#   2122#   2173#   2224#
                        2275#   2326#   2377#   2428#   2479#   2530#   2581#
BIT00 = 000001           585#
BIT01 = 000002           584#
BIT02 = 000004           583#
BIT03 = 000010           582#
BIT04 = 000020           581#
BIT05 = 000040           580#
BIT06 = 000100           579#
BIT07 = 000200           578#
BIT08 = 000400           577#
BIT09 = 001000           576#
BIT10 = 002000           575#
BIT11 = 004000           574#    966    1017    1068    1119    1170    1221    1272    1323    1374    1425    1476    1527
                        1578    1629    1680    1731    1782    1833    1884    1935    1986    2037    2088    2139    2190
                        2241    2292    2343    2394    2445    2496    2547
BIT12 = 010000           573#
BIT13 = 020000           572#
BIT14 = 040000           571#
BIT15 = 100000           570#
CHRCNT  013604          2809*   2813    2826*   2840#   2841
DATABP  012712          2649*   2652    2659    2662#
DEVADR  013426          2756*   2790    2798#
DHBA    013626           968*   1019*   1070*   1121*   1172*   1223*   1274*   1325*   1376*   1427*   1478*   1529*   1580*
                        1631*   1682*   1733*   1784*   1835*   1886*   1937*   1988*   2039*   2090*   2141*   2192*   2243*
                        2294*   2345*   2396*   2447*   2498*   2549*   2852#
DHBAR   013632           975*   1026*   1077*   1128*   1179*   1230*   1281*   1332*   1383*   1434*   1485*   1536*   1587*
                        1638*   1689*   1740*   1791*   1842*   1893*   1944*   1995*   2046*   2097*   2148*   2199*   2250*
                        2301*   2352*   2403*   2454*   2505*   2556*   2854#
DHBC    013630           969*   1020*   1071*   1122*   1173*   1224*   1275*   1326*   1377*   1428*   1479*   1530*   1581*
                        1632*   1683*   1734*   1785*   1836*   1887*   1938*   1989*   2040*   2091*   2142*   2193*   2244*
                        2295*   2346*   2397*   2448*   2499*   2550*   2853#
DHBCR   013634          2855#
DHLPR   013624           971*   1022*   1073*   1124*   1175*   1226*   1277*   1328*   1379*   1430*   1481*   1532*   1583*
                        1634*   1685*   1736*   1787*   1838*   1889*   1940*   1991*   2042*   2093*   2144*   2195*   2246*
                        2297*   2348*   2399*   2450*   2501*   2552*   2851#
DHNRC   013622          2850#
DHRLVL  013644          2859#
DHRVEC  013642           910    2858#
DHSCR   013620           918     966*    967*    977    1017*   1018*   1028    1068*   1069*   1079    1119*   1120*   1130
                        1170*   1171*   1181    1221*   1222*   1232    1272*   1273*   1283    1323*   1324*   1334    1374*
                        1375*   1385    1425*   1426*   1436    1476*   1477*   1487    1527*   1528*   1538    1578*   1579*
                        1589    1629*   1630*   1640    1680*   1681*   1691    1731*   1732*   1742    1782*   1783*   1793
                        1833*   1834*   1844    1884*   1885*   1895    1935*   1936*   1946    1986*   1987*   1997    2037*
                        2038*   2048    2088*   2089*   2099    2139*   2140*   2150    2190*   2191*   2201    2241*   2242*
                        2252    2292*   2293*   2303    2343*   2344*   2354    2394*   2395*   2405    2445*   2446*   2456
                        2496*   2497*   2507    2547*   2548*   2558    2849#
DHSLR   013640           921*    922*   2857#
DHSSR   013636           921    2856#
DHTLVL  013650          2861#
DHTVEC  013646          2860#
DT1     014522          2997    2999    3003#
```

DZDHDC.PFC CROSS REFERENCE TABLE -- USER SYMBOLS

```
EM1     014345          2959#   2996
EM2     014373          2963#   2998
ENDCOD  014534           557    3008#
EOP     012374          2588#
ERRCNT  013656           886*   2670*  2866#
ERRFLG  013652           887*    888*  2591*  2616*  2621   2639*  2650   2656*  2864#  2922*
ERRMSG  012700          2648*   2658#
ERRORS  012564           850    2634#
ERRTAB  014506          2647    2993#
ERTABO  012760          2655    2675#
ESCAPE  013662           958*   1009*  1060*  1111*  1162*  1213*  1264*  1315*  1366*  1417*  1468*  1519*  1570*
                        1621*  1672*  1723*  1774*  1825*  1876*  1927*  1978*  2029*  2080*  2131*  2182*  2233*
                        2284*  2335*  2386*  2437*  2488*  2539*  2673   2868#
ET1     014512          2996#
ET2     014516          2998#
EXITER  012736          2665    2670#
FREEZ1  013664           959*   1010*  1061*  1112*  1163*  1214*  1265*  1316*  1367*  1418*  1469*  1520*  1571*
                        1622*  1673*  1724*  1775*  1826*  1877*  1928*  1979*  2030*  2081*  2132*  2183*  2234*
                        2285*  2336*  2387*  2438*  2489*  2540*  2629   2869#
HALTS   012716          2635    2664#
HILIM   013424          2755*   2781   2797#
ICOUNT  013666           957*   1008*  1059*  1110*  1161*  1212*  1263*  1314*  1365*  1416*  1467*  1518*  1569*
                        1620*  1671*  1722*  1773*  1824*  1875*  1926*  1977*  2028*  2079*  2130*  2181*  2232*
                        2283*  2334*  2385*  2436*  2487*  2538*  2613   2870#
INBUF   014450          2733    2761   2984#
INIFLG  013712           890     923    925*  2880#
INSTER= 104404           867#   2776
INSTR = 104403           866#    905    913    934
INSTRE  013236          2746#   2976
INSTRG  013144          2729#   2975
INSTRI  013156          2731#   2748
INSTR2  013244          2740    2749#
LAST    013716          2590*   2636   2638*  2882#  2923*
LIGHTS= 177570           555#   2593*
LIMITS  013356          2771    2781#
LINE  = 000020           949#   1000#  1051#  1102#  1153#  1204#  1255#  1306#  1357#  1408#  1459#  1510#  1561#
                        1612#  1663#  1714#  1765#  1816#  1867#  1918#  1969#  2020#  2071#  2122#  2173#  2224#
                        2275#  2326#  2377#  2428#  2479#  2530#  2581#
LOBITS  013430          2757*   2785   2799#  2800
LOGICA  012432          2597#
LOLIM   013422          2754*   2783   2796#
LPCNT   013670          2612*   2613   2615*  2871#
MCRLF   014226          2805    2944#
MDATA   014474          2824    2835   2988#
MEPASS  014316          2589    2954#
MPFAIL  014231          2921    2945#
MQM     014222          2747    2943#
MR      014326           947    2956#
MREGAD  014166           914    2938#
MSG     013160          2729*   2732#
MTITLE  014076           889    2928#
MTSTPC  014332           935    2957#
MVECTO  014144           906    2935#
N     = 000001             1#
OCTASC= 104402           865#   2654   2661   2918
OCTASN  013432          2804#   2974
```

```
PARAM = 104405          868#   907    915    936
PARAMS  013246         2753#  2977
PARAM1  013276         2760#  2777
PARERR  013352         2763   2765   2767   2776#  2782   2784   2786
PASCNT  013654          885*  2592*  2593   2865#
PC    =%000007          550#  2597*
PFAIL   013732          848    883   2891#  2912
PFTAB   014066         2919   2925#
POPRO = 012600          564#  2669
POP1SP= 005726          562#
POP2SP= 022626          566#
PS    = 177776          556#   881*   930*   956*  1007*  1058*  1109*  1160*  1211*  1262*  1313*  1364*  1415*
                       1466*  1517*  1568*  1619*  1670*  1721*  1772*  1823*  1874*  1925*  1976*  2027*  2078*
                       2129*  2180*  2231*  2282*  2333*  2384*  2435*  2486*  2537*  2913*
PUSHRO= 010046          563#  2666
PUSH1S= 005746          561#
PUSH2S= 024646          565#
RESREG  012714         2660   2663#
RESTAR  013770         2899   2905#
RESTRT  012442         2595   2601#
RESO5 = 104407          870#  2663
RETURN  013660          943*   948   2617*  2619   2867#  2924
RSO5    013060         2707#  2979
RO    =%000000          543#   961*   971    996*  1012*  1022   1047*  1063*  1073   1098*  1114*  1124   1149*
                       1165*  1175   1200*  1216*  1226   1251*  1267*  1277   1302*  1318*  1328   1353*  1369*
                       1379   1404*  1420*  1430   1455*  1471*  1481   1506*  1522*  1532   1557*  1573*  1583
                       1608*  1624*  1634   1659*  1675*  1685   1710*  1726*  1736   1761*  1777*  1787   1812*
                       1828*  1838   1863*  1879*  1889   1914*  1930*  1940   1965*  1981*  1991   2016*  2032*
                       2042   2067*  2083*  2093   2118*  2134*  2144   2169*  2185*  2195   2220*  2236*  2246
                       2271*  2287*  2297   2322*  2338*  2348   2373*  2389*  2399   2424*  2440*  2450   2475*
                       2491*  2501   2526*  2542*  2552   2577*  2667*  2703   2707*  2814*  2818*  2825   2891
                       2911*
R1    =%000001          544#   896*   899*   901*   903    963*   997*  1014*  1048*  1065*  1099*  1116*  1150*
                       1167*  1201*  1218*  1252*  1269*  1303*  1320*  1354*  1371*  1405*  1422*  1456*  1473*
                       1507*  1524*  1558*  1575*  1609*  1626*  1660*  1677*  1711*  1728*  1762*  1779*  1813*
                       1830*  1864*  1881*  1915*  1932*  1966*  1983*  2017*  2034*  2068*  2085*  2119*  2136*
                       2170*  2187*  2221*  2238*  2272*  2289*  2323*  2340*  2374*  2391*  2425*  2442*  2476*
                       2493*  2527*  2544*  2578*  2594*  2597   2702   2708*  2806*  2808   2809   2810   2811
                       2892   2910*
R2    =%000002          545#   897*   899    900*   902*  2701   2709*  2893   2909*
R3    =%000003          546#   898*   901    902    2700   2710*  2734*  2744*  2815*  2816*  2817*  2818   2824*
                       2825*  2830*  2833*  2894   2908*
R4    =%000004          547#   964*   995*  1015*  1046*  1066*  1097*  1117*  1148*  1168*  1199*  1219*  1250*
                       1270*  1301*  1321*  1352*  1372*  1403*  1423*  1454*  1474*  1505*  1525*  1556*  1576*
                       1607*  1627*  1658*  1678*  1709*  1729*  1760*  1780*  1811*  1831*  1862*  1882*  1913*
                       1933*  1964*  1984*  2015*  2035*  2066*  2086*  2117*  2137*  2168*  2188*  2219*  2239*
                       2270*  2290*  2321*  2341*  2372*  2392*  2423*  2443*  2474*  2494*  2525*  2545*  2576*
                       2643*  2644*  2645*  2646*  2647*  2648   2649   2699   2711*  2733*  2737*  2738*  2739
                       2761*  2762   2764   2766   2768*  2769   2770   2790*  2791*  2812*  2815   2819*  2820*
                       2821*  2895   2907*
R5    =%000005          548#   960*   967   1011*  1018   1062*  1069   1113*  1120   1164*  1171   1215*  1222
                       1266*  1273   1317*  1324   1368*  1375   1419*  1426   1470*  1477   1521*  1528   1572*
                       1579   1623*  1630   1674*  1681   1725*  1732   1776*  1783   1827*  1834   1878*  1885
                       1929*  1936   1980*  1987   2031*  2038   2082*  2089   2133*  2140   2184*  2191   2235*
                       2242   2286*  2293   2337*  2344   2388*  2395   2439*  2446   2490*  2497   2541*  2548
                       2641*  2642*  2643   2698   2712*  2717*  2721   2724   2753*  2754   2755   2756   2757
```

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                    2758    2759    2760*   2769*   2772*   2773*   2774*   2781    2783    2785    2791    2792*   2813*
                    2822*   2896    2906*
SAVPC   013710      2677    2694*   2879#
SAVR0   013672      2703*   2707    2872#
SAVR1   013674      2702*   2708    2873#
SAVR2   013676      2701*   2709    2874#
SAVR3   013700      2700*   2710    2875#
SAVR4   013702      2699*   2711    2876#   3007
SAVR5   013704      2698*   2712    2877#   3005
SAVSP   013706      2878#   2898*   2905
SAVOSP= 104406       869#   2640
SCOPE = 104400       863#    999    1050    1101    1152    1203    1254    1305    1356    1407    1458    1509    1560
                    1611    1662    1713    1764    1815    1866    1917    1968    2019    2070    2121    2172    2223
                    2274    2325    2376    2427    2478    2529    2580
SCOPER  012446      2606#   2972
SCOPE1= 104410       871#    993    1044    1095    1146    1197    1248    1299    1350    1401    1452    1503    1554
                    1605    1656    1707    1758    1809    1860    1911    1962    2013    2064    2115    2166    2217
                    2268    2319    2370    2421    2472    2523    2574
SCOP1R  012546      2627#   2980
SP    =%000006       549#    882*    931*   2617    2619*   2629*   2636    2638    2641    2667    2673*   2683*   2684*
                    2685*   2686*   2687*   2688*   2689*   2690    2694    2717    2718*   2729    2730*   2753    2759*
                    2806    2807*   2891*   2892*   2893*   2894*   2895*   2896*   2897*   2898    2905*   2906    2907
                    2908    2909    2910    2911    2914*
SPACNT= 013605      2810*   2828    2831*   2841#
STACK = 014734       557#    882     931    2914
START   001000       855     881#
STFLG   013714       884*    944     946*   2881#
SVOS    013026      2698#
SVOSP   013020      2694#   2978
SWR   = 177570       554#    894     932    2606    2608    2610    2627    2634    2664    2671
SW00  = 000001       537#    894
SW01  = 000002       536#    932
SW02  = 000004       535#
SW03  = 000010       534#
SW04  = 000020       533#
SW05  = 000040       532#
SW06  = 000100       531#
SW08  = 000400       530#
SW09  = 001000       529#   2627
SW10  = 002000       528#   2606    2671
SW11  = 004000       527#   2610
SW12  = 010000       526#
SW13  = 020000       525#   2634
SW14  = 040000       524#   2608
SW15  = 100000       523#
TCONST  013720      2883#
TEMP    014462      2814    2915*   2916*   2986#
TEMP1   013726       973*    981*   1024*   1032*   1075*   1083*   1126*   1134*   1177*   1185*   1228*   1236*   1279*
                    1287*   1330*   1338*   1381*   1389*   1432*   1440*   1483*   1491*   1534*   1542*   1585*   1593*
                    1636*   1644*   1687*   1695*   1738*   1746*   1789*   1797*   1840*   1848*   1891*   1899*   1942*
                    1950*   1993*   2001*   2044*   2052*   2095*   2103*   2146*   2154*   2197*   2205*   2248*   2256*
                    2299*   2307*   2350*   2358*   2401*   2409*   2452*   2460*   2503*   2511*   2554*   2562*   2886#
TEMP2   013730       974*    983*   1025*   1034*   1076*   1085*   1127*   1136*   1178*   1187*   1229*   1238*   1280*
                    1289*   1331*   1340*   1382*   1391*   1433*   1442*   1484*   1493*   1535*   1544*   1586*   1595*
                    1637*   1646*   1688*   1697*   1739*   1748*   1790*   1799*   1841*   1850*   1892*   1901*   1943*
                    1952*   1994*   2003*   2045*   2054*   2096*   2105*   2147*   2156*   2198*   2207*   2249*   2258*
```

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                    2300*  2309*  2351*  2360*  2402*  2411*  2453*  2462*  2504*  2513*  2555*  2564*  2887#
TIME1   013722       965*   987    994*  1016*  1038   1045*  1067*  1089   1096*  1118*  1140   1147*  1169*
                    1191   1198*  1220*  1242   1249*  1271*  1293   1300*  1322*  1344   1351*  1373*  1395
                    1402*  1424*  1446   1453*  1475*  1497   1504*  1526*  1548   1555*  1577*  1599   1606*
                    1628*  1650   1657*  1679*  1701   1708*  1730*  1752   1759*  1781*  1803   1810*  1832*
                    1954   1861*  1883*  1905   1912*  1934*  1956   1963*  1985*  2007   2014*  2036*  2058
                    2065*  2087*  2109   2116*  2138*  2160   2167*  2189*  2211   2218*  2240*  2262   2269*
                    2291*  2313   2320*  2342*  2364   2371*  2393*  2415   2422*  2444*  2466   2473*  2495*
                    2517   2524*  2546*  2568   2575*  2884#
TIME2   013724       972*   980*   987    994   1023*  1031*  1038   1045   1074*  1082*  1089   1096   1125*
                    1133*  1140   1147   1176*  1184*  1191   1198   1227*  1235*  1242   1249   1278*  1286*
                    1293   1300   1329*  1337*  1344   1351   1380*  1388*  1395   1402   1431*  1439*  1446
                    1453   1482*  1490*  1497   1504   1533*  1541*  1548   1555   1584*  1592*  1599   1606
                    1635*  1643*  1650   1657   1686*  1694*  1701   1708   1737*  1745*  1752   1759   1788*
                    1796*  1803   1810   1839*  1847*  1854   1861   1890*  1898*  1905   1912   1941*  1949*
                    1956   1963   1992*  2000*  2007   2014   2043*  2051*  2058   2065   2094*  2102*  2109
                    2116   2145*  2153*  2160   2167   2196*  2204*  2211   2218   2247*  2255*  2262   2269
                    2298*  2306*  2313   2320   2349*  2357*  2364   2371   2400*  2408*  2415   2422   2451*
                    2459*  2466   2473   2502*  2510*  2517   2524   2553*  2561*  2568   2575   2885#
TKCSR   013610      2735   2845#
TKDBR   013612      2737   2741   2846#
TPCSR   013614      2719   2742   2847#
TPDBR   013616      2724*  2741*  2848#
TRPOK   013000      2686#
TRPSRV  012766       852   2683#
TRPTAB  014426      2688   2972#
TYPDAT  012702      2653   2659#
TYPE  = 104401       864#   889    947    2598   2657   2731   2746   2804   2834   2920
TYPER   013112      2717#  2973
TYPMSG  012664      2651   2654#
T1      001274       943    956#
T10     003272      1313#
T11     003514      1364#
T12     003736      1415#
T13     004160      1466#
T14     004402      1517#
T15     004624      1568#
T16     005046      1619#
T17     005270      1670#
T2      001516      1007#
T20     005512      1721#
T21     005734      1772#
T22     006156      1823#
T23     006400      1874#
T24     006622      1925#
T25     007044      1976#
T26     007266      2027#
T27     007510      2078#
T3      001740      1058#
T30     007732      2129#
T31     010154      2180#
T32     010376      2231#
T33     010620      2282#
T34     011042      2333#
T35     011264      2384#
T36     011506      2435#
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
T3Z     011730          2486#
T4-     002162          1109#
T4D     012152          2537#
T5      002404          1160#
T6      002626          1211#
T7      003050          1262#
VEC1    001060           891     894#
VEC2    001070           893     896#
WRDCNT  013602          2808#   2836#   2839#
X     = 000000             1#
XBIT  = 000000           949#   1765#
XLINE = 000020           949#   1765#
XN    = 000041             1#    956     960#   1007    1011#   1058    1062#   1109    1113#   1160    1164#   1211    1215#
                        1262    1266#   1313    1317#   1364    1368#   1415    1419#   1466    1470#   1517    1521#   1568
                        1572#   1619    1623#   1670    1674#   1721    1725#   1772    1776#   1823    1827#   1874    1878#
                        1925    1929#   1976    1980#   2027    2031#   2078    2082#   2129    2133#   2180    2184#   2231
                        2235#   2282    2286#   2333    2337#   2384    2388#   2435    2439#   2486    2490#   2537    2541#
Y     = 000011             1#    863     864#    865#    866#    867#    868#    869#    870#    871#    872#
.     = 014536           587#   588     590     592     594     596     598     600     602     604     606     608     610
                         612    614     616     618     620     622     624     626     628     630     632     634     636
                         638    640     642     644     646     648     650     652     654     656     658     660     662
                         664    666     668     670     672     674     676     678     680     682     684     686     688
                         690    692     694     696     698     700     702     704     706     708     710     712     714
                         716    718     720     722     724     726     728     730     732     734     736     738     740
                         742    744     746     748     750     752     754     756     758     760     762     764     766
                         768    770     772     774     776     778     780     782     784     786     788     790     792
                         794    796     798     800     802     804     806     808     810     812     814     816     818
                         820    822     824     826     828     830     832     834     836     838     840     842     847#
                         854#   872#   2901    2917    2968#   2985#   2987#   2989#
```

DZDHDC.PFC CROSS REFERENCE TABLE -- MACRO NAMES

```
CODEM1    872*   921
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         1705   1750   1756   1801   1807   1852   1858   1903   1909   1954   1960   2005   2011   2056   2062
         2107   2113   2158   2164   2209   2215   2260   2266   2311   2317   2362   2368   2413   2419   2464
         2470   2515   2521   2566   2572
SPEED     949*  1000   1051   1102   1153   1204   1255   1306   1357   1408   1459   1510   1561   1612   1663
         1714   1765   1816   1867   1918   1969   2020   2071   2122   2173   2224   2275   2326   2377   2428
         2479   2530
TRPDEF      1*   863    864    865    866    867    868    869    870    871
TS          1*   956   1007   1058   1109   1160   1211   1262   1313   1364   1415   1466   1517   1568   1619
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         2435   2486   2537
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.CATCH      1*   586
.ENDCO      1*  3008
.EOP        1*  2581
.ERROR      1*  2631
.ERRTA      1*  2990
.HEADE      1*   501
.INSTR      1*  2726
.MSG        1*  2928
.OCTAS      1*  2801
.PARAM      1*  2750
.PFAIL      1*  2888
.POINT      1*  2843
.RESRE      1*  2705
.SAVRE      1*  2691
.SCOPE      1*  2602
.SCOP1      1*  2624
.SETVE      1*   844
.START      1*   872
.SYMBO      1*   520
.TRPDE      1*   858
.TRPSR      1*  2678
.TRPTA      1*  2969
.TYPER      1*  2714
.VARIA      1*  2862
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DZDHDC.PFC CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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        2424  2475  2526  2577  2647  2688  2718  2730  2792  2807  2817
ASL     2644  2645  2686  2772  2773  2774
ASR     2819  2820  2821
BEQ      895   933  2595  2622  2628  2637  2651  2660  2672  2740  2763  2771  2829
BGT     2767
BHI     2782
BIC     2646  2687  2816
BICB    2738  2768
BISB    2769
BIT      894   932  2606  2608  2610  2627  2634  2671
BITB    2785
BLO      988  1039  1090  1141  1192  1243  1294  1345  1396  1447  1498  1549  1600  1651  1702
        1753  1804  1855  1906  1957  2008  2059  2110  2161  2212  2263  2314  2365  2416  2467
        2518  2569  2784
BLT     2765
BMI      979  1030  1081  1132  1183  1234  1285  1336  1387  1438  1489  1540  1591  1642  1693
        1744  1795  1846  1897  1948  1999  2050  2101  2152  2203  2254  2305  2356  2407  2458
        2509  2560
BNE      891   904   924   945   982   984   998  1033  1035  1049  1084  1096  1100  1135  1137
        1151  1186  1188  1202  1237  1239  1253  1288  1290  1304  1339  1341  1355  1390  1392
        1406  1441  1443  1457  1492  1494  1508  1543  1545  1559  1594  1596  1610  1645  1647
        1661  1696  1698  1712  1747  1749  1763  1798  1800  1814  1849  1851  1865  1900  1902
        1916  1951  1953  1967  2002  2004  2018  2053  2055  2069  2104  2106  2120  2155  2157
        2171  2206  2208  2222  2257  2259  2273  2308  2310  2324  2359  2361  2375  2410  2412
        2426  2461  2463  2477  2512  2514  2528  2563  2565  2579  2607  2609  2611  2614  2635
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BPL     2665  2720  2736  2743
BR       893   942   986  1037  1088  1139  1190  1241  1292  1343  1394  1445  1496  1547  1598
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        2414  2465  2516  2567  2623  2725  2748  2775  2777  2901
CLR      884   885   886   887   888   900   968   972   973  1019  1023  1024  1070  1074  1075
        1121  1125  1126  1172  1176  1177  1223  1227  1228  1274  1278  1279  1325  1329  1330
        1376  1380  1381  1427  1431  1432  1478  1482  1483  1529  1533  1534  1580  1584  1585
        1631  1635  1636  1682  1686  1687  1733  1737  1738  1784  1788  1789  1835  1839  1840
        1886  1890  1891  1937  1941  1942  1988  1992  1993  2039  2043  2044  2090  2094  2095
        2141  2145  2146  2192  2196  2197  2243  2247  2248  2294  2298  2299  2345  2349  2350
        2396  2400  2401  2447  2451  2452  2498  2502  2503  2549  2553  2554  2590  2591  2615
        2616  2639  2760  2915  2922  2923
CLRB    2833
CMP      903   987  1038  1089  1140  1191  1242  1293  1344  1395  1446  1497  1548  1599  1650
        1701  1752  1803  1854  1905  1956  2007  2058  2109  2160  2211  2262  2313  2364  2415
        2466  2517  2568  2613  2636  2781  2783
CMPB    2739  2762  2764  2766  2770
COM      925   946
DEC      983   997  1034  1048  1085  1099  1136  1150  1187  1201  1238  1252  1289  1303  1340
        1354  1391  1405  1442  1456  1493  1507  1544  1558  1595  1609  1646  1660  1697  1711
        1748  1762  1799  1813  1850  1864  1901  1915  1952  1966  2003  2017  2054  2068  2105
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        2513  2527  2564  2578  2744  2822  2836
DECB    2793  2826  2831
EMT      567
HALT     589   591   593   595   597   599   601   603   605   607   609   611   613   615   617
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        649   651   653   655   657   659   661   663   665   667   669   671   673   675   677
```

```
        679   681   683   685   687   689   691   693   695   697   699   701   703   705   707
        709   711   713   715   717   719   721   723   725   727   729   731   733   735   737
        739   741   743   745   747   749   751   753   755   757   759   761   763   765   767
        769   771   773   775   777   779   781   783   785   787   789   791   793   795   797
        799   801   803   805   807   809   811   813   815   817   819   821   823   825   827
        829   831   833   835   837   839   841   843  2668  2900
INC     922   980   981   995  1031  1032  1046  1082  1083  1097  1133  1134  1148  1184  1185
       1199  1235  1236  1250  1286  1287  1301  1337  1338  1352  1388  1389  1403  1439  1440
       1454  1490  1491  1505  1541  1542  1556  1592  1593  1607  1643  1644  1658  1694  1695
       1709  1745  1746  1760  1796  1797  1811  1847  1848  1862  1898  1899  1913  1949  1950
       1964  2000  2001  2015  2051  2052  2066  2102  2103  2117  2153  2154  2168  2204  2205
       2219  2255  2256  2270  2306  2307  2321  2357  2358  2372  2408  2409  2423  2459  2460
       2474  2510  2511  2525  2561  2562  2576  2592  2612  2670  2916
JMP     855   948  2601  2690  2924
JSR    2597
MOV     881   882   883   896   897   898   899   921   930   931   943   956   957   958   959
        960   961   963   964   965   966   967   969   971   974   975   994  1007  1008  1009
       1010  1011  1012  1014  1015  1016  1017  1018  1020  1022  1025  1026  1045  1058  1059
       1060  1061  1062  1063  1065  1066  1067  1068  1069  1071  1073  1076  1077  1096  1109
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       1160  1161  1162  1163  1164  1165  1167  1168  1169  1170  1171  1173  1175  1178  1179
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       1230  1249  1262  1263  1264  1265  1266  1267  1269  1270  1271  1272  1273  1275  1277
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       1526  1527  1528  1530  1532  1535  1536  1555  1568  1569  1570  1571  1572  1573  1575
       1576  1577  1578  1579  1581  1583  1586  1587  1606  1619  1620  1621  1622  1623  1624
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       1925  1926  1927  1928  1929  1930  1932  1933  1934  1935  1936  1938  1940  1943  1944
       1963  1976  1977  1978  1979  1980  1981  1983  1984  1985  1986  1987  1989  1991  1994
       1995  2014  2027  2028  2029  2030  2031  2032  2034  2035  2036  2037  2038  2040  2042
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       2341  2342  2343  2344  2346  2348  2351  2352  2371  2384  2385  2386  2387  2388  2389
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       2910  2911  2912  2913  2914
MOVB   2724  2737  2741  2757  2758  2809  2810  2813  2818  2825  2830
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DZDHDC.PFC CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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NOP      2598    2599    2600
RESET    2596
RETURN    939    2927
RTI      2618    2620    2630    2674    2704    2713    2723    2749    2795    2838
SUB      2642    2684
TRAP      863     864     865     866     867     868     869     870     871
TST       890     923     944     977    1028    1079    1130    1181    1232    1283    1334    1385    1436    1487    1538
         1589    1640    1691    1742    2621    2650    2652    2659    2664
TSTB     1793    1844    1895    1946    1997    2048    2099    2150    2201    2252    2303    2354    2405    2456    2507
         2558    2719    2721    2735    2742    2828
.ASCIZ   2928    2935    2938    2943    2944    2945    2954    2956    2957    2959    2963
.BYTE     911     912     919     920     940     941    2676    3004    3006
.ENABL    520
.END     3009
.ENDC     893     894     921     923     960    1011    1062    1113    1164    1215    1266    1317    1368    1419    1470
         1521    1572    1623    1674    1725    1776    1827    1878    1929    1980    2031    2082    2133    2184    2235
         2286    2337    2388    2439    2490    2541
.EQUIV    567
.EVEN    2968
.IF       891     893     921     959    1010    1061    1112    1163    1214    1265    1316    1367    1418    1469    1520
         1571    1622    1673    1724    1775    1826    1877    1928    1979    2030    2081    2132    2183    2234    2285
         2336    2387    2438    2489    2540
.IFF      893     894
.IIF      880
.IRP     2849    2883
.LIST       1     501     520     864     865     866     867     868     869     870     871     872     949     960    1000
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         1408    1419    1459    1470    1510    1521    1561    1572    1612    1623    1663    1674    1714    1725    1765
         1776    1816    1827    1867    1878    1918    1929    1969    1980    2020    2031    2071    2082    2122    2133
         2173    2184    2224    2235    2275    2286    2326    2337    2377    2388    2428    2439    2479    2490    2530
         2541    2581
.MACRO      1     872     949
.NLIST      1     501     520     864     865     866     867     868     869     870     871     872     949     960    1000
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         1408    1419    1459    1470    1510    1521    1561    1572    1612    1623    1663    1674    1714    1725    1765
         1776    1816    1827    1867    1878    1918    1929    1969    1980    2020    2031    2071    2082    2122    2133
         2173    2184    2224    2235    2275    2286    2326    2337    2377    2388    2428    2439    2479    2490    2530
         2541    2581
.PAGE     539     586     844     872    2631    2678    2714    2750    2801    2843    2888    2928
.REM        1
.REPT     588     949    1765
.TITLE    520


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

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 RUN-TIME: 13 24 3 SECONDS
 RUN-TIME RATIO: 107/42=2.5
 CORE USED:  11K  (21 PAGES)
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Spooler runtime 12 Seconds, 358 KCS, 307 disk reads, 3 disk writes, 71 pages

[redacted]