11/21+ DMV11 MCTRL DIAG #1
DMV-11 CNDMAA0

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                        PRODUCT CODE:   AC-T826A-MC

                        PRODUCT NAME:   CNDMAAO DMV-11 MICRO-CONTROLLER STATIC DIAGNOSTIC PART 1

                        PRODUCT DATE:   APRIL 1984

                        MAINTAINER:     ISS DIAGNOSTICS

                        AUTHORS:        CHRIS BRIENEN
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                        MODIFIED BY:    JAKI BERG       9-APR-1984

                        PURPOSE:        THIS DIAGNOSTIC IS DESIGNED TO PERFORM STATIC LOGIC TESTS FOR
                                        THE M8053 OR M8064 (HEREAFTER REFERRED TO AS THE DMV OR DMV-11)


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                                ***** MODIFICATION HISTORY *****

REV A: ORIGINAL RELEASE                          CHRIS BRIENEN, RAY MARSHALL     14-JAN-81

REV B: INSTALLED OUTSTANDING PATCHES                                             11-JUL-83

CVDMAB => CNDMAA                                 JAKI BERG                       9-APR-84
CHANGES WERE MADE TO  CVDMAB  TO PRODUCE  CNDMAA  FOR THE  FALCON-PLUS PROJECT
(SBC-11/21+).   CHANGES, MARKED BY ";JB REV A-0", ARE:
 - SET THE  ODT BREAK  VECTOR (LOCATION 140) TO THE STARTING ADDRESS OF
   FALCON'S ODT ROM (170000-OCTAL).
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CONTENTS

1.0 INTRODUCTION

THE M8053 AND M8064 ARE SINGLE-LINE SYNCHRONOUS, MICRO-PROCESSOR BASED COMMUNICATIONS INTERFACES WHICH CAN SUPPORT BOTH CHARACTER-ORIENTED (DDCMP, BSC, ETC.) AND BIT-ORIENTED (SDLC, HDLC, ETC.) PROTOCOLS. THE PURPOSE OF THIS PROGRAM IS TO PERFORM DIAGNOSTIC TESTING OF THE CSRS, RAM, AND BASIC MICRO-PROCESSOR LOGIC ON THESE BOARDS. THE FOLLOWING FUNCTIONS WILL BE PERFORMED: DMV RESIDENT U-DIAG EXECUTION CSR ADDRESSING, VIA REGISTER STATIC BIT INTERACTION AND READ/WRITE TESTING, AND ON-BOARD RAM TESTING.

THE STATIC LOGIC TESTS WILL PROVIDE EXTENSIVE TROUBLESHOOTING CAPABILITIES, SUCH AS TIGHT SCOPE LOOPS, SWITCH OPTIONS, AND ABILITY TO "LOCK" ONTO INTERMITTENT ERRORS. IN ADDITION TESTS ARE DESIGNED AND STRUCTURED TO ACHIEVE MAXIMUM FAULT RESOLUTION AND FACILITATE REPLACEMENT OF THE SMALLEST FIELD REPLACEABLE UNIT.

THIS PROGRAM IS IMPLEMENTED USING THE DIAGNOSTIC SUPERVISOR AND A STRUCTURED PROGRAMMING APPROACH. BECAUSE THE DESIGN CONFORMS TO THE SUPERVISOR (STANDALONE VERSION) THE PROGRAM IS COMPATIBLE WITH ACT, APT, XXDP+, AND SLIDE.

THROUGH DIALOGUE WITH THE OPERATOR, THE PROGRAM ALLOWS MODIFICATION OF DEVICE PARAMETERS, SUCH AS LSI-BUS ADDRESS, VECTOR ADDRESSES AND DEVICE PRIORITY. IN ADDITION, THE OPERATOR CAN SPECIFY PARTICULAR TESTS TO BE RUN AND A VARIETY OF LOOPING, RUNNING, AND REPORTING MODES.

DEVICE ERRORS WILL BE REPORTED AS THEY OCCUR. THE REPORT WILL INCLUDE A TEST NUMBER AND DESCRIPTION OF THE ERROR, GOOD AND BAD TEST DATA, AND APPLICABLE DEVICE REGISTER CONTENTS.

2.0 HARDWARE REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE M8053/8064 STATIC LOGIC TESTS:

SBC-11/21+
16K WORDS OF MEMORY
CONSOLE TERMINAL
M8053 OR M8064 COMMUNICATIONS INTERFACE

3.0 PRELIMINARY PROGRAM REQUIREMENTS

THIS PROGRAM (CNDMA) SHOULD BE THE FIRST OF THE FIVE DMV-11 STATIC DIAGNOSTICS TO BE RUN. ERRORS FOUND IN THIS PROGRAM SHOULD BE CORRECTED BEFORE RUNNING THE OTHERS.

4.0 GENERAL PROGRAM CONSIDERATIONS

4.1 DIAGNOSTIC SUPERVISOR

THIS PROGRAM IS COMPATIBLE WITH THE STANDALONE DIAGNOSTIC SUPERVISOR, AND MUST BE LOADED TO BE CO-RESIDENT WITH THE SUPERVISOR, OR BE PREVIOUSLY COMBINED WITH THE SUPERVISOR AND LOADED AS A SINGLE FILE. IN EITHER CASE, THE COMBINED PROGRAM WILL NOT EXCEED 16K OF MEMORY.

4.2 EXECUTION TIME

THE MAXIMUM TIME REQUIRED TO RUN THIS PROGRAM PER PASS FOR EACH UNIT IS 160 SECS.

4.3 XXDP+

THIS PROGRAM MAY BE LOADED UNDER XXDP+, AND MAY BE RUN IN DUMP MODE OR CHAIN MODE.

4.4 ACT/SLIDE

THIS PROGRAM MAY BE LOADED UNDER ACT OR SLIDE AND MAY BE RUN IN DUMP MODE OR CHAIN MODE.

4.5 APT

THIS PROGRAM MAY BE LOADED BY THE APT SYSTEM (INCLUDING APT-RD) AND RUN IN PROGRAM MODE OR SCRIPT MODE.

4.6 MEMORY MANAGEMENT

MEMORY MANAGEMENT IS NOT UTILIZED IN THIS PROGRAM.

4.7 ERROR LOGGING

AT THE END OF EACH PASS ON ALL UNITS, THE PROGRAM PRINTS OUT THE CUMULATIVE TOTAL NUMBER OF ERRORS SINCE THE LAST START OR RESTART COMMAND.

5.0 PROGRAM LOAD MEDIA

THIS PROGRAM CAN BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER OR FROM ACT, SLIDE, OR APT SYSTEMS, OR FROM ANY MEDIA SUPPORTED BY XXDP+. WHEN USING THE PAPER TAPE ABSOLUTE LOADER, THE PROGRAM SHOULD BE LOADED FIRST, FOLLOWED BY THE DIAGNOSTIC SUPERVISOR. WHEN USING XXDP+, THE DIAGNOSTIC SUPERVISOR SHOULD BE LOADED FIRST, FOLLOWED BY

225 THE DIAGNOSTIC PROGRAM.

```
227
228
229                          6.0 OPERATING INSTRUCTIONS
230
231
232                          6.1 LOADING AND STARTING PROCEDURES
233
234
235                          6.1.1 LOADING PROCEDURES
236
237                          THIS PROGRAM MAY BE LOADED FROM PAPER TAPE USING THE
238                          ABSOLUTE LOADER.  IT MAY ALSO BE LOADED FROM ANY XXDP+ LOAD
239                          MEDIA. WHEN LOADED UNDER XXDP+, THE DIAGNOSTIC SUPERVISOR
240                          WILL BE LOADED AUTOMATICALLY.
241
242
243                          6.1.2 STARTING PROCEDURES
244
245                          THE PROGRAM STARTS AT LOCATION 200.  USE STANDARD DEC
246                          PROCEDURES TO START THE PROGRAM.
247
248
249                          6.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION
250
251                          THE DIAGNOSTIC CAN BE EXECUTED STANDALONE UNDER XXDP+,
252                          WITHOUT READING THE REMAINDER OF THIS DOCUMENT, AS FOLLOWS:
253
254                          A) LOAD AND START DIAGNOSTIC USING RUN COMMAND
255                          B) RECEIVE DIAGNOSTIC SUPERVISOR IDENTIFICATION AND PROMPT (DRS-C>)
256                          C) ENTER STA<CR>
257                          D) ANSWER HARDWARE AND SOFTWARE QUESTIONS
258                          E) GET END OF PASS MESSAGES OR ERROR MESSAGES
259                          F) TO END EXECUTION, ENTER CONTROL/C
260
261
262                          6.2 INITIAL DIALOGUE
263
264                          AFTER THE PROGRAM AND THE SUPERVISOR ARE LOADED AND THE PROGRAM
265                          IS STARTED, THE FOLLOWING IDENTIFICATION IS TYPED :
266
267                          DRS LOADED
268                          DIAG. RUN-TIME SERVICES
269                          CNDMA-A-0
270                          DMV-11 U-CONTRL LOGIC DIAG - PART 1 OF 2
271                          UNIT IS M8053 OR M8064
272                          DR>
273
274                          THE OPERATOR THEN PROCEEDS BY TYPING ONE OR MORE OF THE
275                          COMMANDS DESCRIBED IN THE FOLLOWING SECTION 6.3. (FOR MORE
276                          DETAILED INFORMATION, REFER TO THE DIAGNOSTIC SUPERVISOR
277                          FUNCTIONAL SPECIFICATION).
278
279
280                          6.3 PROGRAM OPTIONS
281
282
283                          6.3.1 START COMMAND
```

```
284
285                     ************************************************************
286                     STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
287                        <FLAG-LIST>/EOP:<INCR>
288                     ************************************************************
289
290
291                     6.3.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>)
292
293                     <TEST-LIST>  IS  A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR
294                     RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT  SPECIFY  THE
295                     TESTS  TO BE EXECUTED.  THE NUMBERS ARE SEPARATED BY COLONS.
296                     THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER  IN  THE
297                     DIAGNOSTIC.  THEY MAY BE SPECIFIED IN ANY ORDER.  TESTS WILL
298                     BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF  THE  ORDER  OF
299                     SPECIFICATION.   THE  DEFAULT  IS  TO EXECUTE ALL TESTS.  ON
300                     THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION
301                     USED  IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE
302                     OPERATOR.  SEE EXAMPLE AT END OF 6.3.1.5.
303
304
305                     6.3.1.2 PASS SWITCH (/PASS:<PASS-CNT>)
306
307                     <PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER
308                     OF  PASSES.   A PASS IS DEFINED AS THE EXECUTION OF THE FULL
309                     DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED.
310                     THE DEFAULT IS NON-ENDING EXECUTION.  IN THIS CASE EXIT FROM
311                     THE PROGRAM IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C  OR
312                     BY  OCCURANCE  OF AN ERROR WITH THE HALT ON ERROR FLAG BEING
313                     SET.  THE EXIT IS A RETURN TO COMMAND MODE.  SEE EXAMPLE  AT
314                     END OF 6.3.1.5.
315
316
317                     6.3.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)
318
319                     <FLAG-LIST>  IS  A  SEQUENCE OF ELEMENTS OF THE FORM <FLAG>,
320                     <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS
321                     ONE OF THE FOLLOWING VALUES:
322
323                        HOE   HALT ON ERROR, CAUSING COMMAND MODE TO BE
324                              ENTERED WHEN AN ERROR IS ENCOUNTERED
325                        LOE   LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP
326                              CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK
327                              OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAIN-
328                              ING THE ERROR
329                        IER   INHIBIT ERROR REPORTING
330                        IBE   INHIBIT BASIC ERROR REPORTS
331                        IXE   INHIBIT EXTENDED ERROR REPORTS
332                        PRI   DIRECT ALL MESSAGES TO A LINE PRINTER
333                        PNT   PRINT NUMBER OF TEST BEING EXECUTED
334                        BOE   BELL ON ERROR
335                        UAM   RUN IN UNATTENDED MODE, BYPASSING MANUAL
336                              INTERVENTION TESTS
337                        ISR   INHIBIT STATISTICAL REPORTS
338                        IDU   INHIBIT DROPPING OF UNITS BY DIAGNOSTIC
339                        LOT   LOOP ON TEST
340
```

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.4 END OF PASS SWITCH (/EOP:<INCR>)

<INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.5 EFFECT OF START COMMAND

THE EFFECT OF THE START COMMAND IS TO INITIATE THE HARDWARE PARAMETER DIALOGUE, THE SOFTWARE PARAMETER DIALOGUE, AND THEN THE DIAGNOSTIC TESTS THEMSELVES.

THE HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE QUESTION "# UNITS?" TO WHICH THE OPERATOR REPLIES WITH A DECIMAL NUMBER N FROM 1 TO 16. THE TERM "UNIT" REFERS TO THE DEVICE TO WHICH THIS SERIES OF DIAGNOSTICS IS DEDICATED. FOLLOWING THIS ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES WILL BE BUILT. EACH P-TABLE IS A CORE-RESIDENT TABLE CONTAINING ALL THE HARDWARE INFORMATION FOR ONE UNIT. THE OPERATOR MUST SUPPLY N (NUMBER OF UNITS) VALUES FOR EACH QUESTION. HE MAY DO THIS BY GIVING ONE ANSWER TO EACH QUESTION (IN WHICH CASE THE SERIES OF QUESTIONS WILL BE POSED N TIMES) OR BY GIVING N VALUES, SEPARATED BY COMMAS, TO EACH QUESTION (SERIES WILL BE POSED ONCE). EACH QUESTION IS FOLLOWED BY THE RESPONSE RADIX (D FOR DECIMAL, B FOR BINARY, O FOR OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE THE MODE (QUICK VERIFY ETC.) THAT THE DIAGNOSTIC WILL EXECUTE IN.

WHEN THE QUESTION "# UNITS?" IS ANSWERED, MEMORY STORAGE IS ALLOCATED FOR THE P-TABLES, AND IF THERE IS NOT ENOUGH TO ACCOMMODATE THEM THE MESSAGE "TOO MANY UNITS" IS ISSUED. IN THIS CASE THE DIAGNOSTIC MUST BE EXECUTED MORE THAN ONCE TO TEST ALL UNITS.

EXAMPLE:

STA/TESTS:1:2-4:6:8-10/PASS:3/FLAGS:IER:HOE=1:UAM:LOE

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, EACH PASS CONSISTING OF TESTS 1,2,3,4,6,8,9, AND 10 EXECUTED AGAINST ALL UNITS. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

```
398
399
400                          6.3.2 RESTART COMMAND
401
402                          ********************************************************************
403                          RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
404                             <FLAG-LIST>/UNITS:<UNIT-LIST>
405                          ********************************************************************
406
407
408                          6.3.2.1 TESTS, PASS, AND FLAGS SWITCHES
409
410                          <TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START
411                          COMMAND.
412
413
414                          6.3.2.2 UNITS SWITCH (/UNITS:<UNIT-LIST>)
415
416                          <UNIT-LIST>  IS  A SEQUENCE OF DECIMAL NUMBERS (0,1 ETC.) OR
417                          RANGES OF DECIMAL NUMBERS (0-5, 8-10 ETC.) THAT SPECIFY  THE
418                          UNITS  TO  BE  TESTED.  THE NUMBERS ARE SEPARATED BY COLONS.
419                          THE NUMBERS MAY RANGE FROM 0 THRU N-1  (N  IS  THE  NUMBER  OF
420                          UNITS  SPECIFIED IN THE PREVIOUS START COMMAND).  THE NUMBER
421                          INDICATES THE POSITION  OF  THE  P-TABLE  AS  THE  DATA  WAS
422                          ENTERED  DURING THE HARDWARE DIAGLOGUE.  THE UNITS WHICH ARE
423                          SELECTED MUST NOT HAVE BEEN DROPPED  BY  THE  DROP  COMMAND.
424                          SEE  THE DISCUSSION OF ADD AND DROP COMMANDS BELOW.  DEFAULT
425                          IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY  A  DROP
426                          COMMAND.
427
428
429                          6.3.2.3 EFFECT OF RESTART COMMAND
430
431                          THE  RESTART  COMMAND DIFFERS FROM THE START COMMAND IN THAT
432                          THE P-TABLES FROM THE PREVIOUS  START  COMMAND  (THERE  MUST
433                          HAVE  BEEN  ONE)  ARE USED, INSTEAD OF NEW ONES BEING BUILT.
434                          THE UNITS SWITCH GIVES THE ABILITY TO  SELECT  A  SUBSET  OF
435                          THESE.   THE  SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED
436                          (OPERATOR WILL BE ASKED). THE  COMMAND  CAN  BE  USED  AFTER
437                          COMMAND  MODE  HAS BEEN REENTERED IN ANY OF THE THREE NORMAL
438                          WAYS:  A) THE REQUESTED NUMBER OF PASSES HAVE BEEN  MADE  B)
439                          AN  ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C)
440                          A CONTROL/C WAS ENTERED BY THE OPERATOR.
441
442
443                          6.3.3 CONTINUE COMMAND
444
445                          ********************************************************************
446                          CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>
447                          ********************************************************************
448
449
450                          6.3.3.1 PASS SWITCH (/PASS:<PASS-CNT>)
451
452                          <PASS-CNT> IS SAME AS IN START COMMAND, BUT THE  DEFAULT  IS
453                          THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART.
454                          IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION.
```

```
455
456
457                     6.3.3.2 FLAG SWITCH (/FLAGS:<FLAG-LIST>)
458
459                     <FLAG-LIST> IS SAME AS IN  START  COMMAND,  BUT  UNSPECIFIED
460                     FLAGS RETAIN THEIR CURRENT VALUE.
461
462
463                     6.3.3.3 EFFECT OF CONTINUE COMMAND
464
465                     CONTINUE  MUST  FOLLOW  A START OR RESTART, AND COMMAND MODE
466                     MUST HAVE  BEEN  ENTERED  DUE  TO  A  HALT  ON  ERROR  OR  A
467                     CONTROL/C.  THE  EFFECT  OF  THE  COMMAND  IS  TO  GO TO THE
468                     BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE  HALT
469                     OR  CONTROL/C  TOOK PLACE.  SOFTWARE DIALOGUE MAY OPTIONALLY
470                     BE REEXECUTED.  HARDWARE PARAMETERS MAY NOT BE CHANGED.
471
472
473                     6.3.4 PROCEED COMMAND
474
475                     ****************************************************************
476                     PRO(CEED)/FLAGS:<FLAG-LIST>
477                     ****************************************************************
478
479
480                     6.3.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)
481
482                     <FLAG-LIST> IS AS IN  THE  START  COMMAND,  BUT  UNSPECIFIED
483                     FLAGS RETAIN THEIR CURRENT VALUE.
484
485
486                     6.3.4.2 EFFECT OF PROCEED COMMAND
487
488                     PROCEED  MUST FOLLOW A START, RESTART, OR CONTINUE.  COMMAND
489                     MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR.  THE EFFECT
490                     OF  THE  COMMAND  IS  TO  BEGIN  EXECUTION  AT  THE LOCATION
491                     FOLLOWING THE ERROR CALL.   NEITHER  HARDWARE  NOR  SOFTWARE
492                     PARAMETERS MAY BE ALTERED.
493
494
495
496                     6.3.5 ADD COMMAND
497
498                     ****************************************************************
499                     ADD/UNITS:<UNIT-LIST>
500                     ****************************************************************
501
502
503                     6.3.5.1 UNITS SWITCH (/UNITS:<UNIT-LIST>
504
505                     <UNIT-LIST> IS AS IN THE RESTART COMMAND.
506
507
508                     6.3.5.2 EFFECT OF ADD COMMAND
509
510                     THE UNITS SPECIFIED ARE ADDED TO THE  TEST  SEQUENCE.   EACH
511                     UNIT  MUST  HAVE  A  P-TABLE  IN  MEMORY  DUE  TO AN EARLIER
```

HARDWARE DIALOGUE. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE. THE UNITS SWITCH MUST BE SPECIFIED. THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS THAT WERE PREVIOUSLY DROPPED.

6.3.6 DROP COMMAND

****
DRO(P)/UNITS:<UNIT-LIST>
****

6.3.6.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.6.2 EFFECT OF DROP COMMAND

THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING. THE UNITS WILL BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND. THE UNITS SWITCH MUST BE ENTERED. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR A CONTINUE COMMAND.

6.3.7 PRINT COMMAND

****
PRI(NT)
****

6.3.7.1 EFFECT OF PRINT COMMAND

THE TOTAL NUMBER OF ERRORS FOR EACH UNIT SINCE THE LAST START OR RESTART COMMAND ARE PRINTED. THE ISR (INHIBIT STATISTICAL REPORTING) FLAG IS CLEARED.

6.3.8 DISPLAY COMMAND

****
DIS(PLAY)/UNITS:<UNIT-LIST>
****

6.3.8.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.8.2 EFFECT OF DISPLAY COMMAND

THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED OUT IN THE FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS THAT WERE DROPPED BY THE OPERATOR "DROP" COMMAND ARE SO

DESIGNATED.

6.3.9 FLAGS COMMAND

****
FLA(GS)
****

6.3.9.1 EFFECT OF FLAGS COMMAND

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

6.3.10 ZFLAGS COMMAND

****
ZFL(AGS)
****

6.3.10.1 EFFECT OF ZFLAGS COMMAND

ALL FLAGS ARE CLEARED.

6.3.11 CONTROL CHARACTERS

A CONTROL C (C) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES A RETURN TO COMMAND MODE.

A CONTROL Z (Z) ENTERED DURING ONE OF THE THREE OPERATOR DIALOGUES- HARD CORE QUESTIONS (SEE 6.2),HARDWARE DIALOGUE (SEE 6.3.1.5), OR SOFTWARE DIALOGUE (SEE 6.3.1.5) CAUSES THE DEFAULTS TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

A CONTROL O (O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES ALL TELETYPE OUTPUT TO BE SURPRESSED FOR THE REMAINDER OF THE DIAGNOSTIC OR UNTIL ANOTHER O IS TYPED, WHICH RESTORES NORMAL TELETYPE OUTPUT.

6.3.12 HARDWARE PARAMETERS

THE FOLLOWING 3 QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

1. DEVICE CSR ADDRESS : (O) 160020?

THIS IS THE ADDRESS AT WHICH THE CSR REGISTERS (SELO) RESIDE ON THE LSI-BUS. THE ALLOWABLE RANGE IS 160020-177760 (OCTAL), AND THE DEFAULT VALUE IS 160020.

2. DEVICE VECTOR ADDRESS : (O) 300 ?

THIS IS THE ADDRESS OF THE INPUT INTERRUPT VECTOR FOR THIS DEVICE. THE ALLOWABLE RANGE IS 000-674 (OCTAL), AND THE DEFAULT VALUE IS 300.

3. DEVICE PRIORITY LEVEL : (O) 4 ?

THIS IS THE CPU PRIORITY AT WHICH THE INTERRUPT HANDLERS OF THIS DEVICE WILL BE EXECUTED. THE ALLOWABLE RANGE IS 0-7, AND THE DEFAULT VALUE IS 4.

6.3.13 SOFTWARE PARAMETERS

NO SOFTWARE PARAMETER QUESTIONS ARE ASKED BY PART 1 OF THE STATIC LOGIC TESTS.

6.3.14 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

THE FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY.

AS SOON AS THE QUESTION "# UNITS?" IS ANSWERED (WITH THE NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES. ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT.

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN ALL OF THE P-TABLES ARE FILLED. IF THE OPERATOR TYPES IN LESS THAN N EXPLICIT VALUES IN RESPONSE TO A PARTICULAR QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES (ONE VALUE GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH THE FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED. THE LAST VALUE IN THE STRING BECOMES THE NEW DEFAULT AND IS USED TO FILL THAT SLOT IN THE REMAINING P-TABLES.

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT, EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED IN THE FIRST TRIP.

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED N EXPLICIT VALUES FROM THE OPERATOR.

IN GIVING A STRING OF VALUES, COMMAS WITHOUT INTERVENING VALUES MAY BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE.

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE). IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1). IF THE VALUES ARE ADDRESSES, THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2).

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO

```
                        CONSTRUCT A SET OF P-TABLES.  ASSUME THAT WE HAVE 16  UNITS,
                        AND THAT THERE ARE THREE HARDWARE PARAMETERS FOR EACH (THREE
                        SLOTS IN  THE  P-TABLE,  THREE  HARDWARE  QUESTIONS  IN  THE
                        DIALOGUE).  LET THE DESIRED VALUE FOR THE FIRST PARAMETER BE
                        THE NUMBER 75 FOR ALL 16 TABLES.  LET THE DESIRED VALUE  FOR
                        THE   SECOND   PARAMETER   BE   EQUAL   TO   THE  UNIT  NUMBER
                        (0,1,2,....,15) EXCEPT FOR UNIT 12, WHICH SHOULD RECEIVE  THE
                        VALUE  11.  LET THE DESIRED VALUE FOR THE THIRD PARAMETER BE
                        THE NUMBER 76 FOR THE FIRST 7 UNITS AND THE NUMBER  77  FOR
                        THE LAST 9 UNITS.

                        THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL:

                        @ UNITS (D) ? 16
                        UNIT 0
                        <QUESTION 1> ? 75
                        <QUESTION 2> ? 0-6
                        <QUESTION 3> ? 76

                        UNIT 7
                        <QUESTION 1> ?
                        <QUESTION 2> ? 7-11,,13-15
                        <QUESTION 3> ? 77

                        THE  FIRST  TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75
                        IN ALL 16 TABLES.  SLOT TWO RECEIVES THE VALUES 0,1,2,....,6
                        IN  TABLES 0 THRU 6 AND A CONSTANT 6 IN TABLES 7 THRU 15.
                        SLOT THREE RECEIVES A CONSTANT 76 IN ALL 16 TABLES.

                        THE SECOND TIME THRU THE SERIES, TABLES 7 THRU THE END  ARE
                        GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS
                        PRINTED OUT FOR THE THE OPERATOR IN THE FORM  "UNIT  XX"  AT
                        THE  BEGINNING  OF EACH SERIES).  QUESTION 1 IS RESPONDED TO
                        BY A <CR>, SO SLOT ONE STAYS AT CONSTANT  75  IN  TABLES  7
                        THRU 15, SINCE NO NEW EXPLICIT VALUES ARE TYPED IN.  SLOT TWO
                        GETS THE VALUES 7,8,9,10,11 IN TABLES 7  THRU  11,  AND
                        GETS AN 11 IN SLOT 12, AND GETS THE VALUES 13,14,15 IN
                        TABLES 13 THRU 15. SLOT THREE GETS THE VALUE 77 IN TABLES 7
                        THRU 15.

                        THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT
                        16 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION
                        (NAMELY QUESTION 2).
```

```
729
730
731                     7.0 TEST DESCRIPTIONS
732
733
734                     ;*****************************************************************************
735                     ;*      TEST 1  <DMV-11 AVAILABILITY>
736                     ;*
737                     ;* EACH NORMALLY USED CSR IS ACCESSED WITH A "TST" OR "TSTB" INSTRUCTION AND IF
738                     ;* A BUS TIMEOUT OCCURS (INTERRUPT @ VECTOR ADDR 4) A FLAG WILL BE SET SHOWING
739                     ;* WHICH CSR ADDR AND INSTRUCTION FAILED. "T1.HSW" REFLECTS "TST" INSTRUCTIONS
740                     ;* AND "T1.HSB" REFLECTS "TSTB" INSTRUCTIONS.
741                     ;*
742                     ;*      EXAMPLES:
743                     ;*
744                     ;*      IF "TSTB  @BSEL1"  FAILS,  BIT # 1 OF "T1.HSB" WILL BE SET.
745                     ;*      IF "TST  @SEL4" FAILS, BIT # 4 OF "T1.HSW" WILL BE SET
746                     ;*      (NOTE: ONLY EVEN BITS IN "T1.HSW" CAN BE SET).
747                     ;*
748                     ;*  THE FLAG WORDS ARE OUTPUT IN BINARY AS "EXTENDED ERROR INFORMATION".
749                     ;*****************************************************************************
750
751
752                     ;*****************************************************************************
753                     ;*      TEST 2  <MASTER CLEAR, RUN MICRODIAGNOSTICS>
754                     ;*
755                     ;* A MASTER CLEAR IS ISSUED TO THE DMV-11, AND THE PROGRAM ALLOWS SUFFICIENT
756                     ;* TIME FOR THE MICRODIAGNOSTICS TO BE PERFORMED. THESE MICRODIAGNOSTICS RESIDE
757                     ;* IN 6502 PROGRAM  MEMORY,  AND  THOROUGHLY VERIFY THE OPERATION OF THE 6502
758                     ;* MICROPROCESSOR CHIP. THEN, THEY CHECK OUT THE DATA RAM, THE 6502'S ACCESS TO
759                     ;* THE CSR'S,  AND  PERFORM  A  SIMPLE MESSAGE TEST USING THE 6522 CHIP AND THE
760                     ;* USYRT, WITH INTERNAL LOOPBACK.
761                     ;*
762                     ;* NEXT, THE LSI-11 PROGRAM READS THE THE CSR'S (SEL0-SEL6) AND CHECKS THEM FOR
763                     ;* THEIR EXPECTED INITIALIZED  STATES.  IF AN ERROR HAS OCCURRED IN THE MICRO-
764                     ;* DIAGNOSTICS THE NUMBER OF THE FAILING TEST WILL BE FOUND IN SEL4, AND RUN
765                     ;* (BIT 7) WILL NOT BE SET IN BSEL1.
766                     ;*****************************************************************************
767
768
769                     ;*****************************************************************************
770                     ;*      TEST 3  <CSR ADDRESSING>
771                     ;*
772                     ;* FIRST, HALT THE 6502 UP BY CLEARING ALL CSRS. THEN, WRITE A DIFFERENT WORD
773                     ;* OF DATA  PATTERN  A INTO EACH OF BSEL0-17, AND AFTER EACH WRITE, READ AND
774                     ;* COMPARE ALL REGS TO EXPECTED VALUES.
775                     ;*
776                     ;* DATA PATTERN A = 001, 002, 004, 010, 020, 040, 100, 200, 052, 300, 140,
777                     ;*                  060, 030, 014, 006, 003
778                     ;*****************************************************************************
779
780
781                     ;*****************************************************************************
782                     ;*      TEST 4  <CSR REGISTERS DATA READ/WRITE>
783                     ;*
784                     ;* WRITE, READ, AND COMPARE EACH BYTE OF DATA PATTERN B INTO REGISTER BSEL0.
785                     ;* THEN, REPEAT THIS USING EACH OF THE REMAINING CSR'S, BSEL1-BSEL17.  WHEN BSEL1
```

```
;* IS BEING TESTED, THE PROGRAM ALWAYS SETS BIT 7 IN THE DATA PATTERN SO THAT
;* RUN WILL NOT BE CLEARED, AND IT ALWAYS CLEARS BIT6 SO THAT MCLR WILL NOT BE
;* SET.
;*
;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
;*****************************************************************************


;*****************************************************************************
;*       TEST 5  <BASIC MASTER CLEAR>
;*
;* PERFORM AN INITIAL MASTER CLEAR. WRITE 356 INTO BSEL0 AND READ AND CHECK IT.
;* THEN, ISSUE A MASTER CLEAR AND READ AND CHECK BSEL0 FOR 000.
;*****************************************************************************


;*****************************************************************************
;*       TEST 6  <BUS RESET>
;*
;* PERFORM AN INITIAL MASTER CLEAR.  WRITE 377 INTO BSEL0 AND READ AND CHECK
;* IT. THEN, ISSUE A RESET INSTRUCTION, STALL FOR COMPLETION, AND READ AND
;* CHECK BSEL0 FOR 000.
;*****************************************************************************


;*****************************************************************************
;*       TEST 7  <CSR, MAINTENANCE MICROCODE INTERACTION>
;*
;* THIS TEST INVOKES THE MAINTENANCE REQUEST MECHANISM THROUGH WHICH THE LSI-11
;* AND 6502 CAN COMMUNICATE.    FIRST, A MASTER CLEAR IS DONE WITH ONLY BIT 0
;* (MREQ) SET IN BSEL1. THE PROGRAM THEN CHECKS FOR THE SETTING OF BSEL2 BIT 7
;* (MRDY) BY THE MAINTENANCE MICROCODE WITHIN ABOUT 50 MICRO-SEC., AND IF MRDY
;* DOES NOT GET SET, AN ERROR IS REPORTED.
;*
;* NEXT, THE PROGRAM LOADS SEL4 WITH 000010 AND BSEL6 WITH 125. THEN, ALL CSR'S
;* ARE READ AND CHECKED FOR EXPECTED CONTENTS.
;*
;* BSEL2 IS THEN LOADED WITH A WRITE COMMAND, WHICH SHOULD CAUSE THE MICROCODE
;* TO  TRANSFER  THE  125  INTO  BSEL0. ALL CSR'S ARE THEN READ AND CHECKED FOR
;* EXPECTED CONTENTS.
;*
;* THEN, THE PROGRAM LOADS 252 INTO BSEL0 AND READS AND CHECKS ALL CSR'S. BSEL2
;* IS THEN LOADED  WITH  A  READ  COMMAND, WHICH SHOULD CAUSE THE MICROCODE TO
;* TRANSFER THE 252 INTO BSEL6.  ALL CSR'S ARE READ AND CHECKED.
;*****************************************************************************


;*****************************************************************************
;*       TEST 8  <RUN FLIP-FLOP>
;*
;* THE PROGRAM PUTS THE MICROCODE INTO THE MAINTENANCE LOOP. A 125 CHARACTER
;* IS LOADED INTO BSEL6 AND A REQUEST IS MADE TO WRITE THE CONTENTS OF BSEL6
;* INTO BSEL0. THE PROGRAM THEN READS AND CHECKS BSEL0 TO CONTAIN 125.
;* NEXT, THE RUN FLIP-FLOP IS CLEARED BY LOADING A 0 INTO RUN (BSEL1 BIT 7).
;* BSEL0 IS THEN CLEARED AND THE REQUEST IS MADE AGAIN TO WRITE THE CONTENTS
;* OF BSEL6 INTO BSEL0. THE PROGRAM STALLS FOR 50 MICRO SEC. AND CHECKS FOR
```

```
                        ;* MRDY (BSEL2 BIT 7) NOT SET, AND BSEL0 STILL CLEARED.
                        ;* THEN, THE PROGRAM SETS THE RUN FLIP-FLOP AGAIN BY LOADING A 1 INTO RUN,
                        ;* AND CHECKS FOR MRDY SET WITHIN 50 MICRO-SEC. AND BSELO = 125.
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*      TEST 9  <LOW RAM (00-0F) SCRATCHPAD>
                        ;*
                        ;* THIS TEST FIRST PERFORMS AN ADDRESSING TEST OF RAM LOCATIONS (00-0F), BY
                        ;* WRITING THE ADRS INTO EACH LOCATION AND AFTER EACH WRITE, ALL THE LOCATIONS
                        ;* ARE READ AND CHECKED FOR EXPECTED CONTENTS.
                        ;*
                        ;* THEN, THE TEST PERFORMS READ/WRITE DATA TESTING OF RAM LOCATIONS 00-0F,
                        ;* BY WRITING, READING, AND COMPARING ALL BYTES OF DATA PATTERN B IN EACH
                        ;* LOCATION.
                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*      TEST 10 <DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)>
                        ;*
                        ;* GENERAL DESCRIPTION:
                        ;*  FIRST, THE 2K BYTE LOCATIONS IN RAM ARE LOADED WITH 0'S (SEE NOTE BELOW).
                        ;* THEN, THE FIRST LOCATION IS READ AND CHECKED, A SINGLE 1 IS WRITTEN INTO
                        ;* THE LOW BIT POSITION, AND THIS IS READ AND CHECKED. THIS IS DONE FOR ALL
                        ;* BYTES IN THE RAM, BY INCREMENTING THE ADDRESS TO POINT TO THE NEXT RAM
                        ;* LOCATION.
                        ;*  THEN, THE NEXT BIT POSITION IS CHOSEN TO INSERT A 1, AND ALL LOCATIONS
                        ;* ARE READ, WRITTEN, AND READ AS BEFORE. THIS IS CONTINUED FOR ALL BIT
                        ;* POSITIONS UNTIL THE ENTIRE RAM IS WRITTEN TO ALL 1'S. THE ABOVE OPERATIONS
                        ;* ARE PERFORMED A SECOND TIME, WITH 0'S INSERTED INTO THE RAM INSTEAD OF 1'S.
                        ;* THIS RESULTS IN THE ENTIRE RAM BEING WRITTEN TO ALL 0'S.
                        ;*  THIS TEST CONSTITUTES A THOROUGH TEST OF THE RAM. IT IS CAPABLE OF
                        ;* DETECTING THE FOLLOWING FAULTS :  STUCK ADDRESS BITS, UNI- AND BI-DIRECT-
                        ;* IONAL COUPLING BETWEEN ADDRESS BITS, STUCK MEMORY BITS, AND UNI- AND
                        ;* BI-DIRECTIONAL COUPLING BETWEEN MEMORY BITS IN BOTH ROWS AND COLUMNS OF THE
                        ;* MEMORY MATRIX.
                        ;*
                        ;* NOTE:
                        ;*  THIS TEST DOES NOT CHECK LOCATIONS 0010-001F, SO THAT THE PRIMARY CSR'S
                        ;* ARE NOT WRITTEN. IT DOES TEST LOCATIONS 0000-000F (SCRATCHPAD RAM) AND
                        ;* LOCATIONS 0020-002F (SECONDARY CSR'S), AS WELL AS 0030-0800 (BASIC RAM).
                        ;*
                        ;* THE "TMP#" REGISTERS ARE USED HERE TO CONTAIN THE VARIOUS CONSTANTS &
                        ;* VARIABLES USED THROUGHOUT THIS TEST.  A LIST OF THEIR ASSIGNMENTS SEEMS
                        ;* USEFUL SO HERE IT IS:
                        ;*
                        ;*      TMP0    POINTS TO THE FIRST LOCATION AFTER THE SELECT REGISTERS.
                        ;*
                        ;*      TMP1    ----
                        ;*
                        ;*      TMP2    TEST PATTERN ID CODE -- UNUSED BY THIS TEST.
                        ;*
                        ;*      TMP3    TEST DATA PATTERN INDEX -- UNUSED BY THIS TEST.
```

```
900
901                     ;*
902                     ;*      TMP4    TEST DATA PATTERN.  THE HIGH BYTE IS THE PATTERN BEING WRITTEN
903                     ;*              ON ANY GIVEN PASS AND THE LOW BYTE IS THE PATTERN THAT WAS
904                     ;*              WRITTEN BY THE PREVIOUS PASS THROUGH THE RAM.
905                     ;*
906                     ;*      TMP5    DATA READ FROM THE RAM.  ONLY THE LOW BYTE IS USED.
907                     ;*
908                     ;*      TMP6    ----
909                     ;*      TMP7    ----
910                     ;*      TMP8    ----
911                     ;*      TMP9    ----
912                     ;*
913                     ;*      TMPA    RAM ADDRESS BEING TESTED.
914                     ;*
915                     ;*      TMPB    BIT POINTER.  NUMBER OF THE BIT WITHIN THE DATA FIELD WHICH IS
916                     ;*              BEING SWITCHED ON EACH WRITE WITHIN THE CURRENT PASS.
917                     ;*
918                     ;*      TMPC    DATA FLAG.  BIT 0 OF THIS WORD IS THE VALUE TO WHICH THE BIT
919                     ;*              IDENTIFIED IN TMPB IS BEING SET ON EACH WRITE IN THE CURRENT
920                     ;*              PASS.
921                     ;*
922                     ;*      TMPD    DIRECTION SWITCH.  0 = FORWARD    NON-ZERO = BACKWARD
923                     ;*
924                     ;*      TMPE    LAST VALID ADDRESS TO BE TESTED.  (I.E. THE END OF RAM)
925                     ;*
926                     ;*      TMPF    ERROR FLAGS.  BIT 1 SET = THE LAST DETECTED ERROR WAS THE READ
927                     ;*              OF THE PREVIOUS DATA BEFORE WRITING THE NEW DATA.  IF BIT2 IS
928                     ;*              SET, THE READ AFTER WRITE FAILED.  IF EITHER IS SET WHEN AN
929                     ;*              ERROR IS DETECTED, THE SUPERVISOR IS NOT CALL'D AND THEREFOR
930                     ;*              IT'S ERROR COUNTER WILL NOT REFLECT THE ERROR -- INSTEAD, THE
931                     ;*              DATA LINE IS PRINTED.  (UNLESS THE ERROR HANDLER'S DATA LINE
932                     ;*              PRINT COUNT HAS EXCEDED ITS LIMIT -- IN WHICH CASE ITS
933                     ;*              INVOCATION IS IGNORED.)
934                     ;*************************************************************************************
935
936
937                     ;*************************************************************************************
938                     ;*      TEST 11 <VIA REGISTER ADRESSING>
939                     ;*
940                     ;*      VIA == "6522 VERSATILE INTERFACE ADAPTER"
941                     ;*
942                     ;* A MASTER CLEAR IS PERFORMED, NEXT, TIMER 1 LATCHES
943                     ;* ARE CLEARED BY WRITING 000 INTO VIA REGS 6 & 7
944                     ;* THEN, 377 IS LOADED INTO DATA DIRECTION REGISTERS A, B (DDRA,DDRB) TO
945                     ;* SET THE PORT PINS FOR OUTPUT MODE.
946                     ;* THEN, A DIFFERENT BYTE OF DATA PATTERN C IS WRITTEN INTO EACH VIA
947                     ;* LOCATION, (EXCEPT THE TIMER REGS 4,5,10,11 OCT) AND AFTER EACH IS WRITTEN,
948                     ;* ALL VIA REGS (EXCEPT 4,5,10,11) ARE READ AND COMPARED TO EXPECTED
949                     ;* CONTENTS. NOTE THAT SOME VIA REGS ARE ALTERED BY THE LOADING OF OTHERS,
950                     ;* AND THE PROGRAM TAKES THIS INTO ACCOUNT, IN THE SETTING OF EXPECTED REG
951                     ;* VALUES. THE DATA PATTERN IS CHOSEN TO AVOID ACTIVATING THE VIA CHIP (SUCH
952                     ;* AS GENERATING OUTPUTS ON CA1, CA2, CB1, CB2, OR CAUSING 6502
953                     ;* INTERRUPT REQUESTS).
954                     ;*  DATA PATTERN C (WITH VIA REGS AND THEIR DATA SHOWN IN OCTAL) :
955                     ;*   REGISTER =  00   01   02   03   06   07   12   13   14   15   16   17
956                     ;*        DATA = 100, 101, 377, 377, 106, 107, 112, 040, 042, 000, 200, 117
                        ;* NEXT, 000 IS LOADED INTO DDRA, AND DDRB IS READ AND COMPARED TO 377.  THEN,
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                        ;* THE 377 IS LOADED BACK INTO DDRA, AND DDRB IS LOADED WITH 000 AND DDRA IS
                        ;* READ AND COMPARED TO 377.
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*      TEST 12 <VIA'S DDRB DATA READ/WRITE>
                        ;*
                        ;*      DDRB == "DATA DIRECTION REGISTER B"
                        ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
                        ;* READ/WRITE BITS 0-7 OF VIA DATA DIRECTION REGISTER B ARE TESTED BY WRITING,
                        ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*      TEST 13 <VIA'S DDRA DATA READ/WRITE>
                        ;*
                        ;*      DDRA == "DATA DIRECTION REGISTER A"
                        ;*
                        ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
                        ;* READ/WRITE BITS 0-7 OF VIA DATA DIRECTION REGISTER A ARE TESTED BY WRITING,
                        ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*      TEST 14 <VIA'S ORB DATA READ/WRITE>
                        ;*
                        ;*      ORB == "OUTPUT REGISTER PORT B"
                        ;*
                        ;* FIRST, A MASTER CLEAR IS PERFORMED. NEXT, 377 IS LOADED INTO DATA
                        ;* DIR. REG. B (DDRB) TO SET ALL B PORT PINS FOR OUTPUT MODE. THEN ,
                        ;* READ/WRITE BITS 0-7 OF VIA OUTPUT REG. PORT B ARE TESTED BY WRITING,
                        ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*      TEST 15 <VIA'S T1 DATA READ/WRITE>
                        ;*
                        ;*      T1 == "TIMER #1"
                        ;*
                        ;* THIS TEST WRITES, READS, AND CHECKS THE T1 LATCHES AND COUNTER REGISTERS
                        ;* WITH DATA PATTERNS IN EACH OF 3 SUBTESTS.
                        ;*
                        ;*
                        ;* FIRST SUBTEST:  CHECKS FOR PROPER LOADING OF LATCHES
                        ;*      IT ALSO CHECKS TO BE SURE THAT THE COUNTER APPEARS TO BE DOING
                        ;*      SOMETHING TO THE COUNTERS.  AS LONG AS THEY HAVE CHANGED FROM THE
                        ;*      VALUE LOADED INTO THEM, WE WILL BE SATISFIED.
```

```
1014                    ;*
1015                    ;* A. A MASTER CLEAR IS PERFORMED.
1016                    ;* B. ALL LATCHES ARE LOADED TO ZEROES (JUST IN CASE), ACR6 & ACR7 ARE SET
1017                    ;*      TO ZERO (MODE 00), AND "T1" INTERRUPT ENABLE FLAG IS CLEARED.
1018                    ;*
1019                    ;* C. T1L-L(ADR 04) IS LOADED WITH THE CURRENT BYTE OF DATA PATTERN B.
1020                    ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
1021                    ;* E. T1C-L(ADR 04) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
1022                    ;*
1023                    ;* F. T1L-L(ADR 06) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
1024                    ;* G. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
1025                    ;*
1026                    ;* H. T1L-L(ADR 06) IS RE-LOADED WITH 0 TO MAKE T1C-H DECREMENT FAST.
1027                    ;*      T1L-H(ADR 05) IS LOADED WITH THE ORIGINAL TEST DATA PATTERN BYTE.
1028                    ;* I. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE LOADED INTO T1L-H.
1029                    ;*
1030                    ;* J. T1C-H(ADR 05) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
1031                    ;*
1032                    ;* K. T1L-H(ADR 07) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
1033                    ;* L. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE JUST LOADED.
1034                    ;*
1035                    ;* M. STEPS C-L ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
1036                    ;*
1037                    ;*
1038                    ;* SECOND SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
1039                    ;*                  FROM T1L-L TO T1L-H
1040                    ;*
1041                    ;* A. T1L-H(ADR 07) IS LOADED WITH 000 TO CLEAR IT.
1042                    ;* B. T1L-L(ADR 06) IS LOADED WITH A BYTE OF DATA PATTERN B.
1043                    ;* C. T1L-L(ADR 06) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
1044                    ;* D. T1L-H(ADR 07) IS READ AND COMPARED TO 000.
1045                    ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
1046                    ;*
1047                    ;*
1048                    ;* THIRD SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
1049                    ;*                  FROM T1L-H TO T1L-L
1050                    ;*
1051                    ;* A. T1L-L(ADR 04) IS LOADED WITH 000 TO CLEAR IT
1052                    ;* B. T1L-H(ADR 07) IS LOADED WITH A BYTE OF DATA PATTERN B.
1053                    ;* C. T1L-H(ADR 07) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
1054                    ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO 000.
1055                    ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
1056                    ;*
1057                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
1058                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
1059                    ;*****************************************************************************
1060
1061
1062                    ;*****************************************************************************
1063                    ;*      TEST 16 <VIA'S SR DATA READ/WRITE>
1064                    ;*
1065                    ;*      SR == "SHIFT REGISTER"
1066                    ;*
1067                    ;* FIRST, A MASTER CLEAR IS PERFORMED AND THE ACR IS SET TO 000. THEN :
1068                    ;* READ/WRITE BITS 0-7 OF VIA SHIFT REGISTER ARE TESTED BY WRITING, READING,
1069                    ;* AND COMPARING EACH BYTE OF DATA PATTERN B.
1070                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
```

```
1071                    ;*                      200, 376, 375, 373, 367, 357, 337, 277, 177, 000
1072                    ;*****************************************************************************
1073
1074
1075                    ;*****************************************************************************
1076                    ;*      TEST 17 <VIA'S ACR DATA READ/WRITE>
1077                    ;*
1078                    ;*      ACR == "AUXILIARY CONTROL REGISTER"
1079                    ;*
1080                    ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
1081                    ;* READ/WRITE BITS 0-7 OF THE ACR ARE TESTED BY WRITING, READING,
1082                    ;* AND COMPARING EACH BYTE OF DATA PATTERN B.
1083                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
1084                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
1085                    ;*****************************************************************************
1086
1087
1088                    ;*****************************************************************************
1089                    ;*      TEST 18 <VIA'S PCR DATA READ/WRITE>
1090                    ;*
1091                    ;*      PCR == "PERIPHERAL CONTROL REGISTER"
1092                    ;*
1093                    ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
1094                    ;* READ/WRITE BITS 0-7 OF THE PCR REGISTER ARE TESTED BY WRITING, READING,
1095                    ;* AND COMPARING EACH BYTE OF A SUBSET OF DATA PATTERN B.
1096                    ;*   DATA PATTERN B (SUBSET) =  125, 252, 000, 377, 001, 002, 004, 010, 020,
1097                    ;*                              040, 100, 200.
1098                    ;*****************************************************************************
1099
1100
1101                    ;*****************************************************************************
1102                    ;*      TEST 19 <VIA'S IER DATA READ/WRITE>
1103                    ;*
1104                    ;*      IER == "INTERRUPT ENABLE REGISTER"
1105                    ;*
1106                    ;* BITS 0-6 OF THE IER CAN BE SET OR CLEARED ON A WRITE, UNDER CONTROL OF THE
1107                    ;* SET/CLEAR CONTROL BIT 7. TO TEST THIS , EACH BYTE OF DATA PATTERN D IS
1108                    ;* WRITTEN INTO IER, AND THE REGISTER IS READ AND COMPARED TO THE CORRESPOND-
1109                    ;* ING BYTE OF DATA PATTERN E.
1110                    ;*
1111                    ;*   DATA PATTERN D = 200, 201, 202, 204, 210, 220, 240, 300, 200, 000, 001,
1112                    ;*                    002, 004, 010, 020, 040, 100, 000, 325, 125, 252, 052
1113                    ;*
1114                    ;*   DATA PATTERN E = 000, 001, 003, 007, 017, 037, 077, 177, 177, 177, 176,
1115                    ;*                    174, 170, 160, 140, 100, 000, 000, 125, 000, 052, 000
1116                    ;*
1117                    ;*****************************************************************************
1118
1119
1120                    ;*****************************************************************************
1121                    ;*      TEST 20 <VIA'S ORB/DDRB MASTER CLEAR TEST>
1122                    ;*
1123                    ;*      ORB == "OUTPUT REGISTER PORT B"
1124                    ;*      DDRB == "DATA DIRECTION REGISTER B"
1125                    ;*
1126                    ;* FIRST, A MASTER CLEAR IS PERFORMED. NEXT, 377 IS LOADED INTO DDRB TO SET
1127                    ;* ALL B PORT PINS FOR OUTPUT MODE. THEN, A 000 BYTE IS WRITTEN INTO ORB AND
```

```
1128                    ;* THE REGISTER IS READ BACK AND CHECKED FOR 000. THEN, A MASTER CLEAR IS
1129                    ;* PERFORMED AND ORB IS READ AND CHECKED FOR 377.
1130                    ;*****************************************************************************
1131
1132
1133                    ;*****************************************************************************
1134                    ;*      TEST 21 <VIA'S DDRB MASTER CLEAR TEST>
1135                    ;*
1136                    ;*      DDRB == "DATA DIRECTION REGISTER B"
1137                    ;*
1138                    ;* A 377 BYTE IS WRITTEN INTO DDRB AND THE REGISTER IS READ BACK AND CHECKED
1139                    ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND DDRB IS READ AND CHECKED FOR
1140                    ;* 000.
1141                    ;*
1142                    ;* NOTE:  THIS TESTING IS ALSO DONE IN TEST 23.  IT IS INCLUDED HERE ONLY TO
1143                    ;*        PROVIDE TIGHTER LOOPING ON JUST THE DDRB MASTER CLEAR CHECKING.
1144                    ;*****************************************************************************
1145
1146
1147                    ;*****************************************************************************
1148                    ;*      TEST 22 <VIA'S DDRA MASTER CLEAR TEST>
1149                    ;*
1150                    ;*      DDRA == "DATA DIRECTION REGISTER A"
1151                    ;*
1152                    ;* A 377 BYTE IS WRITTEN INTO DDRA AND THE REGISTER IS READ BACK AND CHECKED
1153                    ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND DDRA IS READ AND CHECKED FOR
1154                    ;* 000.
1155                    ;*****************************************************************************
1156
1157
1158                    ;*****************************************************************************
1159                    ;*      TEST 23 <VIA'S SR MASTER CLEAR TEST>
1160                    ;*
1161                    ;*      SR == "SHIFT REGISTER"
1162                    ;*
1163                    ;* A 123 BYTE IS WRITTEN INTO SR AND THE REGISTER IS READ BACK AND CHECKED
1164                    ;* FOR 123. THEN, A MASTER CLEAR IS PERFORMED AND SR IS READ AND CHECKED FOR
1165                    ;* NO CHANGE.
1166                    ;*****************************************************************************
1167
1168
1169                    ;*****************************************************************************
1170                    ;*      TEST 24 <VIA'S ACR MASTER CLEAR TEST>
1171                    ;*
1172                    ;*      ACR == "AUXILIARY CONTROL REGISTER"
1173                    ;*
1174                    ;* A 252 BYTE IS WRITTEN INTO ACR AND THE REGISTER IS READ BACK AND CHECKED
1175                    ;* FOR 252. THEN, A MASTER CLEAR IS PERFORMED AND ACR IS READ AND CHECKED FOR
1176                    ;* 000, TO VERIFY THAT IT IS CLEARED BY MASTER CLEAR.
1177                    ;*****************************************************************************
1178
1179
1180                    ;*****************************************************************************
1181                    ;*      TEST 25 <VIA'S PCR MASTER CLEAR TEST>
1182                    ;*
1183                    ;*      PCR == "PERIPHERAL CONTROL REGISTER"
1184                    ;*
```

```
1185                    ;* A 377 BYTE IS WRITTEN INTO PCR AND THE REGISTER IS READ BACK AND CHECKED
1186                    ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND PCR IS READ AND CHECKED FOR
1187                    ;* 000.
1188                    ;*****************************************************************************
1189
1190
1191                    ;*****************************************************************************
1192                    ;*      TEST 26 <VIA'S IER MASTER CLEAR TEST>
1193                    ;*
1194                    ;*      IER == "INTERRUPT ENABLE REGISTER"
1195                    ;*
1196                    ;* A 377 BYTE IS WRITTEN INTO IER AND THE REGISTER IS READ BACK AND CHECKED
1197                    ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND IER IS READ AND CHECKED FOR
1198                    ;* 200.
1199                    ;*****************************************************************************
1200
```

```
1202
1203
1204                    8.0 ERROR INFORMATION
1205
1206
1207                    8.1 ERROR REPORTING
1208
1209                    ERRORS  ARE  REPORTED  BY  THE PROGRAM AS THEY OCCUR (IF NOT
1210                    INHIBITED). THE REPORT CONFORMS TO THE DIAGNOSTIC SUPERVISOR
1211                    ERROR  REPORT  FORMAT,  AND CONSISTS OF A DESCRIPTION OF THE
1212                    ERROR, THE TEST NUMBER, SUBTEST  NUMBER,  PC  OF  THE  ERROR
1213                    CALL,   DEVICE   ADDRESS,   AND  BASIC  AND  EXTENDED  ERROR
1214                    INFORMATION.
1215
1216                    THE FOLLOWING EXAMPLE PROVIDES A TYPICAL ERROR REPORT, WHICH
1217                    DESCRIBES A "MASTER CLEAR FAILURE" ERROR, AND PROVIDES THE PC
1218                    OF THE ERROR CALL AND THE DEVICE REGISTER CONTENTS :
1219
1220                      CNDMA DVC FTL ERR 00001 ON UNIT 00 TST 002 SUB 000 PC: 021122
1221                      MASTER CLEAR FAILURE
1222
1223                        THE CONTENTS OF ALL BYTE SELECT REG'S ARE:
1224                      BSEL0   BSEL1   BSEL2   BSEL3
1225                       000     000     000     000
1226                          BSEL4   BSEL5   BSEL6   BSEL7
1227                           000     000     121     000
1228                      BSEL10  BSEL11  BSEL12  BSEL13
1229                       000     000     000     000
1230                          BSEL14  BSEL15  BSEL16  BSEL17
1231                           000     000     000     000
1232
1233                    FOR OTHER ERRORS, THE REPORT  MAY  BE  MORE  EXTENSIVE,  AND
1234                    REQUIRE ADDITIONAL DATA TO BE REPORTED.
1235
1236                    IF  EXTENDED  ERROR INFORMATION HAD BEEN INHIBITED USING THE
1237                    IXE FLAG PRIOR TO RUNNING THE TEST, THE  ABOVE  ERROR  WOULD
1238                    HAVE BEEN REPORTED IN THE FOLLOWING SHORTENED FORM :
1239
1240                      CNDMA DVC FTL ERR 00001 ON UNIT 00 TST 002 SUB 000 PC: 021122
1241                      MASTER CLEAR FAILURE
1242
1243                    ↑
```

```
                        .SBTTL LISTING & ASSEMBLY CONTROL

000000                  HELP=0          ; CONTROL LISTING OF HELP INFORMATION
                                        ; HELP=0   NO LIST
                                        ; HELP=1   LIST

002000                          .=2000

                                .MCALL  SVC
002000                          SVC                             ; INITIALIZE SUPERVISOR MACROS

002000                          BGNMOD  LU1MOD

000001                  $LSTIN= 1
000001                  $LSTTAG= 1
000001                  SVCINS= 1       ; LIST INSTRUCTIONS, SHIFTED RIGHT
000001                  SVCTST= 1       ; LIST TEST TAGS, SHIFTED RIGHT
000001                  SVCSUB= 1       ; LIST SUBTEST TAGS, SHIFTED RIGHT
000001                  SVCGBL= 1       ; LIST GLOBAL TAGS, SHIFTED RIGHT
000001                  SVCTAG= 1       ; LIST OTHER TAGS, SHIFTED RIGHT

                        ;       CHANGE THE VALUES OF THE SVC... SYMBOLS TO BE ZERO IF YOU WISH
                        ;       TO ALIGN THE MACRO CALLS AND THEIR EXPANSIONS.  CHANGE THE
                        ;       SYMBOLS TO BE MINUS-ONE TO NOT LIST THE EXPANSIONS.  YOU MAY
                        ;       CHANGE THE SYMBOLS AT ANY POINT IN YOUR PROGRAM.

002000                          POINTER BGNAU,BGNDU,ERRTBL
```

```
                        .SBTTL PROGRAM HEADER
                        ;**
                        ;THE PROGRAM HEADER MACRO CHARACTERIZES THIS DIAGNOSTIC. THE
                        ;HEADER MACRO'S ARGUMENTS ARE FILE NAME, RELEASE LEVEL, PATCH
                        ;DISPOSITION OF THE MOST RECENT PATCH, MAXIMUM TEST TIME IN SEC.,
                        ;AND THE TYPE OF DIAGNOSTIC (0-SEQUENTIAL, 1-EXERCISER).  THESE
                        ;ARGUMENTS ARE IN RESPECTIVE ORDER.
                        ;--

                        HEADER CNDMA,A,0,110.,,0
002000                                                  L$NAME::
002000  103                                                     .ASCII /C/
002001  116                                                     .ASCII /N/
002002  104                                                     .ASCII /D/
002003  115                                                     .ASCII /M/
002004  101                                                     .ASCII /A/
002005  000                                                     .BYTE   0
002006  000                                                     .BYTE   0
002007  000                                                     .BYTE   0
002010                                                  L$REV::
002010  101                                                     .ASCII  /A/
002011                                                  L$DEPO::
002011  060                                                     .ASCII  /0/
002012                                                  L$UNIT::
002012  000000                                                  .WORD   0
002014                                                  L$TIML::
002014  000156                                                  .WORD   110.
002016                                                  L$HPCP::
002016  040122                                                  .WORD   L$HARD
002020                                                  L$SPCP::
002020  000000                                                  .WORD   0
002022                                                  L$HPTP::
002022  002216                                                  .WORD   L$HW
002024                                                  L$SPTP::
002024  000000                                                  .WORD   0
002026                                                  L$LADP::
002026  040400                                                  .WORD   L$LAST
002030                                                  L$STA::
002030  000000                                                  .WORD   0
002032                                                  L$CO::
002032  000000                                                  .WORD   0
002034                                                  L$DTYP::
002034  000000                                                  .WORD   0
002036                                                  L$APT::
002036  000000                                                  .WORD   0
002040                                                  L$DTP::
002040  002124                                                  .WORD   L$DISPATCH
002042                                                  L$PRIO::
002042  000000                                                  .WORD   0
002044                                                  L$ENVI::
002044  000000                                                  .WORD   0
002046                                                  L$EXP1::
002046  000000                                                  .WORD   0
002050                                                  L$MREV::
002050  003                                                     .BYTE   C$REVISION
002051  003                                                     .BYTE   C$EDIT
002052                                                  L$EF::
```

PROGRAM HEADER SEQ 0028

```
002052  000000                          .WORD   0
002054  000000                          .WORD   0
002056                          L$SPC::
002056  000000                          .WORD   0
002060                          L$DEVP::
002060  003522                          .WORD   L$DVTYP
002062                          L$REPP::
002062  000000                          .WORD   0
002064                          L$EXP4::
002064  000000                          .WORD   0
002066                          L$EXP5::
002066  000000                          .WORD   0
002070                          L$AUT::
002070  020400                          .WORD   L$AU
002072                          L$DUT::
002072  020374                          .WORD   L$DU
002074                          L$LUN::
002074  000000                          .WORD   0
002076                          L$DESP::
002076  003542                          .WORD   L$DESC
002100                          L$LOAD::
002100  104035                          EMT     E$LOAD
002102                          L$ETP::
002102  002236                          .WORD   L$ERRTBL
002104                          L$ICP::
002104  017622                          .WORD   L$INIT
002106                          L$CCP::
002106  020356                          .WORD   L$CLEAN
002110                          L$ACP::
002110  020232                          .WORD   L$AUTO
002112                          L$PRT::
002112  017614                          .WORD   L$PROT
002114                          L$TEST::
002114  000000                          .WORD   0
002116                          L$DLY::
002116  000000                          .WORD   0
002120                          L$HIME::
002120  000000                          .WORD   0
1297
1303                            .EVEN
```

```
1305                                    .SBTTL DISPATCH TABLE
1306
1307                                    ;////////////////////////////////////////////////////////////////////////////////
1308                                    ;/ THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
1309                                    ;/ IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
1310                                    ;////////////////////////////////////////////////////////////////////////////////
1311
1312 002122                                 DISPATCH        28.
     002122  000034                                                    .WORD   28
     002124                                                  L$DISPATCH::
     002124  020402                                                    .WORD   T1
     002126  021146                                                    .WORD   T2
     002130  021256                                                    .WORD   T3
     002132  021450                                                    .WORD   T4
     002134  021612                                                    .WORD   T5
     002136  021734                                                    .WORD   T6
     002140  022136                                                    .WORD   T7
     002142  022646                                                    .WORD   T8
     002144  023214                                                    .WORD   T9
     002146  024162                                                    .WORD   T10
     002150  025142                                                    .WORD   T11
     002152  025764                                                    .WORD   T12
     002154  026046                                                    .WORD   T13
     002156  026130                                                    .WORD   T14
     002160  026232                                                    .WORD   T15
     002162  027276                                                    .WORD   T16
     002164  027360                                                    .WORD   T17
     002166  027442                                                    .WORD   T18
     002170  027526                                                    .WORD   T19
     002172  027614                                                    .WORD   T20
     002174  030102                                                    .WORD   T21
     002176  030232                                                    .WORD   T22
     002200  030362                                                    .WORD   T23
     002202  030516                                                    .WORD   T24
     002204  030646                                                    .WORD   T25
     002206  030776                                                    .WORD   T26
     002210  031134                                                    .WORD   T27
     002212  036366                                                    .WORD   T28
1313
```

```
                        .SBTTL DEFAULT HARDWARE P-TABLE

                        ;////////////////////////////////////////////////////////////////////////
                        ;/ THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                        ;/ THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                        ;/ IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
                        ;////////////////////////////////////////////////////////////////////////

002214                          BGNHW   DFPTBL
002214  000007                                                         .WORD   L10000-L$HW/2
002216                                                                  L$HW::
002216                                                                  DFPTBL::

002216  160020                  .WORD   160020          ;DMV11 CSR UNIBUS ADDRESS
002220  000300                  .WORD      300          ;DMV11 INTERRUPT VECTOR
002222  004000                  .WORD     4000          ;DMV11 INTERRUPT PRIORITY LEVEL = 4
002224  000000                  .WORD      000          ;SWITCH REG. #1 (BOOT ADDRESS)
002226  000000                  .WORD      000          ;SWITCH REG. #2 (DDCMP ADDRESS)
002230  000000                  .WORD        0          ;H3254&H3255 USED
002232  000111                  .WORD   000111          ;MISC. CONTROLS:

                        ; POWER-UP MODE 0 MASK = 100
                        ;   0 = NOT JUMPERED FOR MODE 0 POWER-UP
                        ;   1 = JUMPERED FOR MODE 0 POWER-UP    <=== DEFAULT SETTING
                        ;       BOTH W5 & W6 REMOVED

                        ; BAUD RATE MASK = 77
                        ;       7 = 19.2 K
                        ;      11 = 56 K        <=== DEFAULT SETTING

002234                  ENDHW
002234                                                                  L10000:
```

SOFTWARE P-TABLE

```
                        .SBTTL SOFTWARE P-TABLE

                        ;////////////////////////////////////////////////////////////////
                        ;/ THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                        ;/ PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                        ;////////////////////////////////////////////////////////////////

002234                          BGNSW   SFPTBL
002234  000000                                                  .WORD   L10001-L$SW/2
002236                                                  L$SW::
002236                                                  SFPTBL::
002236                          ENDSW
002236                                                  L10001:
```

```
1360                            .SBTTL GLOBAL EQUATES SECTION
1361
1362
1363                            ;//////////////////////////////////////////////////////////////////////////////
1364                            ;/      THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
1365                            ;/      ARE USED IN MORE THAN ONE TEST.
1366                            ;//////////////////////////////////////////////////////////////////////////////
1367
1368 002236                             EQUALS
                                ;
                                ; BIT DIFINITIONS
                                ;
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
                                ;
001000                          BIT9==  BIT09
000400                          BIT8==  BIT08
000200                          BIT7==  BIT07
000100                          BIT6==  BIT06
000040                          BIT5==  BIT05
000020                          BIT4==  BIT04
000010                          BIT3==  BIT03
000004                          BIT2==  BIT02
000002                          BIT1==  BIT01
000001                          BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;
                                ;                                       ;  BIT POSITION IN SECOND STATUS WORD
000040                          EF.START==      32.                     ; (100000) START COMMAND WAS ISSUED
000037                          EF.RESTART==    31.                     ; (040000) RESTART COMMAND WAS ISSUED
000036                          EF.CONTINUE==   30.                     ; (020000) CONTINUE COMMAND WAS ISSUED
000035                          EF.NEW==        29.                     ; (010000) A NEW PASS HAS BEEN STARTED
000034                          EF.PWR==        28.                     ; (004000) A POWER-FAIL/POWER-UP OCCURRED
                                ;
                                ;
                                ; PRIORITY LEVEL DEFINITIONS
                                ;
000340                          PRI07== 340
000300                          PRI06== 300
000240                          PRI05== 240
000200                          PRI04== 200
```

GLOBAL EQUATES SECTION

```
                000140          PRIO3== 140
                000100          PRIO2== 100
                000040          PRIO1== 40
                000000          PRIO0== 0
                                ;
                                ;OPERATOR FLAG BITS
                                ;
                000004          EVL==     4
                000010          LOT==    10
                000020          ADR==    20
                000040          IDU==    40
                000100          ISR==   100
                000200          UAM==   200
                000400          BOE==   400
                001000          PNT==  1000
                002000          PRI==  2000
                004000          IXE==  4000
                010000          IBE== 10000
                020000          IER== 20000
                040000          LOE== 40000
                100000          HOE== 100000
   1369
   1370                         .SBTTL  DEFINE THE NUMBER OF CSR'S
   1371         000020          CSREGS  =  16.
   1372
   1373                         ;-------------------------------------------------------------------------------
   1374
   1375                         .SBTTL  NPR ADDRESS REGISTER EQUATES
   1376         000070          NPRAOL  = 70                    ;OUT NPR ADRS LO REG
   1377         000071          NPRAOH  = NPRAOL+1              ;OUT NPR ADRS HI REG
   1378         000072          NPRAOX  = NPRAOL+2              ;OUT NPR EXTENDED ADRS REG
   1379         000074          NPRAIL  = NPRAOL+4              ;IN NPR ADRS LO REG
   1380         000075          NPRAIH  = NPRAOL+5              ;IN NPR ADRS HI REG
   1381         000076          NPRAIX  = NPRAOL+6              ;IN NPR EXTENDED ADRS REG
   1382         000010          NPRBS7  = BIT3                  ;"BANK SELECT 7" BIT -- W/IN EXTENDED ADRS. REG.
   1383
   1384
   1385
   1386                         .SBTTL  NPR DATA REG EQUATES
   1387         123000          NPRDRL  = 123000                ;NPR DATA REGISTER -- LOW BYTE
   1388         123001          NPRDRH  = NPRDRL+1              ;NPR DATA REGISTER -- HIGH BYTE
   1389
   1390
   1391
   1392                         .SBTTL  NPR CONTROL REG EQUATES
   1393         123004          NPRCTL  = NPRDRL+4              ;NPR CONTROL REGISTER
   1394         000200          NPRABT  = BIT7                  ;=1 IF BUS TIME-OUT ON NPR
   1395         000100          NPRGO   = BIT6                  ;SET FOR NOP, CLEAR TO "GO" / 0=DONE, 1=BUSY
   1396         000040          NPRIO   = BIT5                  ;0 = (LSI ==> DMV);  1 = (DMV ==> LSI)
   1397         000020          LSIHLT  = BIT4                  ;SETTING THIS WILL "HALT" THE LSI-11 !!
   1398         000010          NPRBYT  = BIT3                  ;SET TO 1 TO WRITE BYTE ONLY TO LSI-11
   1399         000004          DMVPU   = BIT2                  ;SET BY MICRO-DIAG.  MUST REMAIN SET!!!
   1400         000002          LSIDCL  = BIT1                  ;IF SET, WILL CAUSE POWER DOWN CONDITION IN LSI!
   1401         000001          DMVDAI  = BIT0                  ;"DISABLE INIT" FROM EFFECTING DMV-11
   1402
   1403
   1404                         .SBTTL  NPR REQUEST FUNCTIONS
```

```
1405    000004          NPRLD   = DMVPU                 ;WORD XFER:  LSI ==> DMV
1406    000044          NPRDL   = DMVPU!NPRIO           ;WORD XFER:  DMV ==> LSI
1407    000054          NPRDLB  = DMVPU!NPRIO!NPRBYT    ;BYTE XFER:  DMV ==> LSI
1408
1409                    ;-------------------------------------------------------------------------------
1410
1411                    .SBTTL  INTERRUPT REG EQUATES
1412    123005          IRQREG  = 123005                ;INTERRUPT REQUEST REG
1413    000004          IRQA    = BIT2                  ;REQUEST BIT FOR XX0 INTERRUPT -- "A"
1414    000002          IRQB    = BIT1                  ;REQUEST BIT FOR XX4 INTERRUPT -- "B"
1415
1416                    ;-------------------------------------------------------------------------------
1417
1418                    .SBTTL  CONTROL FLAGS FROM P-TABLE ENTRIES
1419    000001          PU24    = BIT0                  ;POWER-FAIL VECTORING MODE.  1 = MODE 0
1420                                                    ;  (I.E. JUMPERS W5 & W6 BOTH REMOVED)
```

```
                        .SBTTL  SWITCH PACKS

                        ;;*****************************************************************************
                        ;* SWITCH PACKS
                        ;;*****************************************************************************

121000                  SWPBOT  = 121000                ;"BOOT ADDRESS" SWITCH PACK [A200]
121400                  SWPDDCMP = 121400               ;"DDCMP ADDRESS" SWITCH PACK [A300]
```

CSR REG. DEFINITION FOR MAINT. LOOP

```
                        .SBTTL  CSR REG. DEFINITION FOR MAINT. LOOP

                        ;++*************************************************************************
                        .SBTTL          MAINTENANCE REGISTER - BSEL0
                        ;--*************************************************************************
                        ;       INTERRUPT ENABLE BITS

000001                  IENBA   = BIT0                  ;INTERRUPT ENABLE "A"
000020                  IENBB   = BIT4                  ;INTERRUPT ENABLE "B"


                        ;++*************************************************************************
                        .SBTTL          MAINTENANCE REGISTER - BSEL1
                        ;--*************************************************************************
                        ; MAINT. LOOP CONTROL BITS:

000200                  RUN     = BIT7
000100                  MCLR    = BIT6
000001                  MREQ    = BIT0


                        ;++*************************************************************************
                        .SBTTL          MAINTENANCE REGISTER - BSEL2
                        ;--*************************************************************************
                        ; MAINTENANCE FUNCTION CODES

000001                  REDLOC  = 1                     ;FUNCTION CODE FOR READ A 6502 LOCATION
000002                  WRILOC  = 2                     ;FUNCTION CODE FOR WRITE A 6502 LOCATION
000003                  REDPAG  = 3                     ;FUNCTION CODE FOR READ A 6502 MEMORY PAGE
000004                  WRIPAG  = 4                     ;FUNCTION CODE FOR WRITE A 6502 RAM PAGE
000005                  EXECUT  = 5                     ;FUNCTION CODE FOR EXECUTE AT GIVEN PC

000200                  MRDY    = BIT7                  ;M-LOOP REDY FOR A COMMAND WHEN SET
```

```
                              .SBTTL  DMV INTERNAL ADDRESSES
                              ;+*********************************************************************
                              ;               DMV INTERNAL ADDRESSES
                              ;--*********************************************************************
                              ;########  <<  MICROPROCESSOR REGISTER ADDRESS EQUATES  >> #########
                              .SBTTL          BYTE & WORD SELECT REGISTERS
          000020              SLT0     =020
          000020              BSLT0    =SLT0
          000021              BSLT1    =SLT0+1
          000022              SLT2     =SLT0+2
          000022              BSLT2    =SLT0+2
          000023              BSLT3    =SLT0+3
          000024              SLT4     =SLT0+4
          000024              BSLT4    =SLT0+4
          000025              BSLT5    =SLT0+5
          000026              SLT6     =SLT0+6
          000026              BSLT6    =SLT0+6
          000027              BSLT7    =SLT0+7
                              .SBTTL          VIA'S REGISTERS
          120000              ORB      =120000
          120001              ORA      =ORB+1
          120002              DDRB     =ORB+2
          120003              DDRA     =ORB+3
          120004              T1CL     =ORB+4
          120005              T1CH     =ORB+5
          120005              T1LHGO   =ORB+5
          120006              T1LL     =ORB+6
          120007              T1LH     =ORB+7
          120010              T2LL     =ORB+10
          120010              T2CL     =T2LL
          120011              T2CH     =ORB+11
          120012              SR       =ORB+12
          120013              ACR      =ORB+13
          120014              PCR      =ORB+14
          120015              IFR      =ORB+15
          120016              IENR     =ORB+16
          120017              ORAM     =ORB+17
                              .SBTTL          VIA'S "IFR" REGISTER'S BIT ASSIGNMENTS
          000200              IFRIRQ   =BIT7   ;"IRQ" HAS BEEN ISSUED -- LOGICAL "OR" OF BITS 0 --> 6
          000100              IFRT1    =BIT6   ;"T1" -- TIMER # 1 TIMED-OUT
          000040              IFRT2    =BIT5   ;"T2" -- TIMER # 1 TIMED-OUT
          000020              IFRCB1   =BIT4   ;"CB1" EDGE DETECTED ("K2 LINE UNIT STEP" O/P SIGNAL FROM SR)
          000010              IFRCB2   =BIT3   ;"CB2" EDGE DETECTED (UNUSED!)
          000004              IFRSR    =BIT2   ;"SR" REGISTER COMPLETED SHIFT OPERATION
          000002              IFRCA1   =BIT1   ;"CA1" EDGE DETECTED ("K6 MOD RDY H")
          000001              IFRCA2   =BIT0   ;"CA2" EDGE DETECTED ("K2 CTS H")
```

M3

GLOBAL DATA SECTION

```
                                .SBTTL GLOBAL DATA SECTION

                                ;////////////////////////////////////////////////////////////////////////////////
                                ;/      THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ;/      IN MORE THAN ONE TEST.
                                ;////////////////////////////////////////////////////////////////////////////////

                                ;++*************************************************************************************
                                .SBTTL  CONTROL BLOCK FOR STACKED ERROR MESSAGES
                                ;--*************************************************************************************

                                        ERRTBL
002236                                                                  L$ERRTBL::
002236  000000                  ERRTYP::        .WORD   0
002240  000000                  ERRNBR::        .WORD   0
002242  000000                  ERRMSG::        .WORD   0
002244  000000                  ERRBLK::        .WORD   0

                                ;++*************************************************************************************
                                .SBTTL  STORAGE FOR DEVICE REGISTERS
                                ;--*************************************************************************************
002246                          WSR0:
002246  000000                  BSR0:   .WORD   0
002250                          WSR2:
002250  000000                  BSR1:   .WORD   0
002252                          WSR4:
002252  000000                  BSR2:   .WORD   0
002254                          WSR6:
002254  000000                  BSR3:   .WORD   0
002256                          WSR10:
002256  000000                  BSR4:   .WORD   0
002260                          WSR12:
002260  000000                  BSR5:   .WORD   0
002262                          WSR14:
002262  000000                  BSR6:   .WORD   0
002264                          WSR16:
002264  000000                  BSR7:   .WORD   0
002266  000000                  BSR10:  .WORD   0
002270  000000                  BSR11:  .WORD   0
002272  000000                  BSR12:  .WORD   0
002274  000000                  BSR13:  .WORD   0
002276  000000                  BSR14:  .WORD   0
002300  000000                  BSR15:  .WORD   0
002302  000000                  BSR16:  .WORD   0
002304  000000                  BSR17:  .WORD   0

                                ;++*************************************************************************************
                                .SBTTL  MISCELLANEOUS STORAGE
                                ;--*************************************************************************************
002306  000000                  TDATA:  .WORD   0               ;TEST DATA
002310  000000                  GDATA:  .WORD   0               ;EXPECTED DATA
002312  000000                  BDATA:  .WORD   0               ;ACTUAL DATA
002314  000000                  XDATA:  .WORD   0               ;EXCLUSIVE OR BETWEEN "GDATA" & "BDATA"
002316  110400                  DELAY1: .WORD   110400          ;DELAY TIME, 3 INST., 500 MILLISEC.
002320  000007                  DELAY2: .WORD   7               ;DELAY TIME FOR M-LOOP FUNCTION, 100 USEC.APPROX.
002322  000000                  LOGDEV: .WORD   0               ;LOGICAL DEVICE NUMBER
002324  000000                  PSTACK: .WORD   0               ;CONTAINS BASE LEVEL PROGRAM STACK POINTER
```

MISCELLANEOUS STORAGE

```
1825 002326  000000                INTFLG: .WORD   0               ;INTERRUPT RECEIVED FLAG BYTES.  ALLOCATION:
1826                                                                ;  LOW BYTE FOR "A" & HIGH BYTE FOR "B"
1827 002330  000000                INTWCH: .WORD   0               ;BYTE IS SET NON-ZERO WHEN HANDLER SHOULD BE
1828                                                                ;  WATCHING FOR INT'S.  ALLOCATION: SEE INTFLG
1829 002332  000000                ERRFLG: .WORD   0               ;ERROR FLAG
1830 002334  000000                REGNUM: .WORD   0               ;REGISTER NUMBER -- FOR PASSING ARG. TO "ERR#"
1831 002336  000000                FRSTIM: .WORD   0               ;FLAG=0 IF PROGRAM JUST LOADED
1832 002340  000000                FRSPAS: .WORD   0               ;FLAG=0 IF FIRST PASS AFTER LOAD
1833 002342  000000                DEVMAP: .WORD   0               ;BIT MAP OF ACTIVE DEVICES
1834 002344  000000                DEVPTR: .WORD   0               ;DEVICE MAP BIT POINTER
1835 002346  000000                CONSOL: .WORD   0               ;CONSOLE DEVICE FLAG -- NON-ZERO = NONE PRESENT
1836 002350  000000                PFLAG:  .WORD   0               ;MISC. PROGRAM FLAGS
1837                                  ;
1838                                  ; THE ABOVE WORD CONTAINS MISC. FLAGS WHICH CAN ONLY BE ACCESSED BY PATCHING.
1839                                  ; IT IS NOT INTENDED THAT THEY BE SET OR CLEARED EXCEPT UNDER VERY UNUSUAL
1840                                  ; CIRCUMSTANCES.  THEREFORE, THEY WILL NOT BE DOCUMENTED ANY OTHER PLACE
1841                                  ; EXCEPT RIGHT HERE.
1842                                  ;
1843                                  ; BIT 0 -- WHEN SET, THOSE TESTS WHICH DO A BUS RESET WILL NOT BE EXECUTED.
1844                                  ;          THIS WAS IMPLEMENTED TO SAVE WEAR & TEAR ON THE RX01 IN THE
1845                                  ;          DEVELOPMENT SYSTEM WHILE DOING LONG TERM TESTING OF ALL OTHER
1846                                  ;          TESTS.
1847                                  ;
1848                                  ; BIT 1 -- CPU TYPE. (NOT USED)
1849                                  ;
1850                                  ; BIT 2 -- CONTROLS PRINTING OF EXTENDED ERROR INFORMATION DURING "MOVING
1851                                  ;          INVERSIONS TEST" OF RAM.  NORMALLY ONLY ADDRESS, GOOD & BAD
1852                                  ;          DATA, AND XOR WILL BE PRINTED.  IF THIS BIT IS SET HOWEVER,
1853                                  ;          INFORMATION IDENTIFYING WHERE WITHIN THE ALGORITHM THE ERROR
1854                                  ;          WAS DETECTED IS REPORTED.  THE FOLLOWING ABBREVIATIONS ARE USED
1855                                  ;          IN THE HEADING:
1856                                  ;                BIT --- IDENTIFIES THE INNERMOST LOOP.  WHICH BIT IS
1857                                  ;                        BEING INVERTED AT EACH LOCATION.  BITS ARE
1858                                  ;                        IDENTIFIED AS 0 THROUGH 7.
1859                                  ;                DATA -- IDENTIFIES THE VALUE TO WHICH THE ABOVE BIT IS
1860                                  ;                        BEING SET (I.E. 0 OR 1).  IT IS FIRST READ AND
1861                                  ;                        CHECKED FOR EXPECTED CONTENTS; THEN THE BIT IS
1862                                  ;                        INVERTED TO THIS STATE (DATA) AND RE-WRITTEN;
1863                                  ;                        THEN IT IS AGAIN READ & CHECKED FOR THE NEW
1864                                  ;                        VALUE.
1865                                  ;                SEQ --- INDICATES THE DIRECTION (FWD OR BKWD) THE TEST
1866                                  ;                        WAS SCANING THROUGH RAM WHEN THE ERROR OCCURED.
1867                                  ;                LSB --- THIS IS THE LOGICAL LEAST SIGNIFICANT BIT OF THE
1868                                  ;                        RAM ADDRESS AS WE SCAN THROUGH MEMORY.  BY
1869                                  ;                        VARYING THIS, THE ALGORITHM GENERATS NON-SEQUEN-
1870                                  ;                        TIAL ADDRESSING OF RAM AND EFFECTS A MUCH MORE
1871                                  ;                        THOROUGH TEST OF MEMORY.
1872                                  ;
1873
1874
```

```
                                        .SBTTL  CURRENT DEVICE PARAMETERS

        160000                          $MPCSR  ==      160000          ;INITIAL ASSEMBLED IN CSR ADDRESS

002352                                  MPCSR:                          ;POINTER TO THE DMV11 CSR'S
002352                                  BSEL0:                          ;POINTER TO BSEL0
002352                                  BSEL:                           ;ALTERNATE NAME FOR BSEL0
002352  160000                          SEL0:   .WORD   $MPCSR          ;POINTER TO SEL0
002354  160001                          BSEL1:  .WORD   $MPCSR+1        ;POINTER TO BSEL1
002356                                  BSEL2:                          ;POINTER TO BSEL2
002356  160002                          SEL2:   .WORD   $MPCSR+2        ;POINTER TO SEL2
002360  160003                          BSEL3:  .WORD   $MPCSR+3        ;POINTER TO BSEL3
002362                                  BSEL4:                          ;POINTER TO BSEL4
002362  160004                          SEL4:   .WORD   $MPCSR+4        ;POINTER TO SEL4
002364  160005                          BSEL5:  .WORD   $MPCSR+5        ;POINTER TO BSEL5
002366                                  BSEL6:                          ;POINTER TO BSEL6
002366  160006                          SEL6:   .WORD   $MPCSR+6        ;POINTER TO SEL6
002370  160007                          BSEL7:  .WORD   $MPCSR+7        ;POINTER TO BSEL7
002372                                  BSEL10:                         ;POINTER TO BSEL10
002372  160010                          SEL10:  .WORD   $MPCSR+10       ;POINTER TO SEL10
002374  160011                          BSEL11: .WORD   $MPCSR+11       ;POINTER TO BSEL11
002376                                  BSEL12:                         ;POINTER TO BSEL12
002376  160012                          SEL12:  .WORD   $MPCSR+12       ;POINTER TO SEL12
002400  160013                          BSEL13: .WORD   $MPCSR+13       ;POINTER TO BSEL13
002402                                  BSEL14:                         ;POINTER TO BSEL14
002402  160014                          SEL14:  .WORD   $MPCSR+14       ;POINTER TO SEL14
002404  160015                          BSEL15: .WORD   $MPCSR+15       ;POINTER TO BSEL15
002406                                  BSEL16:                         ;POINTER TO BSEL16
002406  160016                          SEL16:  .WORD   $MPCSR+16       ;POINTER TO SEL16
002410  160017                          BSEL17: .WORD   $MPCSR+17       ;POINTER TO BSEL17

002412  000300                  MPIVEC: .WORD   300             ;DMV11 INPUT INTERRUPT VECTOR
002414  000304                  MPOVEC: .WORD   304             ;DMV11 OUTPUT INTERRUPT VECTOR
002416  000340                  MPRIOR: .WORD   340             ;DMV11 DEVICE PRIORITY

                                .SBTTL  GEN'L PURPOSE SCRATCH STORAGE

002420  000000                  REG0:   .WORD   0
002422  000000                  REG1:   .WORD   0
002424  000000                  REG2:   .WORD   0
002426  000000                  REG3:   .WORD   0
002430  000000                  REG4:   .WORD   0
002432  000000                  REG5:   .WORD   0
002434  000000                  REG6:   .WORD   0
002436  000000                  REG7:   .WORD   0
```

```
                                        .SBTTL  SCRATCH STORAGE FOR MESSAGE REPORTING

002440  000000                TMP0:   .WORD   0
002442  000000                TMP1:   .WORD   0
002444  000000                TMP2:   .WORD   0
002446  000000                TMP3:   .WORD   0
002450  000000                TMP4:   .WORD   0
002452  000000                TMP5:   .WORD   0
002454  000000                TMP6:   .WORD   0
002456  000000                TMP7:   .WORD   0
002460  000000                TMP8:   .WORD   0
002462  000000                TMP9:   .WORD   0
002464  000000                TMPA:   .WORD   0
002466  000000                TMPB:   .WORD   0
002470  000000                TMPC:   .WORD   0
002472  000000                TMPD:   .WORD   0
002474  000000                TMPE:   .WORD   0
002476  000000                TMPF:   .WORD   0
002500  000000                NEWPC:  .WORD   0       ;SAVE LOCATION FOR A "PC" VALUE RESET
002502  000000                OLDSP:  .WORD   0       ;SAVE LOCATION FOR A STACK POINTER RESET VALUE
```

```
***** DATA PATTERN A *****

1946
1947
1948
1949 002504  000020
1950 002506     001
1951 002507     002
1952 002510     004
1953 002511     010
1954 002512     020
1955 002513     040
1956 002514     100
1957 002515     200
1958 002516     052
1959 002517     300
1960 002520     140
1961 002521     060
1962 002522     030
1963 002523     014
1964 002524     006
1965 002525     003
1966
1967
1968
1969
1970 002526  000026
1971 002530     125
1972 002531     252
1973 002532     000
1974 002533     377
1975 002534     001
1976 002535     002
1977 002536     004
1978 002537     010
1979 002540     020
1980 002541     040
1981 002542     100
1982 002543     200
1983 002544     376
1984 002545     375
1985 002546     373
1986 002547     367
1987 002550     357
1988 002551     337
1989 002552     277
1990 002553     177
1991 002554     000
1992
```

```
.SBTTL  ***** DATA PATTERN A *****

.EVEN
PATA:   .WORD   PATB-PATA-2     ;USAGE:
                                ;# OF BYTES IN PATTERN
        .BYTE   001             ;BSEL0
        .BYTE   002             ;BSEL1
        .BYTE   004             ;BSEL2
        .BYTE   010             ;BSEL3
        .BYTE   020             ;BSEL4
        .BYTE   040             ;BSEL5
        .BYTE   100             ;BSEL6
        .BYTE   200             ;BSEL7
        .BYTE   052             ;BSEL10
        .BYTE   300             ;BSEL11
        .BYTE   140             ;BSEL12
        .BYTE   060             ;BSEL13
        .BYTE   030             ;BSEL14
        .BYTE   014             ;BSEL15
        .BYTE   006             ;BSEL16
        .BYTE   003             ;BSEL17

.SBTTL  ***** DATA PATTERN B *****

.EVEN
                                ;USAGE:
PATB:   .WORD   PATC-PATB-2     ;# OF BYTES IN PATTERN
        .BYTE   125
        .BYTE   252
        .BYTE   000
        .BYTE   377
        .BYTE   001
        .BYTE   002
        .BYTE   004
        .BYTE   010
        .BYTE   020
        .BYTE   040
        .BYTE   100
        .BYTE   200
        .BYTE   376
        .BYTE   375
        .BYTE   373
        .BYTE   367
        .BYTE   357
        .BYTE   337
        .BYTE   277
        .BYTE   177
        .BYTE   000
```

```
                                        .SBTTL  ***** DATA PATTERN C *****
                                        ;       USED BY TEST # 11 TO LOAD UP THE VIA'S REGISTERS.  THE REGISTER NUMBER
                                        ;       LOADED IS THE FIRST BYTE AND THE VALUE LOADED INTO IT IS THE SECOND BYTE

                                        .EVEN
002556  000012                  PATC:   .WORD   <PATCR-PATC-2>/2
002560      002         377             .BYTE   2,377           ;SETUP ORB AS AN I/O (READ/WRITE) REGISTER
002562      003         366             .BYTE   3,366           ;SETUP ORA AS AN O/P REGISTER -- IT CAN'T BE TESTED!
002564      000         100             .BYTE   0,100           ;LOAD UP ORB
002566      013         040             .BYTE   13,040          ;       ACR
002570      006         106             .BYTE   6,106           ;       T1LL
002572      007         107             .BYTE   7,107           ;       T1LH
002574      012         112             .BYTE   12,112          ;       SR
002576      014         042             .BYTE   14,042          ;       PCR
002600      015         000             .BYTE   15,000          ;       IFR
002602      016         200             .BYTE   16,200          ;       IER

                                        ;       THIS TABLE IS THE LIST OF EXPECTED CONTENTS OF THE VIA'S REGISTERS

002604      100                 PATCR:  .BYTE   100             ; ORB
002605      000                         .BYTE   000             ; ORA
002606      377                         .BYTE   377             ; DDRB
002607      366                         .BYTE   366             ; DDRA
002610      000                         .BYTE   000             ; T1CL
002611      000                         .BYTE   000             ; T1CH
002612      106                         .BYTE   106             ; T1LL
002613      107                         .BYTE   107             ; T1LH
002614      000                         .BYTE   000             ; T2CL
002615      000                         .BYTE   000             ; T2CH
002616      112                         .BYTE   112             ; SR
002617      040                         .BYTE   040             ; ACR
002620      042                         .BYTE   042             ; PCR
002621      000                         .BYTE   000             ; IFR
002622      200                         .BYTE   200             ; IER
002623      000                         .BYTE   000             ; ORA

                                        ;       THIS IS THE TABLE OF TEST PATTERN "A" MASKS. BEFORE A REGISTER'S
                                        ;       CONTENTS IS TESTED, A BICB IS DONE USING ITS RESPECTIVE BYTE FROM
                                        ;       THE TABLE BELOW (INSURING THAT "DON'T CARE" BITS ARE IGNORED).

002624      000                 PATCM:  .BYTE   000             ; ORB
002625      377                         .BYTE   377             ; ORA -- THIS REGISTER CAN'T BE TESTED!!!
002626      000                         .BYTE   000             ; DDRB
002627      000                         .BYTE   000             ; DDRA
002630      377                         .BYTE   377             ; T1CL -- THIS IS A FREE RUNNING COUNTER
002631      377                         .BYTE   377             ; T1CH -- THIS IS A FREE RUNNING COUNTER
002632      000                         .BYTE   000             ; T1LL
002633      000                         .BYTE   000             ; T1LH
002634      377                         .BYTE   377             ; T2CL -- THIS IS A FREE RUNNING COUNTER
002635      377                         .BYTE   377             ; T2CH -- THIS IS A FREE RUNNING COUNTER
002636      000                         .BYTE   000             ; SR
002637      000                         .BYTE   000             ; ACR
002640      000                         .BYTE   000             ; PCR
002641      377                         .BYTE   377             ; IFR
002642      200                         .BYTE   200             ; IER -- BIT 7 IS ALWAYS READ AS ZERO
002643      377                         .BYTE   377             ; ORA -- THIS REGISTER CAN'T BE TESTED!!!
```

```
***** DATA PATTERN D *****

                                        .SBTTL  ***** DATA PATTERN D *****

                                        .EVEN
002644  000026                  PATD:     .WORD   PATE-PATD-2
002646      200                           .BYTE   200
002647      201                           .BYTE   201
002650      202                           .BYTE   202
002651      204                           .BYTE   204
002652      210                           .BYTE   210
002653      220                           .BYTE   220
002654      240                           .BYTE   240
002655      300                           .BYTE   300
002656      200                           .BYTE   200
002657      000                           .BYTE   000
002660      001                           .BYTE   001
002661      002                           .BYTE   002
002662      004                           .BYTE   004
002663      010                           .BYTE   010
002664      020                           .BYTE   020
002665      040                           .BYTE   040
002666      100                           .BYTE   100
002667      000                           .BYTE   000
002670      325                           .BYTE   325
002671      125                           .BYTE   125
002672      252                           .BYTE   252
002673      052                           .BYTE   052

                                        .SBTTL  ***** DATA PATTERN E *****

                                        .EVEN
002674  000026                  PATE:     .WORD   PATF-PATE-2
002676      200                           .BYTE   200
002677      201                           .BYTE   201
002700      203                           .BYTE   203
002701      207                           .BYTE   207
002702      217                           .BYTE   217
002703      237                           .BYTE   237
002704      277                           .BYTE   277
002705      377                           .BYTE   377
002706      377                           .BYTE   377
002707      377                           .BYTE   377
002710      376                           .BYTE   376
002711      374                           .BYTE   374
002712      370                           .BYTE   370
002713      360                           .BYTE   360
002714      340                           .BYTE   340
002715      300                           .BYTE   300
002716      200                           .BYTE   200
002717      200                           .BYTE   200
002720      325                           .BYTE   325
002721      200                           .BYTE   200
002722      252                           .BYTE   252
002723      200                           .BYTE   200
```

```
                                .SBTTL  ***** DATA PATTERN F *****

                                .EVEN
002724  000045         PATF:    .WORD   <PATG-PATF-2>/2
002726  125252                  .WORD   125252
002730  052525                  .WORD   052525
002732  000000                  .WORD   000000
002734  177777                  .WORD   177777
002736  000001                  .WORD   000001
002740  000002                  .WORD   000002
002742  000004                  .WORD   000004
002744  000010                  .WORD   000010
002746  000020                  .WORD   000020
002750  000040                  .WORD   000040
002752  000100                  .WORD   000100
002754  000200                  .WORD   000200
002756  000400                  .WORD   000400
002760  001000                  .WORD   001000
002762  002000                  .WORD   002000
002764  004000                  .WORD   004000
002766  010000                  .WORD   010000
002770  020000                  .WORD   020000
002772  040000                  .WORD   040000
002774  100000                  .WORD   100000
002776  177776                  .WORD   177776
003000  177775                  .WORD   177775
003002  177773                  .WORD   177773
003004  177767                  .WORD   177767
003006  177757                  .WORD   177757
003010  177737                  .WORD   177737
003012  177677                  .WORD   177677
003014  177577                  .WORD   177577
003016  177377                  .WORD   177377
003020  176777                  .WORD   176777
003022  175777                  .WORD   175777
003024  173777                  .WORD   173777
003026  167777                  .WORD   167777
003030  157777                  .WORD   157777
003032  137777                  .WORD   137777
003034  077777                  .WORD   077777
003036  000000                  .WORD   000000
```

```
***** DATA PATTERN F *****

 2148 003040                    PATG:
 2149
 2150                           .SBTTL  ***** DATA PATTERN RESULTS TABLE FOR MASTER CLEAR (RESFMC) *****
 2151
 2152                           .EVEN
 2153 003040  000020   RESFMC: .WORD   RESFT3-RESFMC-2
 2154 003042     000   BSELRS: .BYTE   000             ;BSEL0
 2155 003043     200           .BYTE   200             ;BSEL1 -- "RUN" BIT SET
 2156 003044     000           .BYTE   000             ;BSEL2
 2157 003045     000           .BYTE   000             ;BSEL3
 2158 003046     033           .BYTE   033             ;BSEL4 -- CODE FOR THE DMV-11
 2159 003047     000           .BYTE   000             ;BSEL5
 2160 003050     305           .BYTE   305             ;BSEL6 -- INDICATING VALID COMPLETION OF U-DIAG.
 2161 003051     000           .BYTE   000             ;BSEL7
 2162 003052     000           .BYTE   000             ;BSEL10
 2163 003053     000           .BYTE   000             ;BSEL11
 2164 003054     000           .BYTE   000             ;BSEL12
 2165 003055     000           .BYTE   000             ;BSEL13
 2166 003056     000           .BYTE   000             ;BSEL14
 2167 003057     000           .BYTE   000             ;BSEL15
 2168 003060     000           .BYTE   000             ;BSEL16
 2169 003061     000           .BYTE   000             ;BSEL17
 2170
 2171                           .SBTTL  ***** DATA PATTERN RESULTS FOR TEST 3 (RESFT3) *****
 2172
 2173 003062            RESFT3: .BLKW   16.
 2174                           .EVEN
```

```
2176                            .SBTTL  DATA BUFFER AREAS
2177
2178 003122                     BUFAREA:        .BLKB   256.
2179
2180
2181                            ;  THIS BUFFER HAS SOME ALTERNATE USES TOO.  THE FOLLOWING LABELS ARE PROVIDED
2182                            ;  FOR THOSE USAGES.
2183
2184          003322            W0 = BUFAREA+128.       ;THIS WORD TABLE STARTS IN THE MIDDLE OF "BUFAREA"
2185          003324            W1 = W0+2               ;AND IS USED BY "ERR6" FOR PRINTING BYTES
2186          003326            W2 = W1+2
2187          003330            W3 = W2+2
2188          003332            W4 = W3+2
2189          003334            W5 = W4+2
2190          003336            W6 = W5+2
2191          003340            W7 = W6+2
2192          003342            W8 = W7+2
2193          003344            W9 = W8+2
2194          003346            WA = W9+2
2195          003350            WB = WA+2
2196          003352            WC = WB+2
2197          003354            WD = WC+2
2198          003356            WE = WD+2
2199          003360            WF = WE+2
2200
2201          003122            BT1 = BUFAREA           ;BYTE TABLE # 1
2202          003206            BT2 = BUFAREA+64        ;BYTE TABLE # 2
```

GLOBAL TEXT SECTION

```
                                .SBTTL GLOBAL TEXT SECTION

                                ;*****************************************************************************
                                ;*      THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                ;*      MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                ;*      MORE THAN ONE TEST.
                                ;*****************************************************************************

                                ;++*************************************************************************
                                ;* NAMES OF DEVICES SUPPORTED BY PROGRAM
                                ;--*************************************************************************
                                        DEVTYP  <M8053 OR M8064>
                                                                        L$DVTYP::
003522                                                                          .ASCIZ  %M8053 OR M8064%
003522  115   070   060
003525  065   063   040
003530  117   122   040
003533  115   070   060
003536  066   064   000
                                                                        .EVEN

                                ;++*************************************************************************
                                ;* TITLE OF PROGRAM
                                ;--*************************************************************************

000012                          .RADIX  10.
                                        DESCRIPT   <DMV-11 U-CONTRL LOGIC DIAG - PART 1 OF 2>
003542                                                                  L$DESC::
003542  104   115   126                                                       .ASCIZ  /DMV-11 U-CONTRL LOG
IC DIAG - PART 1 OF 2/
003545  055   061   061
003550  040   125   055
003553  103   117   116
003556  124   122   114
003561  040   114   117
003564  107   111   103
003567  040   104   111
003572  101   107   040
003575  055   040   120
003600  101   122   124
003603  040   061   040
003606  117   106   040
003611  062   000
                                                                        .EVEN
000010                          .RADIX  8.
```

```
                        .SBTTL GLOBAL SUBROUTINES
                        ;
                        ;//////////////////////////////////////////////////////////////////////////////
                        ;/       THE GLOBAL SUBROUTINES ARE CALLED BY MORE THAN ONE TEST
                        ;//////////////////////////////////////////////////////////////////////////////
                        ;
                        ;++******************************************************************************
                        .SBTTL  MASCLR -  MASTER CLEAR SUBROUTINE
                        ;
                        ; FUNCTION:
                        ;
                        ;  THIS  SUBROUTINE  FORCES THE 6502 MICROPROCESSOR TO EXECUTE A MINI 17 PART
                        ;  DIAGNOSTIC OF THE MICRO-PROCESSOR INSTRUCTION SET, RAM DATA AND ADDRESSING
                        ;  VALIDITY,   AND   A  ROM  CRC  TEST.  THE  CLEAR  SUBROUTINE  EXECUTES  IN
                        ;  APPROXIMATELY  500  HUNDRED(S)  MILLISECOND. THIS SUBROUTINE WILL SEND THE
                        ;  MASTER  CLEAR  COMMAND  AND  DELAY FOR APPROX. 500 MSEC. AT WHICH POINT IN
                        ;  TIME,  THE  STATE  OF  THE  CSR  REGISTERS  IS  TESTED.  IF ANY ONE OF THE
                        ;  REGISTERS CONTAINS ANYTHING THAT IS NOT EXPECTED, AN ERROR IS QUEUE UP AND
                        ;  THE CARRY BIT IS SET. ELSE, THE CARRY BIT IS CLEARED.
                        ;
                        ; CALLING SEQUENCE:
                        ;
                        ;       JSR     PC,MASCLR
                        ;       BCC     N$              ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                        ;       ERROR                   ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                        ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                        ;
                        ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                        ;
                        ;--******************************************************************************
                        ;
003614  010146          MASCLR: MOV     R1,-(SP)        ; SAVE REGISTER ONE
003616  112777  000300  176530          MOVB    #RUN!MCLR,@BSEL1 ;SET BOTH THE RUN AND MASTER CLEAR BITS
                                                        ;TO INITIATE THE MICRODIAGNOSTIC
                        ;NOW DELAY LONG ENOUGH FOR THE MICRODIAGNOSTIC TO COMPLETE
003624  013701  002316          MOV     DELAY1,R1       ;INITIALIZE THE LOOP COUNTER FOR DELAY LOOP
003630  001402          2$:     BEQ     1$              ; EXIT DELAY LOOP IF THE TIME HAS EXPIRED
003632  005301                  DEC     R1              ;  ELSE, DECREMENT THE LOOP COUNTER AND
003634  000775                  BR      2$              ;  CONTINUE TO LOOP.
003636                  1$:                             ; TIME-UP!
003636  132777  000200  176510          BITB    #RUN,@BSEL1     ;CHECK THE RUN BIT --
003644  001410                  BEQ     3$              ;IF NOT SET, GO REPORT THE ERROR
                        ;IF THE RUN BIT IS SET, MICRODIAGNOSTICS ARE COMPLETE.
                        ;CHECK IF ALL MICRODIAGNOSTICS PASSED.
003646  127737  176514  003050  4$:     CMPB    @BSEL6,BSELRS+6 ;THIS CHECKS THE BYTE IN B-SELECT 6 FOR THE
                                                        ;VALID MICRODIAGNOSTIC COMPLETION CODE.
003654  001004                  BNE     3$              ;IF BAD, GO REPORT ERROR
003656  127737  176500  003046          CMPB    @BSEL4,BSELRS+4 ;ELSE, CHECK FOR THE VALID CODE FOR A DMV-11
003664  001420                  BEQ     6$              ;IF THIS TOO IS CORRECT THEN NO ERROR EXISTS
                                                        ;ELSE, FALL INTO THE ERROR REPORTING CODE
```

MASCLR - MASTER CLEAR SUBROUTINE

```
 2289 003666  004737  004434          3$:    JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 2290 003672                                 GTDF    20$,ERR3        ;MASTER CLEAR ERROR
                                             ;       QUEUE "DEVICE FATAL" ERROR # 1
      003672  012737  000001  002236                                                MOV     #T.EDF,ERRTYP
      003700  012737  000001  002240                                                MOV     #1,ERRNBR
      003706  012737  003734  002242                                                MOV     #20$,ERRMSG
      003714  012737  005414  002244                                                MOV     #ERR3,ERRBLK
 2291 003722  000261                        SEC                     ;INDICATE TO THE CALLING ROUTINE THAT
 2292 003724  000401                        BR      7$              ;   AN ERROR WAS DETECTED
 2293
 2294 003726  000241                  6$:   CLC                     ;CLEAR THE CARRY BIT TO INDICATE NO ERROR
 2295 003730  012601                  7$:   MOV     (SP)+,R1        ;RESTORE REGISTER ONE
 2296 003732  000207                        RTS     PC              ; RETURN TO THE CALLER
 2297                                .NLIST  BEX
 2298 003734     115     101     123  20$:   .ASCIZ  /MASTER CLEAR FAILURE/
 2299                                .LIST   BEX
 2300                                .EVEN
```

M-LOOP -- MSTCLR -- MASTER CLEAR & ENTER M-LOOP

```
                                .SBTTL  M-LOOP -- MSTCLR -- MASTER CLEAR & ENTER M-LOOP
                                ;++*************************************************************************
                                ;  MSTCLR -- MASTER CLEAR & ENTER M-LOOP
                                ;
                                ;  CALLING SEQUENCE:
                                ;
                                ;       JSR     PC,MSTCLR
                                ;       BCC     N$              ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                                ;       ERROR                   ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                                ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                                ;
                                ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                                ;
                                ;--*************************************************************************

003762  012777  140400  176362  MSTCLR: MOV     #<RUN!MCLR!MREQ>*256.,@SEL0  ;INITIATE M-LOOP

003770  010346                          MOV     R3,-(SP)
003772  012703  000014                  MOV     #12.,R3         ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
003776  077301                  1$:     SOB     R3,1$
004000  012603                          MOV     (SP)+,R3

004002  132777  000200  176346          BITB    #MRDY,@BSEL2    ;DID THE M-LOOP FINISH
004010  001023                          BNE     5$              ;YES.  GOOD.  RETURN
004012  004737  004576                  JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004016  012737  000301  002310          MOV     #RUN!MCLR!MREQ,GDATA    ;IDENTIFY REQUESTED FUNCTION
004024                                  GTDF    EM3,ERR4        ;"MRDY" TIMEOUT
                                ;       QUEUE "DEVICE FATAL" ERROR # 2
004024  012737  000001  002236                                  MOV     #T.EDF,ERRTYP
004032  012737  000002  002240                                  MOV     #2,ERRNBR
004040  012737  014454  002242                                  MOV     #EM3,ERRMSG
004046  012737  005426  002244                                  MOV     #ERR4,ERRBLK
004054  000261                          SEC                     ;SET CARRY TO INDICATE ERROR
004056  000401                          BR      9$              ;EXIT WITH THE "ERROR" FLAG (CARRY BIT) SET
004060  000241                  5$:     CLC                     ;CLEAR C BIT FOR NO ERRORS
004062  000207                  9$:     RTS     PC              ;RETURN
```

```
                                .SBTTL  M-LOOP -- READ
                                ;++*************************************************************************************
                                ; READ - READ THE SPECIFIED ADDRESS WITHIN THE DMV-11
                                ;
                                ;  CALLING SEQUENCE:
                                ;
                                ;       JSR     R5,READ
                                ;       .WORD   <ADDRESS OF REGISTER WITHIN DMV-11>
                                ;       .WORD   <DESTINATION ADDRESS WITHIN LSI-11>
                                ;       ?CC     N$                      ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                                ;       ERROR                           ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                                ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                                ;
                                ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                                ;
                                ;--*************************************************************************************

004064  012577  176272          READ:   MOV     (R5)+,@SEL4             ;SETUP SOURCE POINTER
004070  112777  000001  176260          MOVB    #REDLOC,@BSEL2          ;TELL M-LOOP TO GIVE US THE REQUESTED DATA

004076  010346                          MOV     R3,-(SP)
004100  012703  000032                  MOV     #26.,R3                 ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004104  077301                  1$:     SOB     R3,1$
004106  012603                          MOV     (SP)+,R3

004110  132777  000200  176240          BITB    #MRDY,@BSEL2            ;DID THE M-LOOP FINISH
004116  001023                          BNE     5$                      ;YES,  GOOD.  RETURN

004120  004737  004576                  JSR     PC,GETWSR               ;GET BYTE SELECT REGISTERS
004124  012737  000001  002310          MOV     #REDLOC,GDATA           ;IDENTIFY REQUESTED FUNCTION
004132                                  GTDF    EM4,ERR4                ;"MRDY" TIMEOUT
                                        ;       QUEUE "DEVICE FATAL" ERROR # 3
004132  012737  000001  002236                                                  MOV     #T.EDF,ERRTYP
004140  012737  000003  002240                                                  MOV     #3,ERRNBR
004146  012737  014500  002242                                                  MOV     #EM4,ERRMSG
004154  012737  005426  002244                                                  MOV     #ERR4,ERRBLK
004162  000261                          SEC                             ;INDICATE AN ERROR HAS BEEN STACKED
004164  000401                          BR      6$                      ;RETURN WITH THAT INDICATION

004166  000241                  5$:     CLC                             ;INDICATE "NO ERROR"
004170  117735  176172          6$:     MOVB    @BSEL6,@(R5)+           ;PUT DATA WHERE CALLER WANTS IT
004174  000205                          RTS     R5                      ;RETURN
```

```
                        .SBTTL  M-LOOP -- READ IMMEDIATE
                        ;**************************************************************************
                        ; READI - READ IMMEDIATE THE SPECIFIED ADDRESS WITHIN THE DMV-11
                        ;
                        ; CALLING SEQUENCE:
                        ;
                        ;       JSR     R5,READI
                        ;       .WORD   <ADDRESS OF REGISTER WITHIN DMV-11>
                        ;       .WORD   <DESTINATION -- CONTENTS OF REG. IS PUT HERE>
                        ;       BCC     N$              ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                        ;       ERROR                   ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                        ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                        ;
                        ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                        ;
                        ;--**************************************************************************

004176                  READI:
004176  012577  176160          MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004202  112777  000001  176146  MOVB    #REDLOC,@BSEL2  ;TELL M-LOOP TO GIVE US THE REQUESTED DATA

004210  010346          MOV     R3,-(SP)
004212  012703  000015  MOV     #13.,R3         ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004216  077301          1$:     SOB     R3,1$
004220  012603          MOV     (SP)+,R3

004222  132777  000200  176126  BITB    #MRDY,@BSEL2    ;DID THE M-LOOP FINISH
004230  001023          BNE     5$              ;YES,  GOOD.  RETURN

004232  004737  004576  JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004236  012737  000001  002310  MOV     #REDLOC,GDATA   ;IDENTIFY REQUESTED FUNCTION
004244                  GTDF    EM4,ERR4        ;"MRDY" TIMEOUT
                        ;       QUEUE "DEVICE FATAL" ERROR # 4
004244  012737  000001  002236                          MOV     #T.EDF,ERRTYP
004252  012737  000004  002240                          MOV     #4,ERRNBR
004260  012737  014500  002242                          MOV     #EM4,ERRMSG
004266  012737  005426  002244                          MOV     #ERR4,ERRBLK
004274  000261          SEC                     ;INDICATE AN ERROR HAS BEEN STACKED
004276  000401          BR      6$              ;RETURN WITH THAT INDICATION

004300  000241          5$:     CLC             ;INDICATE "NO ERROR"
004302  017725  176060  6$:     MOV     @SEL6,(R5)+     ;PUT DATA WHERE CALLER WANTS IT
004306  000205          RTS     R5              ;RETURN
```

```
                                .SBTTL  M-LOOP -- WRITE
                                ;++*************************************************************************
                                ; WRITE - WRITE THE SPECIFIED DATA INTO THE SPECIFIED DMV-11 ADDRESS
                                ;
                                ;  CALLING SEQUENCE:
                                ;
                                ;       JSR     R5,WRITE
                                ;       .WORD   <ADDRESS OF REGISTER WITHIN DMV-11>
                                ;       .WORD   <ADDRESS OF DATA BYTE>
                                ;       BCC     N$              ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                                ;       ERROR                   ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                                ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                                ;
                                ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                                ;
                                ;--*************************************************************************

004310  012577  176046        WRITE:  MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004314  113577  176046                MOVB    @(R5)+,@SEL6    ;MAKE DATA AVAILABLE TO M-LOOP
004320  000404                        BR      MLWRI           ;THE REST OF THIS ROUTINE IS THE SAME AS "WRITEI"
```

```
                        .SBTTL  M-LOOP -- WRITE IMMEDIATE
                        ;++*************************************************************************
                        ; WRITEI - WRITE IMMEDIATE THE SPECIFIED DATA INTO THE SPECIFIED DMV-11 ADDRESS
                        ;
                        ; CALLING SEQUENCE:
                        ;
                        ;       JSR     R5,WRITEI
                        ;       .WORD   <ADDRESS OF REGISTER WITHIN DMV-11>
                        ;       .WORD   <DATA FIELD -- DATA TO BE WRITTEN IN DMV-11>
                        ;       BCC     N$              ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                        ;       ERROR                   ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                        ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                        ;
                        ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                        ;
                        ;--*************************************************************************

004322                  WRITEI:
004322  012577  176034          MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004326  012577  176034          MOV     (R5)+,@SEL6     ;MAKE DATA AVAILABLE TO M-LOOP
004332  112777  000002  176016  MLWRI:  MOVB    #WRILOC,@BSEL2  ;TELL M-LOOP TO WRITE THE DATA

004340  010346                  MOV     R3,-(SP)
004342  012703  000050          MOV     #40.,R3         ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004346  077301          1$:     SOB     R3,1$
004350  012603                  MOV     (SP)+,R3

004352  132777  000200  175776          BITB    #MRDY,@BSEL2    ;DID THE M-LOOP FINISH
004360  001023                  BNE     5$              ;YES.  GOOD.  RETURN
004362  004737  004576          JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004366  012737  000002  002310          MOV     #WRILOC,GDATA   ;IDENTIFY REQUESTED FUNCTION
004374                          GTDF    EM4,ERR4        ;"MRDY" TIMEOUT
004374  012737  000001  002236  ;       QUEUE "DEVICE FATAL" ERROR # 5
004402  012737  000005  002240                          MOV     #T.EDF,ERRTYP
004410  012737  014500  002242                          MOV     #5,ERRNBR
004416  012737  005426  002244                          MOV     #EM4,ERRMSG
                                                        MOV     #ERR4,ERRBLK
004424  000261                  SEC                     ;INDICATE AN ERROR HAS BEEN STACKED
004426  000401                  BR      6$              ;RETURN WITH THAT INDICATION

004430  000241          5$:     CLC                     ;INDICATE "NO ERROR"
004432  000205          6$:     RTS     R5              ;RETURN
```

```
                                .SBTTL  GETBSR -- GET BYTE SELECT REGISTERS

                                ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                ;
                                ;       GET THE CONTENTS OF ALL CONTROL AND STATUS REGISTERS
                                ;
                                ;       FUNCTION - THIS SUBROUTINE COLLECTS THE CONTENTS OF THE
                                ;               BYTE SELECT REGISTERS FOR THE PURPOSE OF DISPLAY.
                                ;
                                ;       ENTRY CONDITIONS - NONE         @@   @     @@@@    @    @@  @
                                ;                                       @ @  @     @       @ @   @ @ @
                                ;        EXIT CONDITIONS - NONE         @    @      @@    @  @  @  @@
                                ;                                       @ @  @     @      @@@@@ @   @
                                ;    REGISTERS DESTROYED - NONE          @@   @@@@  @@@@  @   @ @   @
                                ;
                                ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

004434  117737  175712  002246  GETBSR: MOVB    @#SEL0,BSR0     ;PUT THE CURRENT CSR VALUES INTO THE PRINT-OUT
004442  117737  175706  002250          MOVB    @#SEL1,BSR1     ;TABLE
004450  117737  175702  002252          MOVB    @#SEL2,BSR2
004456  117737  175676  002254          MOVB    @#SEL3,BSR3
004464  117737  175672  002256          MOVB    @#SEL4,BSR4
004472  117737  175666  002260          MOVB    @#SEL5,BSR5
004500  117737  175662  002262          MOVB    @#SEL6,BSR6
004506  117737  175656  002264          MOVB    @#SEL7,BSR7
004514  117737  175652  002266          MOVB    @#SEL10,BSR10
004522  117737  175646  002270          MOVB    @#SEL11,BSR11
004530  117737  175642  002272          MOVB    @#SEL12,BSR12
004536  117737  175636  002274          MOVB    @#SEL13,BSR13
004544  117737  175632  002276          MOVB    @#SEL14,BSR14
004552  117737  175626  002300          MOVB    @#SEL15,BSR15
004560  117737  175622  002302          MOVB    @#SEL16,BSR16
004566  117737  175616  002304          MOVB    @#SEL17,BSR17
004574  000207                          RTS     PC              ;RETURN TO CALLER

                                .SBTTL  GETWSR -- GET WORD SELECT REGISTERS
                                ; "WORD" VERSION OF ABOVE SUBROUTINE

004576  017737  175550  002246  GETWSR: MOV     @#SEL0,WSR0     ;MOVE THE 8 WORD REGISTERS TO THE OTHERWISE
004604  017737  175546  002250          MOV     @#SEL2,WSR2     ;BYTE TABLE
004612  017737  175544  002252          MOV     @#SEL4,WSR4
004620  017737  175542  002254          MOV     @#SEL6,WSR6
004626  017737  175540  002256          MOV     @#SEL10,WSR10
004634  017737  175536  002260          MOV     @#SEL12,WSR12
004642  017737  175534  002262          MOV     @#SEL14,WSR14
004650  017737  175532  002264          MOV     @#SEL16,WSR16
004656  000207                          RTS     PC              ;RETURN TO CALLER
```

```
                                .SBTTL  .INITT1 -- INITIALIZE TIMER # 1

                                ;*****************************************************************************
                                ;* INITT1 - INITIALIZE TIMER # 1
                                ;*
                                ;*       CALLING SEQUENCE:
                                ;*
                                ;*             JSR     R5,INITT1
                                ;*             .WORD   <VALUE LOADED INTO THE T1 LATCH @ T1LL & T1LH>
                                ;*             .WORD   <BITS 6 & 7 WILL BE LOADED INTO "ACR", BIT 5 WILL BE
                                ;*                      USED TO SET OR CLEAR BIT 6 ("T1") OF THE INTERRUPT
                                ;*                      ENABLE REGISTER ("IER")>
                                ;*
                                ;* SEQUENCE OF EVENTS HEREIN:
                                ;*
                                ;*      SET THE VIA'S INTERRUPT ENABLE REGISTER ("IER")
                                ;*
                                ;*      SET THE VIA'S "ACR"
                                ;*
                                ;*      SET T1L-L (ADDR 06)
                                ;*
                                ;*      SET T1L-H (ADDR 07)
                                ;*
                                ;*      RETURN WITHOUT ANY ERROR CHECKING
                                ;*
                                ;*****************************************************************************

004660  010146                  INITT1: MOV     R1,-(SP)        ;SAVE THE REGISTER WE WILL BE USING
004662  112537  002455                  MOVB    (R5)+,TMP6+1    ;SETUP VALUES TO BE LOADED INTO THE LATCHES
004666  112537  002457                  MOVB    (R5)+,TMP7+1
004672  111537  002467                  MOVB    (R5),TMPB+1     ;GET & PROCESS BITS FOR ACR 6 & 7
004676  142737  177477  002467          BICB    #^C<BIT6+BIT7>,TMPB+1 ;EXTRACT BITS 6 & 7 & SAVE THEM FOR LATER
004704  012501                          MOV     (R5)+,R1        ;NOW, GET THE BIT TO BE USED IN SETTING OR
                                                                ;CLEARING BIT 6 OF "IER"

                                ; THE PASSED BIT IS IN THE WRONG POSITION BUT, IT SHOULD CONTROL THE OPERATION.
                                ; WE KNOW WE ARE SETTING OR CLEARING BIT 6 -- THUS, THE PASSED BIT WILL BECOME
                                ; THE CONTROLLING BIT 7 AND WE WILL "OR" IN THE BIT WE WISH TO BE CONTROLLED
                                ; (BIT 6).

004706  106301                          ASLB    R1              ;THIS PUTS THE PASSED BIT INTO BIT 6.
004710  042701  177677                  BIC     #^C<BIT6>,R1    ;WHILE HERE, CLEAR ALL OTHER BITS AND
004714  140177  175440                  BICB    R1,@BSEL3       ;CLEAR THE INTERRUPT FLAG IN THE SELECT REG.
004720  106301                          ASLB    R1              ;NOW THE BIT IS IN THE CONTROLLING POSITION
004722  052701  000100                  BIS     #BIT6,R1        ;SET BIT 6
004726  110137  002475                  MOVB    R1,TMPE+1       ;THE CALL WILL NOW WRITE THE APPROPRIATE VALUE

004732  004537  004310                  JSR     R5,WRITE        ;WRITE TO
004736  120016                          IENR                    ;THE VIA'S IER
004740  002475                          TMPE+1                  ;INTERRUPT ENABLE/DISABLE INFORMATION
004742  103431                          BCS     63$             ;EXIT ON ERROR

004744  004537  004064                  JSR     R5,READ         ;READ THE CURRENT SETTING OF
004750  120013                          ACR                     ;THE VIA'S ACR
004752  002466                          TMPB
004754  103424                          BCS     63$             ;EXIT ON ERROR
```

```
.INITT1 -- INITIALIZE TIMER # 1

 2575
 2576 004756  013701  002466                MOV     TMPB,R1          ;GET THAT VALUE
 2577 004762  042701  177477                BIC     #^C<BIT6+BIT7>,R1  ;CLEAR BITS 6 & 7
 2578 004766  150137  002467                BISB    R1,TMPB+1        ;ADD CURRENT BITS 0 --> 5 TO NEW BITS 6 & 7
 2579
 2580 004772  004537  004310                JSR     R5,WRITE         ;WRITE THE NEW REGISTER SETTING TO VIA'S ACR
 2581 004776  120013                        ACR
 2582 005000  002467                        TMPB+1
 2583 005002  103411                        BCS     63$              ;EXIT ON ERROR
 2584
 2585 005004  004537  004310                JSR     R5,WRITE         ;WRITE TO
 2586 005010  120006                        T1LL                     ;LOW ORDER LATCH REGISTER (T1L-L)
 2587 005012  002455                        TMP6+1                   ;THE VALUE PASSED
 2588 005014  103404                        BCS     63$              ;EXIT ON ERROR
 2589
 2590 005016  004537  004310                JSR     R5,WRITE         ;WRITE TO
 2591 005022  120007                        T1LH                     ;HIGH ORDER LATCH REGESTER (T1L-H)
 2592 005024  002457                        TMP7+1                   ;THE VALUE PASSED
 2593
 2594
 2595 005026  012601              63$:      MOV     (SP)+,R1         ;RESTORE R1
 2596 005030  000205                        RTS     R5               ;RETURN
 2597
 2598
 2599                                .SBTTL  STALL -- DELAY FOR 10.5 MICRO-SEC'S (ON LSI-11)
 2600                                ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 2601                                ; STALL -- THIS SUBROUTINE STALLS FOR ABOUT 10.5 MICRO-SECONDS
 2602                                ;---++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 2603
 2604 005032  000207              STALL:  RTS     PC
 2605
```

```
                                .SBTTL  STREG -- STATIC TEST OF SPECIFIED DMV-11 LOCATION

                                ;++*************************************************************************************
                                ; STREG -- PERFORM A STATIC TEST OF THE SPECIFIED REGISTER
                                ;
                                ; CALLING SEQUENCE:
                                ;
                                ;       <R0 CONTAINS THE ADDRESS OF THE REGISTER TO BE TESTED>
                                ;       <"TDATA" CONTAINS THE TEST BYTE>
                                ;       <"GDATA" CONTAINS THE EXPECTED DATA>
                                ;
                                ;       JSR     PC,STREG
                                ;       BCC     N$              ;IF NO ERROR OCCURED, PROCEED WITH ROUTINE
                                ;       ERROR                   ;AN ERROR MESSAGE HAS BEEN STACKED:  PRINT IT
                                ;       <ANY OTHER SPECIAL ERROR PROCESSING MAY BE DONE HERE  (I.E. CKLOOP)>
                                ;
                                ; N$:   <RESUMPTION OF NORMAL PROCESSING>
                                ;
                                ;--*************************************************************************************

005034  010037  005050         STREG:  MOV     R0,2$           ;PUT SPECIFIED REGISTER'S ADDRESS IN I/O CALLS
005040  010037  005062                 MOV     R0,4$

005044  004537  004310                 JSR     R5,WRITE        ;WRITE IT
005050  000000                 2$:     0                       ;*** MODIFIED FROM ABOVE ***
005052  002306                         TDATA                   ;*** MODIFIED FROM ABOVE ***
005054  103435                         BCS     10$             ;ON ERROR, EXIT

005056  004537  004064                 JSR     R5,READ         ;READ IT BACK AGAIN
005062  000000                 4$:     0                       ;*** MODIFIED FROM ABOVE ***
005064  002312                         BDATA
005066  103430                         BCS     10$             ;ON ERROR, EXIT

005070  123737  002310  002312         CMPB    GDATA,BDATA     ;DID WE READ WHAT WE WROTE?
005076  000241                         CLC                     ; (THIS ISN'T NEEDED FOR THE ERROR TEST BUT
                                                               ; MUST BE CLEARED ON EXIT IF NO ERROR OCCURED)
005100  001423                         BEQ     10$             ;YES, EXIT FROM SUBTEST
005102  013737  005050  002334         MOV     2$,REGNUM       ;BUILD REGISTER #
005110  042737  177760  002334         BIC     #177760,REGNUM
005116                                 GTDF    EM25,ERR7       ;REPORT READ/WRITE ERROR
                                                               ;       QUEUE "DEVICE FATAL" ERROR # 6
005116  012737  000001  002236                                                       MOV     #T.EDF,ERRTYP
005124  012737  000006  002240                                                       MOV     #6,ERRNBR
005132  012737  015565  002242                                                       MOV     #EM25,ERRMSG
005140  012737  006612  002244                                                       MOV     #ERR7,ERRBLK
005146  000261                         SEC                     ;INDICATE THAT AN ERROR WAS DETECTED
005150  000207                 10$:    RTS     PC
```

```
                                      .SBTTL  INTERRUPT HANDLER -- MPIHAN

                                      ;++*********************************************************************
                                      ; MPIHAN -- COUNT INTERRUPTS -- USUALLY INTERRUPT "A"
                                      ;
                                      ;       THIS ROUTINE WILL INCREMENT THE LOW BYTE OF "INTFLG" EACH TIME IT IS
                                      ;       ENTERED.  IF "IHILNK" IS NON-ZERO, VECTOR TO THE ADDRESS THEREIN USING
                                      ;       A "JSR  PC"
                                      ;--*********************************************************************

005152                                        BGNSRV  MPIHAN
005152                                                                                 MPIHAN::
005152  010046                                MOV     R0,-(SP)         ;SAVE R0
005154  105737  002330                        TSTB    INTWCH           ;HAVE WE BEEN TOLD TO WATCH FOR TYPE "A" INT'S?
005160  001007                                BNE     5$               ;YES, DO NORMAL INTERRUPT PROCESSING
005162  004737  004434                        JSR     PC,GETBSR        ;NO,  DUMP REGISTERS AND
005166                                        GEDF    EM34,ERR3        ;       REPORT "UNEXPECTED INTERRUPT"
                                                                       ;        "DEVICE FATAL" ERROR # 7
005166  104455                                                                           TRAP    C$ERDF
005170  000007                                                                           .WORD   7
005172  015613                                                                           .WORD   EM34
005174  005414                                                                           .WORD   ERR3
005176  000407                                BR      10$              ;GO TO EXIT

005200  105237  002326                5$:     INCB    INTFLG           ;INCREMENT LOW BYTE OF INTERRUPT COUNTER
005204  005737  005222                        TST     IHILNK           ;ARE WE EXPECTED TO EXECUTE ANOTHER ROUTINE?
005210  001402                                BEQ     10$              ;NO, GET OUT
005212  004777  000004                        JSR     PC,@IHILNK       ;YES, GO TO IT -- I HOPE IT'S VALID!
005216  012600                        10$:    MOV     (SP)+,R0         ;RESTORE R0
005220                                        ENDSRV                   ;RETURN TO INTERRUPTED PROCESS
005220                                                                                 L10002:
005220  000002                                                                           RTI

005222  000000                        IHILNK: .WORD   0                ;POINTER TO AUXILIARY INT. HANDLING ROUTINE
```

```
                        .SBTTL  INTERRUPT HANDLER -- MPOHAN

                        ;++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        ; MPOHAN -- SIMPLY COUNT INTERRUPTS -- USUALLY INTERRUPT "B"
                        ;
                        ;       THIS ROUTINE WILL INCREMENT THE HIGH BYTE OF "INTFLG" EACH TIME IT IS
                        ;       ENTERED.  IF "IHOLNK" IS NON-ZERO, VECTOR TO THE ADDRESS THEREIN USING
                        ;       A "JSR  PC"
                        ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

005224                          BGNSRV  MPOHAN
005224                                                                  MPOHAN::
005224  010046                  MOV     R0,-(SP)        ;SAVE R0
005226  105737  002331          TSTB    INTWCH+1        ;HAVE WE BEEN TOLD TO WATCH FOR TYPE "B" INT'S?
005232  001007                  BNE     5$              ;YES, DO NORMAL INTERRUPT PROCESSING
005234  004737  004434          JSR     PC,GETBSR       ;NO,  DUMP REGISTERS AND
005240                          GEDF    EM34B,ERR3      ;       REPORT "UNEXPECTED INTERRUPT"
                                                        ;       "DEVICE FATAL" ERROR # 8
005240  104455                                                          TRAP    C$ERDF
005242  000010                                                          .WORD   8
005244  015644                                                          .WORD   EM34B
005246  005414                                                          .WORD   ERR3
005250  000407                  BR      10$             ;GO TO EXIT

005252  105237  002327  5$:     INCB    INTFLG+1        ;INCREMENT HIGH BYTE OF INTERRUPT COUNTER
005256  005737  005274          TST     IHOLNK          ;ARE WE EXPECTED TO EXECUTE ANOTHER ROUTINE?
005262  001402                  BEQ     10$             ;NO, GET OUT
005264  004777  000004          JSR     PC,@IHOLNK      ;YES, GO TO IT -- I HOPE IT'S VALID!
005270  012600          10$:    MOV     (SP)+,R0        ;RESTORE R0
005272                          ENDSRV                  ;RETURN TO INTERRUPTED PROCESS
005272                                                                  L10003:
005272  000002                                                                  RTI

005274  000000  IHOLNK: .WORD   0               ;POINTER TO AUXILIARY INT. HANDLING ROUTINE
```

```
                                .SBTTL  GLOBAL ERROR REPORT REPORT SECTION

                                ;////////////////////////////////////////////////////////////////////////
                                ;/    THE GLOBAL ERROR REPORT SECTION CONTAINS ERROR MESSAGES
                                ;/    THAT ARE USED IN MORE THAN ONE TEST.
                                ;////////////////////////////////////////////////////////////////////////
                                        .EVEN
                                ;-----------------------------------------------------------------------
                                .SBTTL  ERROR HANDLER -- ERR1 -- "NO NOTHING" HANDLER
                                ;-----------------------------------------------------------------------
                                        BGNMSG  ERR1
                                                                                        ERR1::
005276  004737  012072                  JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
                                        ENDMSG
005302                                                                                  L10004:
005302  104423                                                                                  TRAP    C$MSG
                                ;-----------------------------------------------------------------------
                                .SBTTL  ERROR HANDLER -- ERR2 -- CSR REGISTER ERROR REPORTING
                                ;-----------------------------------------------------------------------
                                        BGNMSG  ERR2
005304                                                                                  ERR2::
                                        PRINTB  #FMT02,#TXT5,REGNUM
005304  013746  002334                                                                          MOV     REGNUM,-(SP)
005310  012746  013605                                                                          MOV     #TXT5,-(SP)
005314  012746  012124                                                                          MOV     #FMT02,-(SP)
005320  012746  000003                                                                          MOV     #3,-(SP)
005324  010600                                                                                  MOV     SP,R0
005326  104414                                                                                  TRAP    C$PNTB
005330  062706  000010                                                                          ADD     #10,SP
005334  004737  011276                  JSR     PC,XORGB
                                        PRINTB  #FMT02A,<B,GDATA>,<B,BDATA>,<B,XDATA>
005340  005046                                                                                  CLR     -(SP)
005342  153716  002314                                                                          BISB    XDATA,(SP)
005346  005046                                                                                  CLR     -(SP)
005350  153716  002312                                                                          BISB    BDATA,(SP)
005354  005046                                                                                  CLR     -(SP)
005356  153716  002310                                                                          BISB    GDATA,(SP)
005362  012746  012161                                                                          MOV     #FMT02A,-(SP)
005366  012746  000004                                                                          MOV     #4,-(SP)
005372  010600                                                                                  MOV     SP,R0
005374  104414                                                                                  TRAP    C$PNTB
005376  062706  000012                                                                          ADD     #12,SP
005402  004737  011322                  JSR     PC,ERR4$                ;DUMP THE BYTE SELECT REGISTERS
005406  004737  012072                  JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
                                        ENDMSG
005412                                                                                  L10005:
005412  104423                                                                                  TRAP    C$MSG
                                ;-----------------------------------------------------------------------
                                .SBTTL  ERROR HANDLER -- ERR3 -- DUMP THE BYTE SELECT REGISTERS
                                ;-----------------------------------------------------------------------
                                        BGNMSG  ERR3
005414                                                                                  ERR3::
005414  004737  011322                  JSR     PC,ERR4$
005420  004737  012072                  JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
                                        ENDMSG
005424                                                                                  L10006:
005424  104423                                                                                  TRAP    C$MSG
```

ERROR HANDLER -- ERR3 -- DUMP THE BYTE SELECT REGISTERS

```
2734                                    ;-------------------------------------------------------------------------------
2735                                    .SBTTL  ERROR HANDLER -- ERR4 -- M-LOOP TIMEOUT ERROR HANDLING
2736                                    ;-------------------------------------------------------------------------------
2737 005426                                     BGNMSG  ERR4
     005426                                                                                     ERR4::
2738 005426  010146                             MOV     R1,-(SP)                ;SAVE THE WORKING REGISTER
2739 005430  113701  002310                     MOVB    GDATA,R1                ;SAVE THIS FOR LATER
2740 005434  122701  000017                     CMPB    #17,R1                  ;WAS THIS AN M-LOOP REQUEST?
2741 005440  103013                             BHIS    5$                      ;YES, THEN REPORT THE FUNCTION CODE
2742 005442                                     PRINTX  #FMT5,<B,R1>            ;NO,  THEN IT MUST BE A BSEL1 SETTING
     005442  005046                                                                            CLR     -(SP)
     005444  150116                                                                            BISB    R1,(SP)
     005446  012746  012400                                                                    MOV     #FMT5,-(SP)
     005452  012746  000002                                                                    MOV     #2,-(SP)
     005456  010600                                                                            MOV     SP,R0
     005460  104415                                                                            TRAP    C$PNTX
     005462  062706  000006                                                                    ADD     #6,SP
2743 005466  000425                             BR      20$
2744
2745 005470  001001                     5$:     BNE     6$                      ;IF IT WAS A 17, THIS IS A "NOP" AND
2746 005472  005001                             CLR     R1                      ;  THE TEXT POINTER MUST SO REFLECT.
2747 005474  022701  000007             6$:     CMP     #7,R1                   ;IS FUNCTION CODE > 7?
2748 005500  003002                             BGT     7$                      ;NO,  THEN WE CAN HANDLE IT
2749 005502  012701  000006                     MOV     #6,R1                   ;YES, THEN IT'S UNDEFINED -- SAY SO
2750 005506  006301                     7$:     ASL     R1                      ;CONVERT TO A WORD OFFSET
2751 005510                                     PRINTX  #FMT5A,<B,GDATA>,TXTMLT(R1)     ;REPORT THE FAILING FUNCTION
     005510  016146  017532                                                                    MOV     TXTMLT(R1),-(SP)
     005514  005046                                                                            CLR     -(SP)
     005516  153716  002310                                                                    BISB    GDATA,(SP)
     005522  012746  012443                                                                    MOV     #FMT5A,-(SP)
     005526  012746  000003                                                                    MOV     #3,-(SP)
     005532  010600                                                                            MOV     SP,R0
     005534  104415                                                                            TRAP    C$PNTX
     005536  062706  000010                                                                    ADD     #10,SP
2752
2753 005542  012601                     20$:    MOV     (SP)+,R1                ;RESTORE THE WORKING REGISTER
2754 005544  004737  011710                     JSR     PC,ERR5$                ;DUMP THE SELECT REGISTERS
2755 005550                                     ENDMSG
     005550                                                                                 L10007:
     005550  104423                                                                            TRAP    C$MSG
2756                                    ;-------------------------------------------------------------------------------
2757                                    .SBTTL  ERROR HANDLER -- ERR5 -- WORD SELECT REG. ERRORS
2758                                    ;-------------------------------------------------------------------------------
2759 005552                                     BGNMSG  ERR5
     005552                                                                                     ERR5::
2760 005552                                     PRINTB  #FMT02,#TXT5,REGNUM
     005552  013746  002334                                                                    MOV     REGNUM,-(SP)
     005556  012746  013605                                                                    MOV     #TXT5,-(SP)
     005562  012746  012124                                                                    MOV     #FMT02,-(SP)
     005566  012746  000003                                                                    MOV     #3,-(SP)
     005572  010600                                                                            MOV     SP,R0
     005574  104414                                                                            TRAP    C$PNTB
     005576  062706  000010                                                                    ADD     #10,SP
2761 005602  004737  011276                     JSR     PC,XORGB
2762 005606                                     PRINTB  #FMT10,GDATA,BDATA,XDATA
     005606  013746  002314                                                                    MOV     XDATA,-(SP)
     005612  013746  002312                                                                    MOV     BDATA,-(SP)
```

```
ERROR HANDLER -- ERR5 -- WORD SELECT REG. ERRORS

        005616  013746  002310                                                  MOV     GDATA,-(SP)
        005622  012746  012654                                                  MOV     #FMT10,-(SP)
        005626  012746  000004                                                  MOV     #4,-(SP)
        005632  010600                                                          MOV     SP,R0
        005634  104414                                                          TRAP    C$PNTB
        005636  062706  000012                                                  ADD     #12,SP
  2763  005642  004737  011710                JSR     PC,ERR5$                ;DUMP THE SELECT REGISTERS
  2764  005646                                ENDMSG
        005646                                                          L10010:
        005646  104423                                                         TRAP    C$MSG
  2765                          ;-------------------------------------------------------------------------
  2766                          .SBTTL  ERROR HANDLER -- ERR6 -- VIA REGISTER ERRORS W/FULL REG. DUMP
  2767                          ;-------------------------------------------------------------------------
  2768  005650                                BGNMSG  ERR6
        005650                                                          ERR6::
  2769                                  ;*** PRINT THE FIRST HALF OF THE REGISTERS ***
  2770  005650  010146                       MOV     R1,-(SP)          ;PRESERVE R1'S CONTENTS
  2771  005652  012701  002604               MOV     #PATCR,R1         ;POINT TO EXPECTED VALUES
  2772  005656                                PRINTX  #FMT06,#TXT7
        005656  012746  013632                                                  MOV     #TXT7,-(SP)
        005662  012746  012562                                                  MOV     #FMT06,-(SP)
        005666  012746  000002                                                  MOV     #2,-(SP)
        005672  010600                                                          MOV     SP,R0
        005674  104415                                                          TRAP    C$PNTX
        005676  062706  000006                                                  ADD     #6,SP
  2773  005702                                PRINTX  #FMT06A,#TXT8A,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>
        005702  005046                                                          CLR     -(SP)
        005704  152116                                                          BISB    (R1)+,(SP)
        005706  005046                                                          CLR     -(SP)
        005710  152116                                                          BISB    (R1)+,(SP)
        005712  005046                                                          CLR     -(SP)
        005714  152116                                                          BISB    (R1)+,(SP)
        005716  005046                                                          CLR     -(SP)
        005720  152116                                                          BISB    (R1)+,(SP)
        005722  005046                                                          CLR     -(SP)
        005724  152116                                                          BISB    (R1)+,(SP)
        005726  005046                                                          CLR     -(SP)
        005730  152116                                                          BISB    (R1)+,(SP)
        005732  012746  014004                                                  MOV     #TXT8A,-(SP)
        005736  012746  012571                                                  MOV     #FMT06A,-(SP)
        005742  012746  000010                                                  MOV     #10,-(SP)
        005746  010600                                                          MOV     SP,R0
        005750  104415                                                          TRAP    C$PNTX
        005752  062706  000022                                                  ADD     #22,SP
  2774  005756                        PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
        005756  005046                                                          CLR     -(SP)
        005760  152116                                                          BISB    (R1)+,(SP)
        005762  005046                                                          CLR     -(SP)
        005764  152116                                                          BISB    (R1)+,(SP)
        005766  012746  012637                                                  MOV     #FMT06B,-(SP)
        005772  012746  000003                                                  MOV     #3,-(SP)
        005776  010600                                                          MOV     SP,R0
        006000  104415                                                          TRAP    C$PNTX
        006002  062706  000010                                                  ADD     #10,SP
  2775  006006  012701  003122        MOV     #BT1,R1           ;POINT TO ACTUAL VALUES
  2776  006012                        PRINTX  #FMT06A,#TXT8B,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>
        006012  005046                                                          CLR     -(SP)
```

```
        006014  152116                                                          BISB    (R1)+,(SP)
        006016  005046                                                          CLR     -(SP)
        006020  152116                                                          BISB    (R1)+,(SP)
        006022  005046                                                          CLR     -(SP)
        006024  152116                                                          BISB    (R1)+,(SP)
        006026  005046                                                          CLR     -(SP)
        006030  152116                                                          BISB    (R1)+,(SP)
        006032  005046                                                          CLR     -(SP)
        006034  152116                                                          BISB    (R1)+,(SP)
        006036  005046                                                          CLR     -(SP)
        006040  152116                                                          BISB    (R1)+,(SP)
        006042  012746  014021                                                  MOV     #TXT8B,-(SP)
        006046  012746  012571                                                  MOV     #FMT06A,-(SP)
        006052  012746  000010                                                  MOV     #10,-(SP)
        006056  010600                                                          MOV     SP,R0
        006060  104415                                                          TRAP    C$PNTX
        006062  062706  000022                                                  ADD     #22,SP
2777    006066                  PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
        006066  005046                                                          CLR     -(SP)
        006070  152116                                                          BISB    (R1)+,(SP)
        006072  005046                                                          CLR     -(SP)
        006074  152116                                                          BISB    (R1)+,(SP)
        006076  012746  012637                                                  MOV     #FMT06B,-(SP)
        006102  012746  000003                                                  MOV     #3,-(SP)
        006106  010600                                                          MOV     SP,R0
        006110  104415                                                          TRAP    C$PNTX
        006112  062706  000010                                                  ADD     #10,SP
2778    006116  012701  003206         MOV     #BT2,R1         ;POINT TO XOR VALUES
2779    006122                  PRINTX  #FMT06A,#TXT8C,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>
        006122  005046                                                          CLR     -(SP)
        006124  152116                                                          BISB    (R1)+,(SP)
        006126  005046                                                          CLR     -(SP)
        006130  152116                                                          BISB    (R1)+,(SP)
        006132  005046                                                          CLR     -(SP)
        006134  152116                                                          BISB    (R1)+,(SP)
        006136  005046                                                          CLR     -(SP)
        006140  152116                                                          BISB    (R1)+,(SP)
        006142  005046                                                          CLR     -(SP)
        006144  152116                                                          BISB    (R1)+,(SP)
        006146  005046                                                          CLR     -(SP)
        006150  152116                                                          BISB    (R1)+,(SP)
        006152  012746  014036                                                  MOV     #TXT8C,-(SP)
        006156  012746  012571                                                  MOV     #FMT06A,-(SP)
        006162  012746  000010                                                  MOV     #10,-(SP)
        006166  010600                                                          MOV     SP,R0
        006170  104415                                                          TRAP    C$PNTX
        006172  062706  000022                                                  ADD     #22,SP
2780    006176                  PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>

        006176  005046                                                          CLR     -(SP)
        006200  152116                                                          BISB    (R1)+,(SP)
        006202  005046                                                          CLR     -(SP)
        006204  152116                                                          BISB    (R1)+,(SP)
        006206  012746  012637                                                  MOV     #FMT06B,-(SP)
        006212  012746  000003                                                  MOV     #3,-(SP)
        006216  010600                                                          MOV     SP,R0
        006220  104415                                                          TRAP    C$PNTX
        006222  062706  000010                                                  ADD     #10,SP
```

```
 2781
 2782 006226  012701  002614          ;*** PRINT SECOND HALF OF THE REGISTERS ***
 2783 006232                          MOV     #PATCR+8.,R1    ;POINT TO 2ND HALF OF REGISTERS EXPECTED VALUES
                                      PRINTX  #FMT06,#TXT7A
      006232  012746  013717                                                    MOV     #TXT7A,-(SP)
      006236  012746  012562                                                    MOV     #FMT06,-(SP)
      006242  012746  000002                                                    MOV     #2,-(SP)
      006246  010600                                                            MOV     SP,R0
      006250  104415                                                            TRAP    C$PNTX
      006252  062706  000006                                                    ADD     #6,SP
 2784 006256                          PRINTX  #FMT06A,#TXT8A,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>
      006256  005046                                                            CLR     -(SP)
      006260  152116                                                            BISB    (R1)+,(SP)
      006262  005046                                                            CLR     -(SP)
      006264  152116                                                            BISB    (R1)+,(SP)
      006266  005046                                                            CLR     -(SP)
      006270  152116                                                            BISB    (R1)+,(SP)
      006272  005046                                                            CLR     -(SP)
      006274  152116                                                            BISB    (R1)+,(SP)
      006276  005046                                                            CLR     -(SP)
      006300  152116                                                            BISB    (R1)+,(SP)
      006302  005046                                                            CLR     -(SP)
      006304  152116                                                            BISB    (R1)+,(SP)
      006306  012746  014004                                                    MOV     #TXT8A,-(SP)
      006312  012746  012571                                                    MOV     #FMT06A,-(SP)
      006316  012746  000010                                                    MOV     #10,-(SP)
      006322  010600                                                            MOV     SP,R0
      006324  104415                                                            TRAP    C$PNTX
      006326  062706  000022                                                    ADD     #22,SP
 2785 006332                          PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
      006332  005046                                                            CLR     -(SP)
      006334  152116                                                            BISB    (R1)+,(SP)
      006336  005046                                                            CLR     -(SP)
      006340  152116                                                            BISB    (R1)+,(SP)
      006342  012746  012637                                                    MOV     #FMT06B,-(SP)
      006346  012746  000003                                                    MOV     #3,-(SP)
      006352  010600                                                            MOV     SP,R0
      006354  104415                                                            TRAP    C$PNTX
      006356  062706  000010                                                    ADD     #10,SP
 2786 006362  012701  003132          MOV     #BT1+8.,R1      ;POINT TO 2ND HALF OF ACTUAL VALUES
 2787 006366                          PRINTX  #FMT06A,#TXT8B,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>
      006366  005046                                                            CLR     -(SP)
      006370  152116                                                            BISB    (R1)+,(SP)
      006372  005046                                                            CLR     -(SP)
      006374  152116                                                            BISB    (R1)+,(SP)
      006376  005046                                                            CLR     -(SP)
      006400  152116                                                            BISB    (R1)+,(SP)
      006402  005046                                                            CLR     -(SP)
      006404  152116                                                            BISB    (R1)+,(SP)
      006406  005046                                                            CLR     -(SP)
      006410  152116                                                            BISB    (R1)+,(SP)
      006412  005046                                                            CLR     -(SP)
      006414  152116                                                            BISB    (R1)+,(SP)
      006416  012746  014021                                                    MOV     #TXT8B,-(SP)
      006422  012746  012571                                                    MOV     #FMT06A,-(SP)
      006426  012746  000010                                                    MOV     #10,-(SP)
      006432  010600                                                            MOV     SP,R0
      006434  104415                                                            TRAP    C$PNTX
```

```
                006436  062706  000022
2788            006442                  PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
                006442  005046                                                  CLR     -(SP)
                006444  152116                                                  BISB    (R1)+,(SP)
                006446  005046                                                  CLR     -(SP)
                006450  152116                                                  BISB    (R1)+,(SP)
                006452  012746  012637                                          MOV     #FMT06B,-(SP)
                006456  012746  000003                                          MOV     #3,-(SP)
                006462  010600                                                  MOV     SP,R0
                006464  104415                                                  TRAP    C$PNTX
                006466  062706  000010                                          ADD     #10,SP
2789            006472  012701  003216          MOV     #BT2+8.,R1      ;POINT TO 2ND HALF OF XOR VALUES
2790            006476                  PRINTX  #FMT06A,#TXT8C,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>
                006476  005046                                                  CLR     -(SP)
                006500  152116                                                  BISB    (R1)+,(SP)
                006502  005046                                                  CLR     -(SP)
                006504  152116                                                  BISB    (R1)+,(SP)
                006506  005046                                                  CLR     -(SP)
                006510  152116                                                  BISB    (R1)+,(SP)
                006512  005046                                                  CLR     -(SP)
                006514  152116                                                  BISB    (R1)+,(SP)
                006516  005046                                                  CLR     -(SP)
                006520  152116                                                  BISB    (R1)+,(SP)
                006522  005046                                                  CLR     -(SP)
                006524  152116                                                  BISB    (R1)+,(SP)
                006526  012746  014036                                          MOV     #TXT8C,-(SP)
                006532  012746  012571                                          MOV     #FMT06A,-(SP)
                006536  012746  000010                                          MOV     #10,-(SP)
                006542  010600                                                  MOV     SP,R0
                006544  104415                                                  TRAP    C$PNTX
                006546  062706  000022                                          ADD     #22,SP
2791            006552                  PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
                006552  005046                                                  CLR     -(SP)
                006554  152116                                                  BISB    (R1)+,(SP)
                006556  005046                                                  CLR     -(SP)
                006560  152116                                                  BISB    (R1)+,(SP)
                006562  012746  012637                                          MOV     #FMT06B,-(SP)
                006566  012746  000003                                          MOV     #3,-(SP)
                006572  010600                                                  MOV     SP,R0
                006574  104415                                                  TRAP    C$PNTX
                006576  062706  000010                                          ADD     #10,SP
2792            006602  012601          MOV     (SP)+,R1        ;RESTORE R1
2793            006604  004737  012072  JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
2794            006610          ENDMSG
                006610                                                  L10011:
                006610  104423                                                  TRAP    C$MSG
2795
2796                    ;-------------------------------------------------------------------------------
                        .SBTTL  ERROR HANDLER -- ERR7 -- VIA REGISTER ERRORS
2797                    ;-------------------------------------------------------------------------------
2798            006612          BGNMSG  ERR7
                006612                                                  ERR7::
2799            006612  113701  002334          MOVB    REGNUM,R1
2800            006616  006301          ASL     R1              ;AS PASSED, THIS WAS A BYTE OFFSET
2801            006620          PRINTB  #FMT07,#TXTVR,TXTVRT(R1)
                006620  016146  017554                                          MOV     TXTVRT(R1),-(SP)
                006624  012746  014327                                          MOV     #TXTVR,-(SP)
                006630  012746  012530                                          MOV     #FMT07,-(SP)
```

```
ERROR HANDLER -- ERR7 -- VIA REGISTER ERRORS

        006634  012746  000003                                                  MOV     #3,-(SP)
        006640  010600                                                          MOV     SP,R0
        006642  104414                                                          TRAP    C$PNTB
        006644  062706  000010                                                  ADD     #10,SP
2802    006650  004737  011276          JSR     PC,XORGB
2803    006654                          PRINTB  #FMT02A,<B,GDATA>,<B,BDATA>,<B,XDATA>
        006654  005046                                                          CLR     -(SP)
        006656  153716  002314                                                  BISB    XDATA,(SP)
        006662  005046                                                          CLR     -(SP)
        006664  153716  002312                                                  BISB    BDATA,(SP)
        006670  005046                                                          CLR     -(SP)
        006672  153716  002310                                                  BISB    GDATA,(SP)
        006676  012746  012161                                                  MOV     #FMT02A,-(SP)
        006702  012746  000004                                                  MOV     #4,-(SP)
        006706  010600                                                          MOV     SP,R0
        006710  104414                                                          TRAP    C$PNTB
        006712  062706  000012                                                  ADD     #12,SP
2804    006716  004737  012072          JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
2805    006722                          ENDMSG
        006722                                                          L10012:
        006722  104423                                                          TRAP    C$MSG
2806                            ;-------------------------------------------------------------------------------
2807                            .SBTTL  ERROR HANDLER -- ERR47 -- FOR RAM DATA ERRORS IN STATIC TEST(S)
2808                            ;-------------------------------------------------------------------------------
2809    006724                          BGNMSG  ERR47
        006724                                                          ERR47::
2810                            ;       PRINT HEADING LINE # 1
2811
2812    006724  013700  002444          MOV     TMP2,R0         ;GET TEST PATTERN CODE
2813    006730  001404                  BEQ     2$              ;ZERO IS UNDEFINED BUT THERE IS TEXT TO SAY THAT
2814    006732  020027  000006          CMP     R0,#6           ;THIS IT ALL WE UNDERSTAND FOR NOW
2815    006736  003401                  BLE     2$              ;IF WITHIN LIMITS, LET IT GO
2816    006740  005000                  CLR     R0              ;ELSE, MAKE IT 0 FOR "UNDEFINED"
2817    006742  006300          2$:     ASL     R0              ;CONVERT TO A WORD INDEX
2818    006744  016000  007614          MOV     TXT47P(R0),R0   ;GET ADDRESS OF REQUIRED TEXT
2819    006750                          PRINTX  #FMT47A,R0      ;IDENTIFY TEST PATTERN BEING USED
        006750  010046                                                          MOV     R0,-(SP)
        006752  012746  007232                                                  MOV     #FMT47A,-(SP)
        006756  012746  000002                                                  MOV     #2,-(SP)
        006762  010600                                                          MOV     SP,R0
        006764  104415                                                          TRAP    C$PNTX
        006766  062706  000006                                                  ADD     #6,SP
2820                            ;       PRINT HEADING LINE # 2
2821
2822    006772                          PRINTX  #FMT47B         ;STANDARD PORTION OF LINE 2
        006772  012746  007263                                                  MOV     #FMT47B,-(SP)
        006776  012746  000001                                                  MOV     #1,-(SP)
        007002  010600                                                          MOV     SP,R0
        007004  104415                                                          TRAP    C$PNTX
        007006  062706  000004                                                  ADD     #4,SP
2823                            ;       PRINT HEADING LINE # 3
2824
2825    007012                          PRINTX  #FMT47C         ;STANDARD PORTION OF LINE 3
        007012  012746  007322                                                  MOV     #FMT47C,-(SP)
        007016  012746  000001                                                  MOV     #1,-(SP)
        007022  010600                                                          MOV     SP,R0
        007024  104415                                                          TRAP    C$PNTX
```

ERROR HANDLER -- ERR47 -- FOR RAM DATA ERRORS IN STATIC TEST(S

```
      007026  062706  000004                                                    ADD     #4,SP
2826                          ;       PRINT HEADING LINE # 4
2827
2828  007032                          PRINTX  #FMT47E         ;STANDARD PORTION OF LINE 4
      007032  012746  007350                                                    MOV     #FMT47E,-(SP)
      007036  012746  000001                                                    MOV     #1,-(SP)
      007042  010600                                                            MOV     SP,R0
      007044  104415                                                            TRAP    C$PNTX
      007046  062706  000004                                                    ADD     #4,SP
2829                          ;       GO PRINT DATA PORTION OF ERROR MESSAGE
2830
2831  007052                          PRINTX  #NEWLIN         ;TERMINATE HEADER & CAUSE 1 BLANK LINE
      007052  012746  012121                                                    MOV     #NEWLIN,-(SP)
      007056  012746  000001                                                    MOV     #1,-(SP)
      007062  010600                                                            MOV     SP,R0
      007064  104415                                                            TRAP    C$PNTX
      007066  062706  000004                                                    ADD     #4,SP
2832  007072  005037  007104                  CLR     ER47CT         ;RE-INITIALIZE THE DATA LINE COUNTER
2833  007076  004737  007110                  JSR     PC,ERR47.      ;USE COMMON SUBROUTINE TO REPORT DATA
2834  007102                                  ENDMSG
      007102                                                                L10013:
      007102  104423                                                            TRAP    C$MSG
2835
2836  007104  000000          ER47CT: .WORD   0               ;THIS VARIABLE WILL COUNT THE DATA LINES
2837  007106  000020          ER47MX: .WORD   16.             ;THIS CONSTANT LIMITS THE DATA LINES PRINTED
2838
2839  007110                  ERR47.:
2840
2841  007110  023737  007104  007106          CMP     ER47CT,ER47MX   ;HAVE WE REPORTED ENOUGH OF THESE DATA LINES?
2842  007116  103044                  BHIS    60$             ;YES,  BYPASS THIS WHOLE ROUTINE AND EXIT
2843  007120  005237  007104                  INC     ER47CT          ;NO,   COUNT THIS LINE
2844
2845  007124  113701  002450                  MOVB    TMP4,R1         ;GET EXPECTED DATA
2846  007130  113703  002452                  MOVB    TMP5,R3         ;SETUP TO CALCULATE XOR
2847  007134  074103                  XOR     R1,R3           ;CALCULATE XOR OF EXPECTED & ACTUAL DATA
2848  007136                          PRINTX  #FMT47G,TMPA,<B,R1>,<B,TMP5>,<B,R3> ;PRINT DATA LINE
      007136  005046                                                            CLR     -(SP)
      007140  150316                                                            BISB    R3,(SP)
      007142  005046                                                            CLR     -(SP)
      007144  153716  002452                                                    BISB    TMP5,(SP)
      007150  005046                                                            CLR     -(SP)
      007152  150116                                                            BISB    R1,(SP)
      007154  013746  002464                                                    MOV     TMPA,-(SP)
      007160  012746  007407                                                    MOV     #FMT47G,-(SP)
      007164  012746  000005                                                    MOV     #5,-(SP)
      007170  010600                                                            MOV     SP,R0
      007172  104415                                                            TRAP    C$PNTX
      007174  062706  000014                                                    ADD     #14,SP
2849  007200  023737  007104  007106          CMP     ER47CT,ER47MX   ;IF THESE TWO ARE EQUAL, WE WON'T BE PRINTING
2850  007206  001010                  BNE     60$             ;ANY MORE LINES FOR A WHILE.  SO,
2851  007210                          PRINTX  #FMT48I         ;  PUT OUT A MESSAGE TO THAT EFFECT.
      007210  012746  010644                                                    MOV     #FMT48I,-(SP)
      007214  012746  000001                                                    MOV     #1,-(SP)
      007220  010600                                                            MOV     SP,R0
      007222  104415                                                            TRAP    C$PNTX
      007224  062706  000004                                                    ADD     #4,SP
2852  007230  000207          60$:    RTS     PC
```

```
2853
2854                                        .NLIST  BEX
2855 007232  045  116  045  FMT47A: .ASCIZ  \%N%S2%ATEST PATTERN:  %T\
2856 007263  045  116  045  FMT47B: .ASCIZ  \%N%S2%A  (ALL VALUES IN OCTAL)\
2857 007322  045  116  045  FMT47C: .ASCIZ  \%N%S3%A  RAM   SHOULD\
2858 007350  045  116  045  FMT47E: .ASCIZ  \%N%S3%AADDRESS   BE    IS  XOR\
2859 007407  045  116  045  FMT47G: .ASCIZ  \%N%S4%04%S4%03%S3%03%S2%03\
2860 007442  101  114  114  TXT47C: .ASCIZ  \ALL ONES\
2861 007453  101  114  114  TXT47D: .ASCIZ  \ALL ZEROES\
2862 007466  061  040  102  TXT47E: .ASCIZ  \1 BIT ALTERNATING\
2863 007510  062  040  102  TXT47F: .ASCIZ  \2 BITS ALTERNATING\
2864 007533  101  104  104  TXT47G: .ASCIZ  \ADDRESS IN ADDRESS\
2865 007556  111  116  103  TXT47H: .ASCIZ  \INCREMENTAL VALUE IN ADDRESS\
2866                                        .LIST   BEX
2867                                        .EVEN
2868 007614 014235 007442 007453 TXT47P: .WORD   TXTML6,TXT47C,TXT47D,TXT47E,TXT47F,TXT47G,TXT47H
     007622 007466 007510 007533
     007630 007556
2869
2870                                ;       "TXTML6" ABOVE IS DEFINED AS "UNDEFINED" IN THE M-LOOP FUNCTION DEF'S.
2871
2872                                ;-------------------------------------------------------------------------------
2873                                .SBTTL  ERROR HANDLER -- ERR48 -- FOR DATA ERRORS IN "MOVING INVERSIONS TEST"
2874                                ;-------------------------------------------------------------------------------
2875 007632                                 BGNMSG  ERR48
     007632                                                                                    ERR48::
2876                                ;       PRINT HEADING LINE # 1
2877
2878 007632                                 PRINTX  #FMT48A         ;STANDARD PORTION OF LINE 1
     007632 012746 010300                                                MOV     #FMT48A,-(SP)
     007636 012746 000001                                                MOV     #1,-(SP)
     007642 010600                                                       MOV     SP,R0
     007644 104415                                                       TRAP    C$PNTX
     007646 062706 000004                                                ADD     #4,SP
2879 007652 032737 000004 002350         BIT     #BIT2,PFLAG    ;IF EXTENDED INFORMATION REQUESTED,
2880 007660 001410                       BEQ     2$
2881 007662                              PRINTX  #FMT48B         ;PRINT EXTENDED PORTION OF LINE 1
     007662 012746 010347                                                MOV     #FMT48B,-(SP)
     007666 012746 000001                                                MOV     #1,-(SP)
     007672 010600                                                       MOV     SP,R0
     007674 104415                                                       TRAP    C$PNTX
     007676 062706 000004                                                ADD     #4,SP
2882                                ;       PRINT HEADING LINE # 2
2883
2884 007702                         2$:  PRINTX  #FMT48C         ;STANDARD PORTION OF LINE 2
     007702 012746 010402                                                MOV     #FMT48C,-(SP)
     007706 012746 000001                                                MOV     #1,-(SP)
     007712 010600                                                       MOV     SP,R0
     007714 104415                                                       TRAP    C$PNTX
     007716 062706 000004                                                ADD     #4,SP
2885
2886                                ;       PRINT HEADING LINE # 3
2887
2888 007722                              PRINTX  #FMT48E         ;STANDARD PORTION OF LINE 3
     007722 012746 010437                                                MOV     #FMT48E,-(SP)
     007726 012746 000001                                                MOV     #1,-(SP)
     007732 010600                                                       MOV     SP,R0
```

```
                                                                                    TRAP    C$PNTX
                                                                                    ADD     #4,SP
2889                                    BIT     #BIT2,PFLAG     ;IF EXTENDED INFORMATION REQUESTED,
2890                                    BEQ     6$
2891                                    PRINTX  #FMT48F         ;PRINT EXTENDED PORTION OF LINE 3
                                                                                    MOV     #FMT48F,-(SP)
                                                                                    MOV     #1,-(SP)
                                                                                    MOV     SP,R0
                                                                                    TRAP    C$PNTX
                                                                                    ADD     #4,SP
2892
2893                            ;       GO PRINT DATA PORTION OF ERROR MESSAGE
2894                            6$:     PRINTX  #NEWLIN         ;TERMINATE HEADER & CAUSE 1 BLANK LINE
                                                                                    MOV     #NEWLIN,-(SP)
                                                                                    MOV     #1,-(SP)
                                                                                    MOV     SP,R0
                                                                                    TRAP    C$PNTX
                                                                                    ADD     #4,SP
2895                                    CLR     ER48CT          ;RE-INITIALIZE THE DATA LINE COUNTER
2896                                    JSR     PC,ERR48.       ;USE COMMON SUBROUTINE TO REPORT DATA
2897                                    ENDMSG
                                                                                L10014:
                                                                                    TRAP    C$MSG
2898
2899                            ER48CT: .WORD   0               ;THIS VARIABLE WILL COUNT THE DATA LINES
2900                            ER48MX: .WORD   16.             ;THIS CONSTANT LIMITS THE DATA LINES PRINTED
2901
2902                            ERR48.:
2903
2904                                    CMP     ER48CT,ER48MX   ;HAVE WE REPORTED ENOUGH OF THESE DATA LINES?
2905                                    BHIS    60$             ;YES.  BYPASS THIS WHOLE ROUTINE AND EXIT
2906                                    INC     ER48CT          ;NO.   COUNT THIS LINE
2907
2908
2909                            ; DETERMINT WHICH ERROR CALL GOT US HERE -- PRE-WRITE OR POST-WRITE:
2910                                    BIT     #BIT1,TMPF      ;DID PRE-WRITE ERROR CALL GET US HERE?
2911                                    BEQ     2$              ;NO. THEN SETUP FOR "POST" IN ERROR MESSAGE
2912                                    MOV     #TXT48A,R0      ;YES. SETUP FOR "PRE" IN ERROR MESSAGE
2913                                    MOVB    TMP4,R1         ;GET EXPECTED DATA (BEFORE WRITING NEW VALUE)
2914                                    BR      4$
2915
2916                            2$:     MOV     #TXT48B,R0      ;POINT TO "POST" TEXT
2917                                    MOVB    TMP4+1,R1       ;GET EXPECTED DATA (AFTER WRITING NEW VALUE)
2918                            4$:     MOV     TMP5,R3         ;SETUP TO CALCULATE XOR
2919                                    XOR     R1,R3           ;CALCULATE XOR OF EXPECTED & ACTUAL DATA
2920                                    PRINTX  #FMT48G,R0,TMPA,<B,R1>,<B,TMP5>,<B,R3> ;PRINT STANDARD DATA LINE
                                                                                    CLR     -(SP)
                                                                                    BISB    R3,(SP)
                                                                                    CLR     -(SP)
                                                                                    BISB    TMP5,(SP)
                                                                                    CLR     -(SP)
                                                                                    BISB    R1,(SP)
                                                                                    MOV     TMPA,-(SP)
                                                                                    MOV     R0,-(SP)
                                                                                    MOV     #FMT48G,-(SP)
                                                                                    MOV     #6,-(SP)
                                                                                    MOV     SP,R0
```

```
                                                                                    TRAP    C$PNTX
                                                                                    ADD     #16,SP
2921 010150  032737  000004  002350          BIT     #BIT2,PFLAG     ;IF EXTENDED INFORMATION REQUESTED,
2922 010156  001433                          BEQ     10$
2923                                                                 ;SETUP FOR PRINTING OF EXTENDED INFORMATION
2924 010160  013701  002470                  MOV     TMPC,R1         ;DATA BIT VALUE (0 OR 1)
2925 010164  042701  177776                  BIC     #^CBIT0,R1      ;  MAKE SURE WE ONLY HAVE ONE BIT
2926 010170  005737  002472                  TST     TMPD            ;DIRECTION?
2927 010174  001003                          BNE     6$              ;BACKWARD --
2928 010176  012700  010750                  MOV     #TXT48C,R0      ;FORWARD ---
2929 010202  000402                          BR      8$
2930 010204  012700  010755          6$:     MOV     #TXT48D,R0      ;BACKWARD --
2931 010210                          8$:     PRINTX  #FMT48H,TMPB,R1,R0,<8.,TMP9>  ;PRINT EXTENDED INFORMATION
     010210  005046                                                                 CLR     -(SP)
     010212  153716  002462                                                         BISB    TMP9,(SP)
     010216  010046                                                                 MOV     R0,-(SP)
     010220  010146                                                                 MOV     R1,-(SP)
     010222  013746  002466                                                         MOV     TMPB,-(SP)
     010226  012746  010611                                                         MOV     #FMT48H,-(SP)
     010232  012746  000005                                                         MOV     #5,-(SP)
     010236  010600                                                                 MOV     SP,R0
     010240  104415                                                                 TRAP    C$PNTX
     010242  062706  000014                                                         ADD     #14,SP
2932 010246  023737  010024  010026  10$:     CMP     ER48CT,ER48MX   ;IF THESE TWO ARE EQUAL, WE WON'T BE PRINTING
2933 010254  001010                          BNE     60$             ;ANY MORE LINES FOR A WHILE.  SO,
2934 010256                                  PRINTX  #FMT48I         ;  PUT OUT A MESSAGE TO THAT EFFECT.
     010256  012746  010644                                                         MOV     #FMT48I,-(SP)
     010262  012746  000001                                                         MOV     #1,-(SP)
     010266  010600                                                                 MOV     SP,R0
     010270  104415                                                                 TRAP    C$PNTX
     010272  062706  000004                                                         ADD     #4,SP
2935 010276                          60$:
2936 010276  000207                          RTS     PC
2937                                 .NLIST  BEX
2938 010300     045     116     045  FMT48A: .ASCIZ  \%N%S2%APRE OR    (ALL VALUES IN OCTAL)\
2939 010347     045     123     065  FMT48B: .ASCIZ  \%S5%AEXTENDED INFORMATION:\
2940 010402     045     116     045  FMT48C: .ASCIZ  \%N%S3%APOST     RAM   SHOULD\
2941 010437     045     116     045  FMT48E: .ASCIZ  \%N%S2%AWRITE   ADDRESS   BE    IS  XOR\
2942 010506     045     123     065  FMT48F: .ASCIZ  \%S5%ABIT  DATA   SEQ  LSB(DECIMAL)\
2943 010551     045     116     045  FMT48G: .ASCIZ  \%N%S3%T%S4%04%S4%03%S3%03%S2%03\
2944 010611     045     123     066  FMT48H: .ASCIZ  \%S6%01%S5%01%S3%T%S2%D2%A.\
2945 010644     045     116     045  FMT48I: .ASCIZ  \%N%N%S5%AFURTHER DATA LINES SUPRESSED UNTIL NEW TEST DATA\
2946 010736     120     122     105  TXT48A: .ASCIZ  \PRE \
2947 010743     120     117     123  TXT48B: .ASCIZ  \POST\
2948 010750     040     106     127  TXT48C: .ASCIZ  \ FWD\
2949 010755     102     113     127  TXT48D: .ASCIZ  \BKWD\
2950                                 .LIST   BEX
2951                                 .EVEN
2952
2953
2954                                 ;-------------------------------------------------------------------------------
2955                                 .SBTTL  ERROR HANDLER -- ERR50 -- FOR REPORTING TIMER # 1 ERRORS
2956                                 ;-------------------------------------------------------------------------------
2957 010762                                  BGNMSG  ERR50
     010762                                                                                 ERR50::
2958 010762  010146                          MOV     R1,-(SP)        ;SAVE R1 FOR CALLER
2959 010764  113701  002467                  MOVB    TMPB+1,R1       ;GET THE MODE LAST SETUP
```

ERROR HANDLER -- ERR50 -- FOR REPORTING TIMER # 1 ERRORS

```
 2960 010770  000241                    CLC                     ;SEEING AS THE CARRY BIT WILL BE ROTATED INTO
 2961                                                            ;THE DATA, WE HAD BETTER CLEAR IT JUST IN CASE.
 2962 010772  042701  177477            BIC     #^C<BIT6+BIT7>,R1 ;LOOK @ JUST THE TIMER 1 MODE DEFINITION
 2963 010776  106101                    ROLB    R1              ;POSITION IT FOR PRINTOUT
 2964 011000  106101                    ROLB    R1
 2965 011002  106101                    ROLB    R1
 2966
 2967                                   ;IDENTIFY THE MODE BEING USED AT THE TIME:
 2968
 2969 011004                            PRINTX  #FMT50A,R1
      011004  010146                                                    MOV     R1,-(SP)
      011006  012746  012747                                            MOV     #FMT50A,-(SP)
      011012  012746  000002                                            MOV     #2,-(SP)
      011016  010600                                                    MOV     SP,R0
      011020  104415                                                    TRAP    C$PNTX
      011022  062706  000006                                            ADD     #6,SP
 2970                                   ;PRINT THE HEADING TO IDENTIFY THE REGISTERS:
 2971
 2972 011026                            PRINTX  #FMT50B
      011026  012746  013021                                            MOV     #FMT50B,-(SP)
      011032  012746  000001                                            MOV     #1,-(SP)
      011036  010600                                                    MOV     SP,R0
      011040  104415                                                    TRAP    C$PNTX
      011042  062706  000004                                            ADD     #4,SP
 2973                                   ;AND THE VALUES THAT WERE LOADED INTO THE REGISTERS:
 2974
 2975 011046                            PRINTX  #FMT50C,#TXT8D,<B,TMP5+1>,<B,TMP4+1>,<B,TMP7+1>,<B,TMP6+1>
      011046  005046                                                    CLR     -(SP)
      011050  153716  002455                                          BISB    TMP6+1,(SP)
      011054  005046                                                    CLR     -(SP)
      011056  153716  002457                                          BISB    TMP7+1,(SP)
      011062  005046                                                    CLR     -(SP)
      011064  153716  002451                                          BISB    TMP4+1,(SP)
      011070  005046                                                    CLR     -(SP)
      011072  153716  002453                                          BISB    TMP5+1,(SP)
      011076  012746  014053                                            MOV     #TXT8D,-(SP)
      011102  012746  013102                                            MOV     #FMT50C,-(SP)
      011106  012746  000006                                            MOV     #6,-(SP)
      011112  010600                                                    MOV     SP,R0
      011114  104415                                                    TRAP    C$PNTX
      011116  062706  000016                                            ADD     #16,SP
 2976 011122                            PRINTX  #FMT50D,<B,TMPB+1>,<B,TMPE+1>
      011122  005046                                                    CLR     -(SP)
      011124  153716  002475                                          BISB    TMPE+1,(SP)
      011130  005046                                                    CLR     -(SP)
      011132  153716  002467                                          BISB    TMPB+1,(SP)
      011136  012746  013142                                            MOV     #FMT50D,-(SP)
      011142  012746  000003                                            MOV     #3,-(SP)
      011146  010600                                                    MOV     SP,R0
      011150  104415                                                    TRAP    C$PNTX
      011152  062706  000010                                            ADD     #10,SP
 2977                                   ;AND THE VALUES READ FROM THOSE REGISTERS:
 2978
 2979 011156                            PRINTX  #FMT50C,#TXT8E,<B,TMP5>,<B,TMP4>,<B,TMP7>,<B,TMP6>
      011156  005046                                                    CLR     -(SP)
      011160  153716  002454                                          BISB    TMP6,(SP)
      011164  005046                                                    CLR     -(SP)
```

ERROR HANDLER -- ERR50 -- FOR REPORTING TIMER # 1 ERRORS

```
        011166  153716  002456                                                  BISB    TMP7,(SP)
        011172  005046                                                          CLR     -(SP)
        011174  153716  002450                                                  BISB    TMP4,(SP)
        011200  005046                                                          CLR     -(SP)
        011202  153716  002452                                                  BISB    TMP5,(SP)
        011206  012746  014070                                                  MOV     #TXT8E,-(SP)
        011212  012746  013102                                                  MOV     #FMT50C,-(SP)
        011216  012746  000006                                                  MOV     #6,-(SP)
        011222  010600                                                          MOV     SP,R0
        011224  104415                                                          TRAP    C$PNTX
        011226  062706  000016                                                  ADD     #16,SP
  2980  011232                          PRINTX  #FMT50E,<B,TMPB>,<B,TMPD>
        011232  005046                                                          CLR     -(SP)
        011234  153716  002472                                                  BISB    TMPD,(SP)
        011240  005046                                                          CLR     -(SP)
        011242  153716  002466                                                  BISB    TMPB,(SP)
        011246  012746  013157                                                  MOV     #FMT50E,-(SP)
        011252  012746  000003                                                  MOV     #3,-(SP)
        011256  010600                                                          MOV     SP,R0
        011260  104415                                                          TRAP    C$PNTX
        011262  062706  000010                                                  ADD     #10,SP
  2981
  2982  011266  004737  012072          JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
  2983  011272  012601                  MOV     (SP)+,R1        ;RESTORE R1 FOR CALLER
  2984  011274                          ENDMSG
        011274                                                          L10015:
        011274  104423                                                          TRAP    C$MSG
  2985
  2986
```

```
                                .SBTTL  ERROR HANDLER SUBROUTINES
                                ;-------------------------------------------------------------------------------
                                ;------------- SUBROUTINES USED ONLY BY ERROR HANDLERS ------------------------
                                ;-------------------------------------------------------------------------------


                                ;-------------------------------------------------------------------------------
                                .SBTTL          ERROR HANDLER SUBROUTINE -- XORGB
                                ;-------------------------------------------------------------------------------
                                ;       PERFORM EXCLUSIVE OR BETWEEN "GDATA" & "BDATA" PUTTING
                                ;       THE RESULT IN "XDATA"

011276  010146                  XORGB:  MOV     R1,-(SP)        ;PRESERVE WORKING REGISTER
011300  013701  002310                  MOV     GDATA,R1        ;GET "GOOD" DATA
011304  013737  002312  002314          MOV     BDATA,XDATA     ;AND "BAD" DATA
011312  074137  002314                  XOR     R1,XDATA        ;PERFORM EXCLUSIVE OR
011316  012601                          MOV     (SP)+,R1        ;RESTORE R1
011320  000207                          RTS     PC              ;RETURN


                                ;-------------------------------------------------------------------------------
                                .SBTTL          ERROR HANDLER SUBROUTINE -- ERR4$
                                ;-------------------------------------------------------------------------------
                                ;       IDENTIFY & DUMP THE BYTE SELECT REGISTERS

011322                          ERR4$:  PRINTX  #FMT4,#TXT3,#TXT1
011322  012746  013253                                                  MOV     #TXT1,-(SP)
011326  012746  013454                                                  MOV     #TXT3,-(SP)
011332  012746  012245                                                  MOV     #FMT4,-(SP)
011336  012746  000003                                                  MOV     #3,-(SP)
011342  010600                                                          MOV     SP,R0
011344  104415                                                          TRAP    C$PNTX
011346  062706  000010                                                  ADD     #10,SP
011352                                  PRINTX  #FMT4A,<B,BSR0>,<B,BSR1>,<B,BSR2>,<B,BSR3>
011352  005046                                                          CLR     -(SP)
011354  153716  002254                                                  BISB    BSR3,(SP)
011360  005046                                                          CLR     -(SP)
011362  153716  002252                                                  BISB    BSR2,(SP)
011366  005046                                                          CLR     -(SP)
011370  153716  002250                                                  BISB    BSR1,(SP)
011374  005046                                                          CLR     -(SP)
011376  153716  002246                                                  BISB    BSR0,(SP)
011402  012746  012305                                                  MOV     #FMT4A,-(SP)
011406  012746  000005                                                  MOV     #5,-(SP)
011412  010600                                                          MOV     SP,R0
011414  104415                                                          TRAP    C$PNTX
011416  062706  000014                                                  ADD     #14,SP
011422                                  PRINTX  #FMT4B,#TXT2
011422  012746  013311                                                  MOV     #TXT2,-(SP)
011426  012746  012340                                                  MOV     #FMT4B,-(SP)
011432  012746  000002                                                  MOV     #2,-(SP)
011436  010600                                                          MOV     SP,R0
011440  104415                                                          TRAP    C$PNTX
011442  062706  000006                                                  ADD     #6,SP
011446                                  PRINTX  #FMT4C,<B,BSR4>,<B,BSR5>,<B,BSR6>,<B,BSR7>
011446  005046                                                          CLR     -(SP)
011450  153716  002264                                                  BISB    BSR7,(SP)
011454  005046                                                          CLR     -(SP)
```

ERROR HANDLER SUBROUTINE -- ERR4$

```
        011456  153716  002262                                                  BISB    BSR6,(SP)
        011462  005046                                                          CLR     -(SP)
        011464  153716  002260                                                  BISB    BSR5,(SP)
        011470  005046                                                          CLR     -(SP)
        011472  153716  002256                                                  BISB    BSR4,(SP)
        011476  012746  012345                                                  MOV     #FMT4C,-(SP)
        011502  012746  000005                                                  MOV     #5,-(SP)
        011506  010600                                                          MOV     SP,R0
        011510  104415                                                          TRAP    C$PNTX
        011512  062706  000014                                                  ADD     #14,SP
3016    011516                          PRINTX  #FMT4B,#TXT2A
        011516  012746  013353                                                  MOV     #TXT2A,-(SP)
        011522  012746  012340                                                  MOV     #FMT4B,-(SP)
        011526  012746  000002                                                  MOV     #2,-(SP)
        011532  010600                                                          MOV     SP,R0
        011534  104415                                                          TRAP    C$PNTX
        011536  062706  000006                                                  ADD     #6,SP
3017    011542                          PRINTX  #FMT4A,<B,BSR10>,<B,BSR11>,<B,BSR12>,<B,BSR13>
        011542  005046                                                          CLR     -(SP)
        011544  153716  002274                                                  BISB    BSR13,(SP)
        011550  005046                                                          CLR     -(SP)
        011552  153716  002272                                                  BISB    BSR12,(SP)
        011556  005046                                                          CLR     -(SP)
        011560  153716  002270                                                  BISB    BSR11,(SP)
        011564  005046                                                          CLR     -(SP)
        011566  153716  002266                                                  BISB    BSR10,(SP)
        011572  012746  012305                                                  MOV     #FMT4A,-(SP)
        011576  012746  000005                                                  MOV     #5,-(SP)
        011602  010600                                                          MOV     SP,R0
        011604  104415                                                          TRAP    C$PNTX
        011606  062706  000014                                                  ADD     #14,SP
3018    011612                          PRINTX  #FMT4B,#TXT2B
        011612  012746  013412                                                  MOV     #TXT2B,-(SP)
        011616  012746  012340                                                  MOV     #FMT4B,-(SP)
        011622  012746  000002                                                  MOV     #2,-(SP)
        011626  010600                                                          MOV     SP,R0
        011630  104415                                                          TRAP    C$PNTX
        011632  062706  000006                                                  ADD     #6,SP
3019    011636                          PRINTX  #FMT4C,<B,BSR14>,<B,BSR15>,<B,BSR16>,<B,BSR17>
        011636  005046                                                          CLR     -(SP)
        011640  153716  002304                                                  BISB    BSR17,(SP)
        011644  005046                                                          CLR     -(SP)
        011646  153716  002302                                                  BISB    BSR16,(SP)
        011652  005046                                                          CLR     -(SP)
        011654  153716  002300                                                  BISB    BSR15,(SP)
        011660  005046                                                          CLR     -(SP)
        011662  153716  002276                                                  BISB    BSR14,(SP)
        011666  012746  012345                                                  MOV     #FMT4C,-(SP)
        011672  012746  000005                                                  MOV     #5,-(SP)
        011676  010600                                                          MOV     SP,R0
        011700  104415                                                          TRAP    C$PNTX
        011702  062706  000014                                                  ADD     #14,SP
3020    011706  000207                  RTS     PC
3021
3022                            ;-------------------------------------------------------------------------
3023                            .SBTTL ........ERROR HANDLER SUBROUTINE -- ERR5$
3024                            ;-------------------------------------------------------------------------
```

.....ERROR HANDLER SUBROUTINE -- ERR5$

```
3025                                    ;
3026 011710                             ERR5$:  COMMON ERROR SUBROUTINE TO PRINT SELECT REGISTERS
3027 011710                                     PRINTX  #FMT4,#TXT6,#TXT4
     011710  012746  013504                                                 MOV     #TXT4,-(SP)
     011714  012746  013607                                                 MOV     #TXT6,-(SP)
     011720  012746  012245                                                 MOV     #FMT4,-(SP)
     011724  012746  000003                                                 MOV     #3,-(SP)
     011730  010600                                                         MOV     SP,R0
     011732  104415                                                         TRAP    C$PNTX
     011734  062706  000010                                                 ADD     #10,SP
3028 011740                                     PRINTX  #FMT11,WSR0,WSR2,WSR4,WSR6 ;DUMP THE SELECT REGISTERS
     011740  013746  002254                                                 MOV     WSR6,-(SP)
     011744  013746  002252                                                 MOV     WSR4,-(SP)
     011750  013746  002250                                                 MOV     WSR2,-(SP)
     011754  013746  002246                                                 MOV     WSR0,-(SP)
     011760  012746  012730                                                 MOV     #FMT11,-(SP)
     011764  012746  000005                                                 MOV     #5,-(SP)
     011770  010600                                                         MOV     SP,R0
     011772  104415                                                         TRAP    C$PNTX
     011774  062706  000014                                                 ADD     #14,SP
3029 012000                                     PRINTX  #FMT4B,#TXT4A
     012000  012746  013544                                                 MOV     #TXT4A,-(SP)
     012004  012746  012340                                                 MOV     #FMT4B,-(SP)
     012010  012746  000002                                                 MOV     #2,-(SP)
     012014  010600                                                         MOV     SP,R0
     012016  104415                                                         TRAP    C$PNTX
     012020  062706  000006                                                 ADD     #6,SP
3030 012024                                     PRINTX  #FMT11,WSR10,WSR12,WSR14,WSR16
     012024  013746  002264                                                 MOV     WSR16,-(SP)
     012030  013746  002262                                                 MOV     WSR14,-(SP)
     012034  013746  002260                                                 MOV     WSR12,-(SP)
     012040  013746  002256                                                 MOV     WSR10,-(SP)
     012044  012746  012730                                                 MOV     #FMT11,-(SP)
     012050  012746  000005                                                 MOV     #5,-(SP)
     012054  010600                                                         MOV     SP,R0
     012056  104415                                                         TRAP    C$PNTX
     012060  062706  000014                                                 ADD     #14,SP
3031 012064  004737  012072                     JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
3032 012070  000207                             RTS     PC
3033
3034                                    ;-------------------------------------------------------------------------
3035                                    .SBTTL          SUBROUTINE TO PERFORM "PRINTB   #ENDEMB"
3036
3037 012072                             NULERR: PRINTB  #ENDEMB         ;TERMINATE ERROR MESSAGE
     012072  012746  012114                                                 MOV     #ENDEMB,-(SP)
     012076  012746  000001                                                 MOV     #1,-(SP)
     012102  010600                                                         MOV     SP,R0
     012104  104414                                                         TRAP    C$PNTB
     012106  062706  000004                                                 ADD     #4,SP
3038 012112  000207                             RTS     PC
3039                                    ;-------------------------------------------------------------------------
```

```
                                .SBTTL  FORMAT SPEC'S FOR ERROR HANDLERS -- "FMT___"
                                ;-----------------------------------------------------------------------------
                                ;-------------- FORMAT SPEC'S USED BY ERROR HANDLERS ---------------------------
                                ;-----------------------------------------------------------------------------
                                .NLIST  BEX
012114      045     116     045 ENDEMB: .ASCIZ  /%N%N/
012121      045     116     000 NEWLIN: .ASCIZ  /%N/

012124      045     116     045 FMT02:  .ASCIZ  /%N%AFAILING REG = %T%ASEL%02/
012161      045     116     045 FMT02A: .ASCIZ  /%N%A  EXPECTED:  %03%A   ACTUAL:  %03%A   XOR:  %03/
012245      045     116     045 FMT4:   .ASCIZ  /%N%A  THE CONTENTS OF ALL%T%N%T/
012305      045     116     045 FMT4A:  .ASCIZ  /%N%S1%03%S5%03%S5%03%S5%03/
012340      045     116     045 FMT4B:  .ASCIZ  /%N%T/
012345      045     116     045 FMT4C:  .ASCIZ  /%N%S5%03%S5%03%S5%03%S5%03/
012400      045     116     045 FMT5:   .ASCIZ  /%N%A  WHEN %03%A LOADED INTO BSEL1/
012443      045     116     045 FMT5A:  .ASCIZ  /%N%A  ATTEMPTING "M-LOOP" FUNCTION CODE %02%A '%T%A)/
012530      045     101     040 FMT07:  .ASCIZ  /%A  DETECTED IN %T%T%A --/
012562      045     116     045 FMT06:  .ASCIZ  /%N%N%T/
012571      045     116     045 FMT06A: .ASCIZ  /%N%T%03%S2%03%S2%03%S2%03%S2%03%S2%03/
012637      045     123     062 FMT06B: .ASCIZ  /%S2%03%S2%03/
012654      045     116     045 FMT10:  .ASCIZ  /%N%A  EXPECTED:%08%A  ACTUAL:%08%A  XOR:%08/
012730      045     116     045 FMT11:  .ASCIZ  /%N%08%08%08%08/
012747      045     116     045 FMT50A: .ASCIZ  /%N%A  TIMER # 1 MODE:  %01%A   REGISTERS:/
013021      045     116     045 FMT50B: .ASCIZ  /%N%S15%AT1CH  T1CL  T1LH  T1LL   ACR   IFR   IER/
013102      045     116     045 FMT50C: .ASCIZ  /%N%S3%T%S1%03%S3%03%S3%03%S3%03/
013142      045     123     063 FMT50D: .ASCIZ  /%S3%03%S9%03/
013157      045     123     063 FMT50E: .ASCIZ  /%S3%03%S3%03/
013174      045     116     062 FMT50M: .ASCIZ  /%N2%S10%A(T1CH & T1CL HAVEN'T YET BEEN LOADED)/

                                .SBTTL  TEXT STRINGS FOR ERROR HANDLERS -- "TXT___"
                                ;-----------------------------------------------------------------------------
                                ;-------------- TEXT USED BY ERROR HANDLERS ------------------------------------
                                ;-----------------------------------------------------------------------------

013253      102     123     105 TXT1:   .ASCIZ  /BSEL0   BSEL1   BSEL2   BSEL3/
013311      040     040     040 TXT2:   .ASCIZ  /    BSEL4   BSEL5   BSEL6   BSEL7/
013353      102     123     105 TXT2A:  .ASCIZ  /BSEL10  BSEL11  BSEL12  BSEL13/
013412      040     040     040 TXT2B:  .ASCIZ  /   BSEL14  BSEL15  BSEL16  BSEL17/
013454      040     102     131 TXT3:   .ASCIZ  / BYTE SELECT REG'S ARE:/
013504      040     040     040 TXT4:   .ASCIZ  /   SEL0    SEL2    SEL4    SEL6/
013544      040     040     040 TXT4A:  .ASCIZ  /   SEL10   SEL12   SEL14   SEL16/
013605      102     000         TXT5:   .ASCIZ  /B/
013607      040     123     105 TXT6:   .ASCIZ  / SELECT REG'S ARE:/
013632      040     122     105 TXT7:   .ASCIZ  / REGISTERS  ORB  ORA  DDRB DDRA T1CL T1CH T1LL T1LH /
013717      040     040     040 TXT7A:  .ASCIZ  /            T2CL T2CH SR   ACR  PCR  IFR  IER  ORA  /
014004      040     105     130 TXT8A:  .ASCIZ  / EXPECTED:  /
014021      040     101     103 TXT8B:  .ASCIZ  / ACTUAL:    /
014036      040     130     117 TXT8C:  .ASCIZ  / XOR:       /
014053      040     114     117 TXT8D:  .ASCIZ  / LOADED:    /
014070      040     122     105 TXT8E:  .ASCIZ  / READ:      /

014105      116     117     120 TXTML0: .ASCIZ  /NOP/
014111      122     105     101 TXTML1: .ASCIZ  /READ 1 BYTE/
014125      127     122     111 TXTML2: .ASCIZ  /WRITE 1 BYTE/
014142      116     120     122 TXTML3: .ASCIZ  /NPR-OUT 256 BYTES/
014164      116     120     122 TXTML4: .ASCIZ  /NPR-IN 256 BYTES/
014205      123     105     124 TXTML5: .ASCIZ  /SET MICROPROCESSOR'S PC/
```

```
3098 014235  125  116  104  TXTML6: .ASCIZ  /UNDEFINED/
3099 014247  123  105  124  TXTML7: .ASCIZ  /SET MAINT INTR & CLR INTR DISABLE IN CPU STATUS/
3100
3101 014327  126  111  101  TXTVR:  .ASCIZ  /VIA REGISTER /
3102 014345  117  122  102  TXTVR0: .ASCIZ  /ORB/
3103 014351  117  122  101  TXTVR1: .ASCIZ  /ORA/
3104 014355  104  104  122  TXTVR2: .ASCIZ  /DDRB/
3105 014362  104  104  122  TXTVR3: .ASCIZ  /DDRA/
3106 014367  124  061  103  TXTVR4: .ASCIZ  /T1CL/
3107 014374  124  061  103  TXTVR5: .ASCIZ  /T1CH/
3108 014401  124  061  114  TXTVR6: .ASCIZ  /T1LL/
3109 014406  124  061  114  TXTVR7: .ASCIZ  /T1LH/
3110 014413  124  062  103  TXTVR8: .ASCIZ  /T2CL/
3111 014420  124  062  103  TXTVR9: .ASCIZ  /T2CH/
3112 014425  123  122  000  TXTVRA: .ASCIZ  /SR/
3113 014430  101  103  122  TXTVRB: .ASCIZ  /ACR/
3114 014434  120  103  122  TXTVRC: .ASCIZ  /PCR/
3115 014440  111  106  122  TXTVRD: .ASCIZ  /IFR/
3116 014444  111  105  122  TXTVRE: .ASCIZ  /IER/
3117 014450  117  122  101  TXTVRF: .ASCIZ  /ORA/
3118
```

```
3120                                    .SBTTL  ERROR MESSAGES -- "EM___"
3121                                    ;-------------------------------------------------------------------------------
3122                                    ;------------ ERROR MESSAGES USED BY ERROR CALL'S ------------------------------
3123                                    ;-------------------------------------------------------------------------------
3124
3125 014454     115     111     103    EM3:     .ASCIZ  /MICRO-DIAG. FAILURE/
3126 014500     115     122     104    EM4:     .ASCIZ  /MRDY TIMEOUT/
3127 014515     115     101     123    EM5:     .ASCIZ  /MASTER CLR FAILURE/
3128 014540     103     123     122    EM6:     .ASCIZ  /CSR ADDRESS FAILURE/
3129 014564     103     123     122    EM7:     .ASCIZ  /CSR DATA PAT FAILURE/
3130 014611     102     123     105    EM8:     .ASCIZ  /BSELO SET=ALL ONES/
3131 014634     105     130     124    EM9:     .ASCIZ  /EXTERNAL BUS RESET FAILURE/
3132 014667     102     101     104    EM14:    .ASCIZ  /BAD CSR VALUE(S) AFTER MASTER CLEAR/
3133 014733     042     115     122    EM15:    .ASCIZ  /"MRDY" DIDN'T GO LOW WHILE PROCESSING A COMMAND/
3134 015013     104     115     126    EM16:    .ASCIZ  /DMV'S RAM LOC. (CORRESPONDING TO BSELO) NOT PROPERLY WRITTEN/
3135 015110     066     065     060    EM17:    .ASCIZ  /6502 WRITE FUNC. FAILURE AFTER "RUN" BIT IS SET/
3136 015170     066     065     060    EM17A:   .ASCIZ  /6502 STILL RUNNING AFTER "RUN" BIT CLEARED/
3137 015243     126     111     101    EM20:    .ASCIZ  /VIA STATIC REGISTER ERROR/
3138 015275     126     111     101    EM20A:   .ASCIZ  /VIA STATIC REGISTER ERROR -- TIMMER NOT RUNNING/
3139 015355     126     111     101    EM20B:   .ASCIZ  /VIA STATIC REGISTER ERROR -- TIMMER CROSS TALK ERROR/
3140 015442     122     105     107    EM21:    .ASCIZ  /REGISTER NOT PROPERLY ZEROED/
3141 015477     132     105     122    EM22:    .ASCIZ  /ZEROING DDRB EFFECTED DDRA/
3142 015532     132     105     122    EM22A:   .ASCIZ  /ZEROING DDRA EFFECTED DDRB/
3143 015565     122     105     101    EM25:    .ASCIZ  'READ/WRITE DATA ERROR'
3144 015613     125     116     105    EM34:    .ASCIZ  /UNEXPECTED "A" INTERRUPT/
3145 015644     125     116     105    EM34B:   .ASCIZ  /UNEXPECTED "B" INTERRUPT/
3146 015675     122     101     115    EM47A:   .ASCIZ  /RAM DATA ERROR ON INITIAL WRITE/
3147 015735     122     101     115    EM47B:   .ASCIZ  /RAM DATA ERROR ON RE-READ AFTER TEST AREA FILLED/
3148 016016     122     101     115    EM48A:   .ASCIZ  /RAM DATA ERROR -- MOVING INVERSIONS TEST/
3149 016067     042     124     061    EM50A:   .ASCIZ  \"T1" FLAG NOT CLEARED BY LOADING T1LH\
3150 016135     042     124     061    EM50B:   .ASCIZ  \"T1" FLAG NOT CLEARED BY LOADING T1CH\
3151 016203     042     124     061    EM50C:   .ASCIZ  \"T1" FLAG NOT CLEARED BY READING T1CL\
3152 016251     126     111     101    EM50D:   .ASCIZ  \VIA'S T1CL NOT DECREMENTING\
3153 016305     126     111     101    EM50E:   .ASCIZ  \VIA'S T1CH NOT DECREMENTING\
3154 016341     042     124     061    EM50F:   .ASCIZ  \"T1" FLAG NOT SET ON TIMER 1 TIMEOUT\
3155 016406     042     124     061    EM50G:   .ASCIZ  \"T1" FLAG CLEARED BY READING T1CH\
3156 016450     126     111     101    EM50H:   .ASCIZ  \VIA'S T1LL IMPROPERLY LOADED BY WRITING T1CL @ ADDR 4\
3157 016536     042     124     061    EM50I:   .ASCIZ  \"T1" FLAG CLEARED BY READING T1LL\
3158 016600     126     111     101    EM50J:   .ASCIZ  \VIA'S T1LH IMPROPERLY LOADED BY WRITING T1CH @ ADDR 5\
3159 016666     042     124     061    EM50K:   .ASCIZ  \"T1" FLAG CLEARED BY READING T1LH\
3160 016730     042     124     061    EM50L:   .ASCIZ  \"T1" FLAG NOT SET AFTER RE-LOADING T1CH & TIMEOUT\
3161 017012     042     124     061    EM50M:   .ASCIZ  \"T1" FLAG CLEARED BY LOADING T1LL\
3162 017054     042     124     061    EM50N:   .ASCIZ  \"T1" FLAG NOT CLEARED BY LOADING T1CH\
3163 017122     042     120     102    EM50S:   .ASCIZ  \"PB7" W/IN VIA NOT SET ON TIMER 1 TIMEOUT\
3164 017174     042     120     102    EM50U:   .ASCIZ  \"PB7" NOT SET AFTER TIMER 1 TIMEOUT\
3165 017240     042     120     102    EM50V:   .ASCIZ  \"PB7" NOT DRIVEN LOW BY LOADING T1CH\
3166 017305     042     120     102    EM50W:   .ASCIZ  \"PB7" UNEXPECTEDLY MODIFIED BY TIMER 1\
3167 017354     042     124     061    EM50X:   .ASCIZ  \"T1" NOT RESET AFTER BEING CLEARED\
3168 017417     042     120     102    EM50Y:   .ASCIZ  \"PB7" PREMATURELY SET DURING T1 COUNTDOWN\
3169 017471     042     120     102    EM50Z:   .ASCIZ  \"PB7" NOT SET AFTER SECOND CYCLE\
3170
3171                                            .EVEN
```

TEXT ADDRESS TABLES FOR ERROR HANDLERS -- "TXT__T"

```
3173                                    .SBTTL  TEXT ADDRESS TABLES FOR ERROR HANDLERS -- "TXT__T"
3174                                    ;-----------------------------------------------------------------------------
3175                                    ;------------ TEXT ADDRESS TABLES USED BY ERROR HANDLERS ----------------------
3176                                    ;-----------------------------------------------------------------------------
3177
3178 017532  014105  014111  014125  TXTMLT: .WORD   TXTML0,TXTML1,TXTML2,TXTML3,TXTML4,TXTML5,TXTML6,TXTML7
3179
3180 017552  014327                          .WORD   TXTVR
3181 017554  014345  014351  014355  TXTVRT: .WORD   TXTVR0,TXTVR1,TXTVR2,TXTVR3,TXTVR4,TXTVR5,TXTVR6,TXTVR7
3182 017574  014413  014420  014425          .WORD   TXTVR8,TXTVR9,TXTVRA,TXTVRB,TXTVRC,TXTVRD,TXTVRE,TXTVRF
3183
3184                                    .LIST   BEX
```

```
                        .SBTTL LOAD DEVICE PROTECTION TABLE

                        ;//////////////////////////////////////////////////////////////////////////////
                        ;/ THIS TABLE IDENTIFIES THE LOAD DEVICE TO THE SUPERVISOR, SO THAT IT CAN BE
                        ;/ PROTECTED FROM TESTING. IF DESIRED.
                        ;//////////////////////////////////////////////////////////////////////////////

017614                          BGNPROT
017614                                                          L$PROT::
017614  177777                  .WORD   -1      ;DON'T CHK CSR ADRS
017616  177777                  .WORD   -1      ;DON'T CHK MASSBUS UNIT NO.
017620  177777                  .WORD   -1      ;DON'T CHK DRIVE NO.
017622                          ENDPROT
```

```
                        .SBTTL INITIALIZE SECTION

                        ;////////////////////////////////////////////////////////////////
                        ;/ THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                        ;/ AT THE BEGINNING OF THE TEST SEQUENCE ON THE NEXT UNIT.
                        ;////////////////////////////////////////////////////////////////

                                BGNINIT
                                                                        L$INIT::

                                SETVEC  #140,#170000,#340       ;ODT ROM ADDRESS
                                                                                MOV     #340,-(SP)
                                                                                MOV     #170000,-(SP)
                                                                                MOV     #140,-(SP)
                                                                                MOV     #3,-(SP)
                                                                                TRAP    C$SVEC
                                                                                ADD     #10,SP

                                MOV     SP,PSTACK       ;SAVE BASE-LEVEL STACK POINTER
                        ;SEE IF PROGRAM JUST STARTED, BR IF YES
                                READEF  #EF.START
                                                                                MOV     #EF.START,R0
                                                                                TRAP    C$REFG
                                BCOMPLETE       STARST
                                                                                BCS     STARST
                        ;SEE IF PROGRAM JUST RESTARTED, BR IF YES
                                READEF  #EF.RESTART
                                                                                MOV     #EF.RESTART,R0
                                                                                TRAP    C$REFG
                                BCOMPLETE       RESTRT
                                                                                BCS     RESTRT
                        ;SEE IF THIS IS A NEW PASS, BR IF YES
                                READEF  #EF.NEW
                                                                                MOV     #EF.NEW,R0
                                                                                TRAP    C$REFG
                                BCOMPLETE       NEWST
                                                                                BCS     NEWST
                        ;SEE IF PROGRAM WAS JUST CONTINUED
                                READEF  #EF.CONTINUE
                                                                                MOV     #EF.CONTINUE,R0
                                                                                TRAP    C$REFG
                                BCOMPLETE       10$
                                                                                BCS     10$
                                BR      GETPRM

                        10$:    JMP     CONTIN          ;(THIS IS TO FAR AWAY FOR A "BR" INSTRUCTION)

                        STARST:         ;ENTER HERE IF "START" COMMAND ISSUED

                        ; TEST FOR THE PRESENCE OR ABSENCE OF A CONSOLE TERMINAL.

                                CLR     CONSOL          ;RESET THE CONSOLE TERMINAL FLAG
                                SETVEC  #4,#CONTST,#0   ;SETUP BUS TIMEOUT VECTER TO TEST FOR A CONSOLE
                                                                                MOV     #0,-(SP)
                                                                                MOV     #CONTST,-(SP)
                                                                                MOV     #4,-(SP)
                                                                                MOV     #3,-(SP)
```

INITIALIZE SECTION

```
                017746  104437                                                  TRAP    C$SVEC
                017750  062706  000010                                          ADD     #10,SP
3233            017754  005737  177564          TST     @#177564        ;TRY TO ACCESS THE CONSOLE TERMINAL'S "XCSR"
3234            017760                          CLRVEC  #4              ;WE SHOULD BE THROUGH WITH THIS BY NOW
                017760  012700  000004                                          MOV     #4,R0
                017764  104436                                                  TRAP    C$CVEC
3235
3236            017766                  RESTRT:         ;ENTER HERE IF "RESTART" COMMAND ISSUED
3237
3238                                    ;CLEAR DEVICE MAP
3239            017766  005037  002342          CLR     DEVMAP
3240
3241            017772                  NEWST:          ;ENTER HERE BEFORE EACH TEST
3242
3243            017772  012737  177777  002322  MOV     #-1,LOGDEV      ;RESET LOGICAL DEVICE TO -1
3244            020000  005237  002340          INC     PASPAS          ;INCREMENT NO. OF PASSES AFTER LOAD
3245            020004  012737  000001  002344  MOV     #BIT0,DEVPTR    ;INIT DEVICE MAP BIT POINTER
3246                                    ; GET UNIBUS ADDRESS, VECTOR, PRIORITY LEVEL, SWITCH PACKS, TEST
3247                                    ;   CONNECTOR INFORMATION FOR THIS LOGICAL DEVICE
3248            020012                  GETPRM:
3249            020012  005237  002322          INC     LOGDEV          ;INCREMENT LOGICAL DEVICE NUMBER
3250            020016                          GPHARD  LOGDEV,R1       ;GET P-TABLE POINTER INTO R1
                020016  013700  002322                                          MOV     LOGDEV,R0
                020022  104442                                                  TRAP    C$GPHRD
                020024  010001                                                  MOV     R0,R1
3251            020026                          BCOMPLETE  10$          ;BR IF DEVICE AVAILABLE
                020026  103403                                                  BCS     10$
3252            020030  006337  002344          ASL     DEVPTR          ;IF UN-AVAILABLE, SHIFT DEVICE MAP BIT POINTER
3253            020034  000766                  BR      GETPRM          ;       AND SKIP THIS DEVICE
3254
3255            020036  053737  002344  002342  10$:    BIS     DEVPTR,DEVMAP   ;ELSE, SET BIT FOR THIS DEVICE IN DEVICE MAP
3256            020044  006337  002344          ASL     DEVPTR          ;SHIFT DEVICE MAP BIT POINTER
3257
3258                                    ;  "R1" WAS RETURNED WITH A POINTER TO THE CURRENT "P-TABLE"
3259
3260            020050  012100                  MOV     (R1)+,R0        ;GET THE DEVICE CSR ADDRESS
3261            020052  012703  000020          MOV     #16.,R3         ;WE HAVE TO SETUP THIS MANY ADDRESS POINTERS
3262            020056  012702  002352          MOV     #MPCSR,R2       ;THIS IS THE ADDRESS OF THE FIRST POINTER
3263            020062  010022          12$:    MOV     R0,(R2)+        ;SETUP ONE CSR POINTER
3264            020064  005200                  INC     R0              ;POINT TO THE NEXT CSR ADDRESS
3265            020066  077303                  SOB     R3,12$          ;LOOP AS LONG AS THERE ARE MORE TABLE ENTRIES
3266                                                                    ;ELSE,  FALL THROUGH TO CONTINUE GETTING MORE
3267                                                                    ;       P-TABLE DATA
3268
3269            020070  012100                  MOV     (R1)+,R0        ;GET INTERRUPT VECTOR
3270            020072  010037  002412          MOV     R0,MPIVEC       ;SETUP "A" VECTOR POINTER
3271            020076  022020                  CMP     (R0)+,(R0)+     ;ADD 4 TO VECTOR TO GET ADDRESS OF "B" VECTOR
3272            020100  010037  002414          MOV     R0,MPOVEC       ;SETUP "B" VECTOR POINTER
3273
3274            020104  012100                  MOV     (R1)+,R0        ;GET DMV11 DEVICE PRIORITY
3275            020106  006200                  ASR     R0              ;       RE-POSITION IT
3276            020110  006200                  ASR     R0
3277            020112  006200                  ASR     R0
3278            020114  006200                  ASR     R0
3279            020116  010037  002416          MOV     R0,MPRIOR       ;SETUP OUR VARIABLE FOR INT. VECTOR INIT'S
3280
3281            020122                  CONTIN:         ;ENTER HERE WHEN A "CONTINUE" COMMAND IS ISSUED
```

INITIALIZE SECTION

```
3282
3283 020122                          SETVEC  @#MPIVEC,#MPIHAN,@#MPRIOR  ;SETUP "A" INT. VECTOR
     020122  013746  002416                                              MOV     @#MPRIOR,-(SP)
     020126  012746  005152                                              MOV     #MPIHAN,-(SP)
     020132  013746  002412                                              MOV     @#MPIVEC,-(SP)
     020136  012746  000003                                              MOV     #3,-(SP)
     020142  104437                                                      TRAP    C$SVEC
     020144  062706  000010                                              ADD     #10,SP
3284 020150  005037  005222          CLR     IHILNK          ;WE DON'T WANT THE HANDLER TO LINK ELSEWHERE
3285 020154                          SETVEC  @#MPOVEC,#MPOHAN,@#MPRIOR  ;SETUP "B" INT. VECTOR
     020154  013746  002416                                              MOV     @#MPRIOR,-(SP)
     020160  012746  005224                                              MOV     #MPOHAN,-(SP)
     020164  013746  002414                                              MOV     @#MPOVEC,-(SP)
     020170  012746  000003                                              MOV     #3,-(SP)
     020174  104437                                                      TRAP    C$SVEC
     020176  062706  000010                                              ADD     #10,SP
3286 020202  005037  005274          CLR     IHOLNK          ;WE DON'T WANT THE HANDLER TO LINK ELSEWHERE
3287 020206  005037  002330          CLR     INTWCH          ;RESET "INTERRUPT WATCH" FLAGS (BOTH "A" & "B")
3288
3289 020212  012737  000001  002336  MOV     #1,FRSTIM       ;MARK FLAG FOR NEXT TIME THROUGH
3290 020220                          ENDINIT         ;END OF "INIT" CODE
     020220                                                          L10017:
     020220  104411                                                      TRAP    C$INIT
3291
3292                         ; ***** SUBROUTINES USED BY "INIT" CODE *****
3293
3294                         ;       INTERRUPT HANDLER FOR CONSOLE TERMINAL PRESENCE TESTING
3295
3296 020222  012737  177777  002346  CONTST: MOV     #-1,CONSOL      ;INDICATE THAT NO CONSOLE TERMINAL EXISTS!
3297 020230  000002                          RTI                     ;RETURN
3298
```

```
                        .SBTTL AUTO DROP UNIT SECTION

                        ;////////////////////////////////////////////////////////////////////////////////
                        ;/ THE AUTO DROP CODING DETERMINES WHETHER OR NOT THE DEVICE WHOSE P-TABLE
                        ;/ WAS JUST OBTAINED IS READY FOR TESTING, AND IT IS DROPPED IF NOT READY.
                        ;////////////////////////////////////////////////////////////////////////////////

                        ;+*****************************************************************************
                        ;
                        ;       THIS ALGORITHM IS THE SAME AS TEST # 1 EXCEPT THAT TEST 1
                        ;       WILL JUST REPORT THE FAILURE AND GO ON -- THIS ROUTINE WILL CAUSE THE
                        ;       DEVICE TO BE DROPPED IF A BUS-TIMEOUT OCCURS WHEN ANY OF THE CSR'S
                        ;       ARE ACCESSED WITH EITHER A "TST" OR "TSTB" INSTRUCTION.
                        ;
                        ;--*****************************************************************************

                                BGNAUTO
                                                                                L$AUTO::
                                SETVEC  #4,#AD.HIT,#0   ;SETUP INVALID-ADDRESS TRAP VECTOR
020232  012746  000000                                                          MOV     #0,-(SP)
020236  012746  020350                                                          MOV     #AD.HIT,-(SP)
020242  012746  000004                                                          MOV     #4,-(SP)
020246  012746  000003                                                          MOV     #3,-(SP)
020252  104437                                                                  TRAP    C$SVEC
020254  062706  000010                                                          ADD     #10,SP
020260  005037  002440                CLR     TMP0            ;INITIALIZE TRAP FLAG REGISTER
020264  012702  000001                MOV     #1,R2           ;FLAG BIT
020270  013703  002352                MOV     BSEL0,R3        ;INIT ADDRESS POINTER

020274  105723          1$:           TSTB    (R3)+           ;ACCESS THE CSR'S BY BYTES.
020276  006302                        ASL     R2
020300  103375                        BCC     1$

020302  013703  002352                MOV     BSEL0,R3        ;RE-INIT ADDRESS POINTER
020306  012702  000001                MOV     #1,R2           ;RE-INIT FLAG BIT
020312  005723          2$:           TST     (R3)+           ;ACCESS THE CSR'S BY WORDS.
020314  006302                        ASL     R2
020316  006302                        ASL     R2
020320  103374                        BCC     2$

020322                                  CLRVEC  #4              ;RESTORE THE VECTOR TO DS
020322  012700  000004                                                          MOV     #4,R0
020326  104436                                                                  TRAP    C$CVEC
020330  005737  002440                TST     TMP0            ;DID WE GET HIT WITH AN INVALID ADDRESS TRAP?
020334  001403                        BEQ     AD.OK           ;NO,  EXIT TEST
020336                                  DODU    LOGDEV          ;YES, DROP THIS LOGICAL DEV.
020336  013700  002322                                                          MOV     LOGDEV,R0
020342  104451                                                                  TRAP    C$DODU
020344  000240          AD.OK:        NOP                     ;(FOR PATCHING IN A HALT IF NECESSARY)
020346                                  ENDAUTO
                                                                                L10020:
020346  104461                                                                  TRAP    C$AUTO
020350  050237  002440          AD.HIT: BIS     R2,TMP0         ;FLAG THE HIT IF WE GET IT!
020354  000002                        RTI                     ;RETURN
```

CLEANUP CODING SECTION

```
                        .SBTTL CLEANUP CODING SECTION
                        ;////////////////////////////////////////////////////////////////
                        ;/ THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                        ;/ AT THE END OF THE TEST SEQUENCE ON A PARTICULAR UNIT.
                        ;////////////////////////////////////////////////////////////////

                                BGNCLN
                                                                        L$CLEAN::
                                CLRVEC  @#MPIVEC        ;RETURN VECTORS TO SUPERVISOR
                                                                                MOV     @#MPIVEC,R0
                                                                                TRAP    C$CVEC
                                CLRVEC  @#MPOVEC
                                                                                MOV     @#MPOVEC,R0
                                                                                TRAP    C$CVEC
                                ENDCLN
                                                                        L10021:
                                                                                TRAP    C$CLEAN
```

DROP UNIT SECTION

```
3354                            .SBTTL DROP UNIT SECTION
3355
3356                            ;//////////////////////////////////////////////////////////////////////////////
3357                            ;/ THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
3358                            ;/ TO NO LONGER BE TESTED.
3359                            ;//////////////////////////////////////////////////////////////////////////////
3360
3361 020374                             BGNDU
      020374                                                        L$DU::
3362
3363 020374                     ;ISSUE UNIBUS RESET TO CLEAN UP
                                BRESET
      020374  104433                                                    TRAP    C$RESET
3364 020376                             ENDDU
      020376                                                        L10022:
      020376  104453                                                    TRAP    C$DU
```

ADD UNIT SECTION

```
                                .SBTTL ADD UNIT SECTION

                                ;////////////////////////////////////////////////////////////////
                                ;/ THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ;/  TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
                                ;/  "EF.AUNIT" IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
                                ;////////////////////////////////////////////////////////////////

 020400                                 BGNAU
 020400                                                         L$AU::
 020400                                 ENDAU
 020400                                                         L10023:
 020400  104452                                                        TRAP    C$AU
```

```
                                          .SBTTL TEST 1 -- DMV-11 AVAILABILITY

                                          ;++*********************************************************************
                                          ;*
                                          ;*         TEST 1 -- DMV-11 AVAILABILITY
                                          ;*
                                          ;* EACH NORMALLY USED CSR IS ACCESSED WITH A "TST" OR "TSTB" INSTRUCTION AND IF
                                          ;* A BUS TIMEOUT OCCURS (INTERRUPT @ VECTOR ADDR 4) A FLAG WILL BE SET SHOWING
                                          ;* WHICH CSR ADDR AND INSTRUCTION FAILED. "T1.HSW" REFLECTS "TST" INSTRUCTIONS
                                          ;* AND "T1.HSB" REFLECTS "TSTB" INSTRUCTIONS.
                                          ;*
                                          ;*         EXAMPLES:
                                          ;*
                                          ;*         IF "TSTB  @BSEL1"  FAILS,  BIT # 1 OF "T1.HSB" WILL BE SET.
                                          ;*         IF "TST  @SEL4" FAILS, BIT # 4 OF "T1.HSW" WILL BE SET
                                          ;*         (NOTE: ONLY EVEN BITS IN "T1.HSW" CAN BE SET).
                                          ;*
                                          ;*  THE FLAG WORDS ARE OUTPUT IN BINARY AS "EXTENDED ERROR INFORMATION".
                                          ;*
                                          ;--*********************************************************************
                                          ;
                                          ;         BGNTST
      020402                                                                                      T1::
      020402  005037  020546                          CLR     T1.HSW          ;INITIALIZE TRAP FLAG REGISTER
      020406  012702  000001                          MOV     #1,R2           ;FLAG BIT FOR BYTE ACCESSED CSR 0.
      020412  013703  002352                          MOV     BSEL0,R3        ;INIT ADDRESS POINTER
      020416                                          SETVEC  #4,#T1.HIT,#0   ;SETUP INVALID-ADDRESS TRAP VECTOR
      020416  012746  000000                                                                       MOV     #0,-(SP)
      020422  012746  020540                                                                       MOV     #T1.HIT,-(SP)
      020426  012746  000004                                                                       MOV     #4,-(SP)
      020432  012746  000003                                                                       MOV     #3,-(SP)
      020436  104437                                                                               TRAP    C$SVEC
      020440  062706  000010                                                                       ADD     #10,SP

      020444  105723                      1$:         TSTB    (R3)+           ;ACCESS THE CSR'S BY BYTES.
      020446  006302                                  ASL     R2
      020450  103375                                  BCC     1$

      020452  013737  020546  020550                  MOV     T1.HSW,T1.HSB   ;MOVE BYTE INTERRUPT FLAG TO PROPER LOCATION.
      020460  005037  020546                          CLR     T1.HSW          ;INITIALIZE TRAP FLAG REGISTER
      020464  012702  000001                          MOV     #1,R2           ;FLAG BIT FOR WORD ACCESSED CSR 0.
      020470  013703  002352                          MOV     BSEL0,R3        ;RE-INIT ADDRESS POINTER

      020474  005723                      2$:         TST     (R3)+           ;ACCESS THE CSR'S BY WORDS.
      020476  006302                                  ASL     R2
      020500  006302                                  ASL     R2
      020502  103374                                  BCC     2$

      020504                                          CLRVEC  #4              ;RESTORE THE VECTOR TO DS
      020504  012700  000004                                                                       MOV     #4,R0
      020510  104436                                                                               TRAP    C$CVEC
      020512  005737  020546                          TST     T1.HSW          ;DID WE GET AN INVALID ADDRESS TRAP?
      020516  001003                                  BNE     3$              ;YES, REPORT FAILURE
      020520  005737  020550                          TST     T1.HSB
      020524  001404                                  BEQ     T1.OK
      020526                              3$:         GEDF    T1.EHD,T1.EM1   ;YES, REPORT THE ERROR
                                                                          ;        "DEVICE FATAL" ERROR # 9
```

```
        020526  104455                                                          TRAP    C$ERDF
        020530  000011                                                          .WORD   9
        020532  020670                                                          .WORD   T1.EHD
        020534  020552                                                          .WORD   T1.EM1
3419    020536                          T1.OK:  ENDTST
        020536                                                          L10024:
        020536  104401                                                          TRAP    C$ETST
3420
3421    020540  050237  020546          T1.HIT: BIS     R2,T1.HSW       ;FLAG THE HIT IF WE GET IT!
3422    020544  000002                          RTI                     ;RETURN
3423
3424    020546  000000                  T1.HSW: .WORD   0               ;INVALID ADDRESS TRAP FLAG WORD:
3425                                                                    ;BITS SET INDICATE TRAPS ON WORD ACCESSES
3426                                                                    ;(BIT # SET = CSR # THAT FAILED)
3427    020550  000000                  T1.HSB: .WORD   0               ;INVALID ADDRESS TRAP FLAG WORD:
3428                                                                    ;BITS SET INDICATE TRAPS ON BYTE ACCESSES
3429                                                                    ;(BIT # SET = CSR # THAT FAILED)
3430    020552                                  BGNMSG  T1.EM1
        020552                                                                  T1.EM1::
3431    020552                                  PRINTB  #T1.1,MPCSR     ;IDENTIFY ERROR AND ON WHAT DEVICE
        020552  013746  002352                                                  MOV     MPCSR,-(SP)
        020556  012746  020717                                                  MOV     #T1.1,-(SP)
        020562  012746  000002                                                  MOV     #2,-(SP)
        020566  010600                                                          MOV     SP,R0
        020570  104414                                                          TRAP    C$PNTB
        020572  062706  000006                                                  ADD     #6,SP
3432    020576                                  PRINTX  #T1.2           ;IF REQUESTED, ALSO INDICATE MISSES (TRAPS)
        020576  012746  021001                                                  MOV     #T1.2,-(SP)
        020602  012746  000001                                                  MOV     #1,-(SP)
        020606  010600                                                          MOV     SP,R0
        020610  104415                                                          TRAP    C$PNTX
        020612  062706  000004                                                  ADD     #4,SP
3433    020616                                  PRINTX  #T1.3
        020616  012746  021034                                                  MOV     #T1.3,-(SP)
        020622  012746  000001                                                  MOV     #1,-(SP)
        020626  010600                                                          MOV     SP,R0
        020630  104415                                                          TRAP    C$PNTX
        020632  062706  000004                                                  ADD     #4,SP
3434    020636                                  PRINTX  #T1.4,T1.HSW,T1.HSB
        020636  013746  020550                                                  MOV     T1.HSB,-(SP)
        020642  013746  020546                                                  MOV     T1.HSW,-(SP)
        020646  012746  021106                                                  MOV     #T1.4,-(SP)
        020652  012746  000003                                                  MOV     #3,-(SP)
        020656  010600                                                          MOV     SP,R0
        020660  104415                                                          TRAP    C$PNTX
        020662  062706  000010                                                  ADD     #10,SP
3435    020666                                  ENDMSG
        020666                                                          L10025:
        020666  104423                                                          TRAP    C$MSG
3436
3437                                    .NLIST  BEX
3438    020670      101     126     101 T1.EHD: .ASCIZ  'AVAILABILITY TEST (#1)'
3439    020717      045     116     045 T1.1:   .ASCIZ  '%N%ADMV-11 @ %O%A NOT RESPONDING TO CSR ACCESSING'
3440    021001      045     116     062 T1.2:   .ASCIZ  '%N2%S21%ASEL #%S11%ABSEL #'
3441    021034      045     116     045 T1.3:   .ASCIZ  '%N%S15%AE C A 8 6 4 2 0  FEDCBA9876543210'
3442    021106      045     116     062 T1.4:   .ASCIZ  '%N2%A    TRAP FLAGS:%B16%S2%B16'
3443                                    .LIST   BEX
```

```
3444                                    .EVEN
```

```
3461                                    .SBTTL TEST 2 -- MASTER CLEAR, RUN MICRODIAGNOSTICS

                                        ;+*****************************************************************************
                                        ;*
                                        ;*      TEST 2 -- MASTER CLEAR, RUN MICRODIAGNOSTICS
                                        ;*
                                        ;* A MASTER CLEAR IS ISSUED TO THE DMV-11, AND THE PROGRAM ALLOWS SUFFICIENT
                                        ;* TIME FOR THE MICRODIAGNOSTICS TO BE PERFORMED. THESE MICRODIAGNOSTICS RESIDE
                                        ;* IN 6502 PROGRAM  MEMORY,  AND  THOROUGHLY VERIFY THE OPERATION OF THE 6502
                                        ;* MICROPROCESSOR CHIP. THEN, THEY CHECK OUT THE DATA RAM, THE 6502'S ACCESS TO
                                        ;* THE CSR'S,  AND  PERFORM  A  SIMPLE MESSAGE TEST USING THE 6522 CHIP AND THE
                                        ;* USYRT, WITH INTERNAL LOOPBACK.
                                        ;*
                                        ;* NEXT, THE LSI-11 PROGRAM READS THE THE CSR'S (SEL0-SEL6) AND CHECKS THEM FOR
                                        ;* THEIR EXPECTED INITIALIZED  STATES.  IF AN ERROR HAS OCCURRED IN THE MICRO-
                                        ;* DIAGNOSTICS THE NUMBER OF THE FAILING TEST WILL BE FOUND IN SEL4, AND RUN
                                        ;* (BIT 7) WILL NOT BE SET IN BSEL1.
                                        ;*
                                        ;--*****************************************************************************
                                        ;
                                        ;       BGNTST
    021146                                                                              T2::
3462                                    ; ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY CALLING
3463                                    ; SUBROUTINE MASCLR.
3464
3465 021146  004737  003614                    JSR     PC,MASCLR       ; -ATTEMPT- TO RUN THE MICRO-DIAGNOSTIC
3466 021152  103002                            BCC     8$              ;IF NO ERROR, PROCEED
3467 021154                                    ERROR                   ;ELSE, REPORT IT AND
    021154  104460                                                                      TRAP    C$ERROR
3468 021156  000436                            BR      24$             ;       EXIT THIS TEST
3469
3470                                    ; FIRST, INITIALIZE INDEX REGISTERS
3471 021160  005001                    8$:     CLR     R1              ;R1 IS THE INDEX OF THE BYTE SELECT TABLE
3472 021162  005002                            CLR     R2              ;R2 IS THE INDEX OF THE RESULTS TABLE
3473 021164  016203  003040                    MOV     RESFMC(R2),R3   ;GET THE NUMBER OF PATTERNS IN RESULTS TABLE
3474 021170  062702  000002                    ADD     #2,R2           ;MOVE POINTER TO NEXT BYTE
3475 021174  126271  003040  002352    2$:     CMPB    RESFMC(R2),@BSEL(R1) ;COMPARE EXPECTED RESULTS WITH CSR'S.
3476 021202  001005                            BNE     1$              ;A MISMATCH IS A DEVICE FATAL ERROR
3477 021204  005202                            INC     R2              ;INCREMENT TABLE POINTER
3478 021206  005201                            INC     R1              ;INCREMENT POINTER
3479 021210  005201                            INC     R1              ;  BY 2  (WORD INCREMENT)
3480
3481 021212  077310                            SOB     R3,2$           ;CONTINUE TO LOOP THROUGH TABLE
3482
3483 021214  000417                            BR      24$             ;TEST COMPLETE WITH NO ERRORS, GO END TEST.
3484
3485 021216  117137  002332  002312    1$:     MOVB    @BSEL(R1),BDATA ;# GET DATA BYTE THAT FAILED
3486 021224  004737  004334                    JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
3487 021230  116237  003040  002310            MOVB    RESFMC(R2),GDATA ;# GET EXPECTED RESULT FROM TABLE
3488 021236  006201                            ASR     R1              ;CONVERT WORD OFFSET TO BYTE CSR #
3489 021240  010137  002334                    MOV     R1,REGNUM
3490 021244                                    GEDF    EM14,ERR2       ;DEVICE FATAL ERROR, REPORT IT AND END TEST
                                                                        ;       "DEVICE FATAL" ERROR # 10
    021244  104455                                                                      TRAP    C$ERDF
    021246  000012                                                                      .WORD   10
    021250  014667                                                                      .WORD   EM14
    021252  005334                                                                      .WORD   ERR2
```

```
3491 021254                          24$:    ENDTST
     021254
     021254  104401                                  L10026:  TRAP    C$ETST
```

```
   3503                                 .SBTTL TEST 3 -- CSR ADDRESSING

                                        ;+*********************************************************************************
                                        ;*
                                        ;*      TEST 3 -- CSR ADDRESSING
                                        ;*
                                        ;* FIRST, HALT THE 6502 UP BY CLEARING ALL CSRS. THEN, WRITE A DIFFERENT WORD
                                        ;* OF DATA  PATTERN  A INTO EACH OF BSEL0-17, AND AFTER EACH WRITE, READ AND
                                        ;* COMPARE ALL REGS TO EXPECTED VALUES.
                                        ;*
                                        ;* DATA PATTERN A = 001, 002, 004, 010, 020, 040, 100, 200, 052, 300, 140,
                                        ;*                  060, 030, 014, 006, 003
                                        ;*
                                        ;--*********************************************************************************
                                        ;
                                        ;       BGNTST
      021256                                                                    T3::
   3504                                 ;-------------------------------------------------------------------------
   3505                                 ;       ******** DETAILED TEST DESCRIPTION ********
   3506                                 ; THIS TEST PROCEEDS AS FOLLOWS:
   3507                                 ;
   3508                                 ; (1) CLEAR ALL CSRS AND VERIFY SAME (CLEARING BSEL01 HALTS 6502)
   3509                                 ; (2) WRITE 01 INTO BSEL0; VERIFY BSEL0=01,ALL OTHERS=0
   3510                                 ; (3) WRITE 02 INTO BSEL1; VERIFY BSEL0=01,BSEL1=02,ALL OTHERS=0.
   3511                                 ; (4) WRITE 04 INTO BSEL2; VERIFY BSEL0=01,BSEL1=02,BSEL2=04,ALL OTHERS=0
   3512                                 ;
   3513                                 ; (5) => (17) CONTINUE TO INCREMENTALLY WRITE DATA-PATTERN-A INTO THE BSR'S,
   3514                                 ;               CHECKING ALL BSR'S AFTER EACH WRITE, UNTIL BSR'S COMPLETELY
   3515                                 ;               FILLED WITH DATA-PATTERN-A.
   3516                                 ; NOTE: IF AN ERROR OCCURS, THE FIRST BAD BSR NUMBER AND GOOD/BAD VALUES ARE
   3517                                 ;       GIVEN, FOLLOWED BY A COMPLETE BSR DUMP.
   3518                                 ;-------------------------------------------------------------------------
   3519
   3520                                 ; CLEAR DMV CSRS AND RESULTS TABLE
   3521
   3522 021256  012703  000010                  MOV     #10,R3          ;GET # OF CSRS
   3523 021262  013701  002352                  MOV     @#BSEL,R1       ;GET 1ST CSR ADDRESS
   3524 021266  012702  003062                  MOV     #RESFT3,R2      ;GET 1ST RESULTS TABLE ADDRESS
   3525 021272  005021                  1$:     CLR     (R1)+           ;CLEAR CSR, BUMP POINTER
   3526 021274  005022                          CLR     (R2)+           ;CLEAR RESULTS TABLE LOC., BUMP POINTER
   3527 021276  005022                          CLR     (R2)+           ; AND DO AGAIN
   3528 021300  077304                          SOB     R3,1$           ;LOOP UNTIL ALL DONE
   3529
   3530                                 ; NOW VERIFY CSRS ARE ALL ZEROED
   3531
   3532 021302  005002                          CLR     R2              ;CLEAR BSR ADDRESS INDEX
   3533 021304  012703  000020                  MOV     #CSREGS,R3      ;GET # OF CSRS
   3534 021310  105772  002352          2$:     TSTB    @#BSEL(R2)      ;IS THIS CSR=0 ?
   3535 021314  001035                          BNE     5$              ;IF NO: GO REPORT ERROR
   3536 021316  005722                          TST     (R2)+           ;  YES: BUMP INDEX
   3537 021320  077305                          SOB     R3,2$           ;DO UNTIL ALL BSRS CHECKED
   3538
   3539                                 ;=========================================================================
   3540
   3541                                         ; INITIALIZE INDEX REGISTERS
   3542 021322  005001                          CLR     R1              ;INITIALIZE PATTERN INDEX REGISTER
   3543 021324  012703  000020                  MOV     #CSREGS,R3      ;GET NUMBER OF CSR'S
```

```
3544
3545                                        ; THE FIRST WORD OF THE DATA TABLE CONTAINS THE NUMBER OF PATTERNS IN
3546                                        ; THE TABLE:
3547 021330  016104  002504                 MOV     PATA(R1),R4     ;INITIALIZE NUMBER OF PATTERNS COUNT
3548 021334  005721                         TST     (R1)+           ;MOVE TABLE POINTER
3549
3550                                ; PUT NEXT PATTERN OF DATA INTO NEXT REGISTER AND TEST AREA:
3551                                ;
3552                                ;  CALCULATE INDEX INTO DATA AREA AND TO REGISTER
3553
3554 021336  010102                 3$:     MOV     R1,R2           ;GET INDEX INTO TEST DATA AREA
3555 021340  005742                         TST     -(R2)           ;IT'S ONE WORD TOO LARGE
3556 021342  006302                         ASL     R2              ;CONVERT FROM BYTE TO WORD INDEX
3557
3558                                ;  NOW, SETUP THE EXPECTED RESULTS AREA AND LOAD THE SELECT REGISTER
3559
3560 021344  116162  002504  003062         MOVB    PATA(R1),RESFT3(R2) ;UPDATE THE EXPECTED RESULTS TABLE
3561 021352  116172  002504  002352         MOVB    PATA(R1),@BSEL(R2) ;PUT PATTERN INTO THE CSR
3562
3563 021360  005201                         INC     R1              ;BUMP DATA POINTER FOR NEXT TIME AROUND
3564 021362  005002                         CLR     R2              ;INITIALIZE TABLE INDEX
3565 021364  012703  000020                 MOV     #CSREGS,R3      ;INITIALIZE NUMBER OF REGISTERS
3566
3567 021370  126272  003062  002352  4$:    CMPB    RESFT3(R2),@BSEL(R2) ;COMPARE CSR WITH RESULTS TABLE
3568 021376  001004                         BNE     5$              ;A MISMATCH IS A DEVICE FATAL ERROR
3569 021400  005722                         TST     (R2)+           ;BUMP TABLE POINTER BY 2  (WORD INCREMENT)
3570 021402  077306                         SOB     R3,4$           ;CONTINUE TO READ & MATCH ALL REGISTERS BEFORE
3571                                                                 ;LOADING THE NEXT PATTERN INTO NEXT REGISTER
3572
3573 021404  077424                         SOB     R4,3$           ;LOOP UNTIL ALL PATTERNS ARE TESTED
3574 021406  000417                         BR      24$             ;TEST COMPLETE **<< NO ERRORS >>**
3575
3576                                        ;--PREPARE THE FAILURE MESSAGE --
3577
3578 021410  116237  003062  002310  5$:    MOVB    RESFT3(R2),GDATA ;# GET THE EXPECTED RESULT FROM TABLE
3579 021416  117237  002352  002312         MOVB    @BSEL(R2),BDATA ;# GET THE FAILED BYTE
3580 021424  004737  004434                 JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
3581 021430  006202                         ASR     R2              ;CONVERT WORD OFFSET TO BYTE CSR ADDRESS
3582 021432  010237  002334                 MOV     R2,REGNUM       ;GET THE REGISTER THAT FAILED
3583 021436                                 GEDF    EM6,ERR2        ;ERROR **** DEVICE FATAL ****
                                                                    ;       "DEVICE FATAL" ERROR # 11
     021436  104455                                                                 TRAP    C$ERDF
     021440  000013                                                                 .WORD   11
     021442  014540                                                                 .WORD   EM6
     021444  005304                                                                 .WORD   ERR2
3584 021446                         24$:    ENDTST
     021446                                                                 L10027:
     021446  104401                                                                 TRAP    C$ETST
```

TEST 4 -- CSR REGISTERS DATA READ/WRITE

```
3598                                    .SBTTL TEST 4 -- CSR REGISTERS DATA READ/WRITE

                                        ;+*************************************************************************
                                        ;*
                                        ;*      TEST 4 -- CSR REGISTERS DATA READ/WRITE
                                        ;*
                                        ;* WRITE,  READ,  AND  COMPARE  EACH BYTE OF DATA PATTERN B INTO REGISTER BSELO.
                                        ;* THEN, REPEAT THIS USING EACH OF THE REMAINING CSR'S, BSEL1-BSEL17.  WHEN BSEL1
                                        ;* IS  BEING  TESTED,  THE PROGRAM ALWAYS SETS BIT 7 IN THE DATA PATTERN SO THAT
                                        ;* RUN  WILL  NOT BE CLEARED, AND IT ALWAYS CLEARS BIT6 SO THAT MCLR WILL NOT BE
                                        ;* SET.
                                        ;*
                                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                        ;*
                                        ;--*************************************************************************
                                        ;
                                        ;       BGNTS1
                                                                                        T4::
    021450
3599 021450  004737  003762                     JSR     PC,MSTCLR       ;CALL MAINTENANCE READY INITIALIZATION. IF
3600                                                                    ;MSTCLR SHOULD FAIL BECAUSE THE MRDY FLAG DOES
3601                                                                    ;NOT BECOME SET, A DEVICE FATAL ERROR WILL BE
3602                                                                    ;REPORTED, AND MSTCLR WILL SET THE "C" BIT
3603 021454  103002                             BCC     8$              ;IF NO ERROR, PROCEED
3604 021456                                      ERROR                   ;ELSE, REPORT IT AND
    021456  104460                                                                      TRAP    C$ERROR
3605 021460  000453                             BR      24$             ;   .   EXIT THIS TEST
3606                                            ;
3607                                            ;  NOTE - THE FIRST BYTE LOCATION OF THE PATTERN B TABLE, USED IN THIS TEST,
3608                                            ;           CONTAINS THE NUMBER OF TEST PATTERNS OF PATTERN B TABLE, NOT A
3609                                            ;           TEST PATTERN.
3610                                            ;
3611                                            ; FIRST, INITIALIZE INDEX AND COUNT REGISTERS
3612
3613 021462  005001                     8$:     CLR     R1              ;R1 IS THE 'PATB' INDEX REGISTER
3614 021464  005002                             CLR     R2              ;R2 IS THE CSR INDEX REGISTER
3615 021466  016103  002526                     MOV     PATB(R1),R3     ;R3 CONTAINS THE NUMBER OF BYTES IN PATB
3616 021472  062702  000002                     ADD     #2,R2           ;MOVE POINTER TO FIRST BYTE OF DATA
3617
3618 021476  113777  000101  160650             MOVB    101,@BSEL1      ;STOP THE MICRO-PROCESSOR!!!
3619
3620 021504  116137  002526  002310  1$:       MOVB    PATB(R1),GDATA  ;GET THE PATB DATA BYTE, WE ARE TO USE
3621
3622                                            ; DON'T GET CAUGHT BY THE NEXT INSTRUCTION!  "R2" IS AN OFFSET INTO A
3623                                            ; WORD TABLE WHICH CONTAINS THE ADDRESSES OF THE CSR'S.  THEREFORE, WHEN
3624                                            ; R2 = 0 -- IT POINTS TO BSELO'S ADDRESS, AND WHEN R2 = 2 -- IT POINTS TO
3625                                            ; BSEL1'S ADDRESS.
3626
3627 021512  022702  000002                     CMP     #2,R2           ;IS "BSEL1" BEING TESTED?
3628 021516  001003                             BNE     2$              ;IF YES, ALTER PATB DATA SO THAT BIT 7 IS
3629                                                                    ;ALWAYS SET, AND BIT6 IS ALWAYS RESET.
3630                                                                    ;ELSE, USE PATB DATA AS IS.
3631
3632 021520  142737  000300  002310             BICB    #RUN!MCLR,GDATA ;FORCE PATTERN TO RESET BITS 7 & 6
3633
3634 021526  113772  002310  002352  2$:       MOVB    GDATA,@BSELO(R2)  ;PUT PATB DATA INTO REGISTER BEING TESTED
3635 021534  123772  002310  002352             CMPB    GDATA,@BSELO(R2)  ; COMPARE PATTERN JUST WRITTEN
```

TEST 4 -- CSR REGISTERS DATA READ/WRITE SEQ 0098

```
3636 021542  001414                        BEQ     5$              ;TEST PASSES IF A MATCH. ELSE, DEVICE FATAL ERROR
3637
3638                                        ;--PREPARE FOR THE FAILURE PRINTOUT--
3639
3640 021544  010237  002334                MOV     R2,REGNUM       ;GET THE REGISTER THAT FAILED
3641 021550  117237  002352  002312        MOVB    @BSEL0(R2),BDATA ;SCORE THE BAD DATA
3642 021556  004737  004434                JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
3643 021562                                GEDF    EM7,ERR2        ;REPORT ERROR AND EXIT THE TEST
                                                                    ;       "DEVICE FATAL" ERROR # 12
     021562  104455                                                                TRAP    C$ERDF
     021564  000014                                                                .WORD   12
     021566  014564                                                                .WORD   EM7
     021570  005304                                                                .WORD   ERR2
3644 021572  000406                        BR      24$
3645
3646 021574  005201                5$:     INC     R1              ;MOVE TABLE POINTER
3647 021576  077336                        SOB     R3,1$           ;DECREMENT NUMBER OF PATTERNS LEFT. IF ZERO,EXIT.
3648                                                                ;ELSE, CONTINUE TO PATTERN TEST REGISTER
3649 021600  005722                        TST     (R2)+           ;INCREMENT THE REGISTER INDEX BY 2
3650 021602  020227  000040                CMP     R2,#<CSREGS*2>  ;COMPARE REGISTER INDEX TO NUMBER OF CSR'S
3651 021606  101336                        BHI     1$              ;IF R2 > 17, END THE TEST
3652
3653 021610                        24$:
3654 021610                                ENDTST
     021610
     021610  104401                                                        L10030:
                                                                                TRAP    C$ETST
```

```
                                .SBTTL TEST 5 -- BASIC MASTER CLEAR

                                ;+*********************************************************************
                                ;*
                                ;*      TEST 5 -- BASIC MASTER CLEAR
                                ;*
                                ;* PERFORM INITIAL MASTER CLEAR.  WRITE 356 INTO BSELO AND READ AND CHECK IT.
                                ;* THEN, ISSUE A MASTER CLEAR AND READ AND CHECK BSELO FOR 000.
                                ;*
                                ;--*********************************************************************
                                ;
                                ;       BGNTST
021612                                                                          T5::
                                ; ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY CALLING
                                ; SUBROUTINE MASCLR.
                                
021612  004737  003614                 JSR     PC,MASCLR       ; -ATTEMPT- TO RUN THE MICRO-DIAGNOSTIC
                                                                ;FAILURES WILL BE REPORTED BY THE SUBROUTINE
                                                                ;AS DEVICE FATAL AND THE "C" BIT WILL BE SET
021616  103002                         BCC     8$              ;IF NO ERROR, PROCEED
021620                                 ERROR                   ;ELSE, REPORT IT AND
021620  104460                                                                  TRAP    C$ERROR
021622  000441                         BR      24$             ;       EXIT THIS TEST

021624  112777  000356  160520  8$:    MOVB    #356,@#BSELO    ;# SET BSEL TO ALMOST ALL ONES
021632  122777  000356  160512         CMPB    #356,@#BSELO    ;# COMPARE
021640  001011                         BNE     2$              ;A MISMATCH INDICATES A DEVICE FATAL ERROR


                                ; ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY CALLING
                                ; SUBROUTINE MASCLR.

021642  004737  003614                 JSR     PC,MASCLR       ; -ATTEMPT- TO RUN THE MICRO-DIAGNOSTIC
                                                                ;FAILURES WILL BE REPORTED BY THE SUBROUTINE
                                                                ;AS DEVICE FATAL AND THE "C" BIT WILL BE SET
021646  103002                         BCC     9$              ;IF NO ERROR, PROCEED
021650                                 ERROR                   ;ELSE, REPORT IT AND
021650  104460                                                                  TRAP    C$ERROR
021652  000425                         BR      24$             ;       EXIT THIS TEST

021654  122777  000000  160470  9$:    CMPB    #000,@#BSELO    ; THIS REGISTER SHOULD BE ZEROED DURING
                                                                ;INITIALIZATION
021662  001421                         BEQ     24$             ;IF ZERO, *** TEST PASSES ***, ELSE REPORT ERROR
                                ;--PREPARE FOR THE FAILURE PRINTOUT--
021664  112737  000356  002310  2$:    MOVB    #356,GDATA      ;# ALMOST ALL ONES IS EXPECTED DATA
021672  117737  160454  002312         MOVB    @#BSELO,BDATA   ;SOMETHING OTHER THAN ALL ONES WAS FOUND. SCORE IT.
021700  004737  004434                 JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
021704  105077  160442                 CLRB    @#BSELO         ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
021710  012737  000000  002334         MOV     #0,REGNUM       ;GET THE REGISTER THAT FAILED
021716                                 GEDF    EM5,ERR2        ;REPORT DEVICE FATAL ERROR
                                                                ;       "DEVICE FATAL" ERROR # 13.
021716  104455                                                                  TRAP    C$ERDF
021720  000015                                                                  .WORD   13
021722  014515                                                                  .WORD   EM5
021724  005304                                                                  .WORD   ERR2
021726  105077  160420          24$:    CLRB    @#BSELO         ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
021732                                 ENDTST
```

TEST 5 -- BASIC MASTER CLEAR

```
        021732
        021732  104401

                                                        L10031:
                                                                TRAP    C$ETST
```

```
                        .SBTTL TEST 6 -- BUS RESET

                        ;++*************************************************************************
                        ;*
                        ;*      TEST 6 -- BUS RESET
                        ;*
                        ;* PERFORM AN INITIAL MASTER CLEAR.  WRITE 377 INTO BSELO AND READ AND CHECK IT.
                        ;* THEN,  ISSUE  A  RESET  INSTRUCTION, STALL FOR COMPLETION, AND READ AND CHECK
                        ;* BSELO FOR 000.
                        ;*
                        ;--*************************************************************************
                        ;
                        ;       BGNTST
021734                                                                  T6::
3709 021734  032737  000001  002350        BIT     @#BIT0,PFLAG    ;IF BUS RESETS ARE NOT ALLOWED,
3710 021742  001072                        BNE     24$             ;  BYPASS THIS TEST
3711
3712                    ; ELSE, ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY
3713                    ; CALLING SUBROUTINE MASCLR.
3714
3715 021744  004737  003614                JSR     PC,MASCLR       ; -ATTEMPT- TO RUN THE MICRO-DIAGNOSTIC
3716                                                                ;FAILURES WILL BE REPORTED BY THE SUBROUTINE
3717                                                                ;AS DEVICE FATAL AND THE "C" BIT WILL BE SET
3718 021750  103002                        BCC     8$              ;IF NO ERROR, PROCEED
3719 021752                                ERROR                   ;ELSE, REPORT IT AND
021752  104460                                                                TRAP    C$ERROR
3720 021754  000465                        BR      24$             ;       EXIT THIS TEST
3721
3722 021756  112777  000377  160366  8$:   MOVB    #377,@BSELO     ;SET ALL BITS IN BSELO
3723 021764  122777  000377  160360        CMPB    #377,@BSELO     ;COMPARE TO ALL BITS SET
3724 021772  001035                        BNE     1$              ;A MISMATCH IS A DEVICE FATAL ERROR
3725
3726 021774                                BRESET                  ;FORCE AN EXTERNAL BUS RESET.  THIS SHOULD
021774  104433                                                                TRAP    C$RESET
3727                                                                ;CAUSE BSELO=0 IN ABOUT 100 MICROSECONDS
3728
3729                    ; DELAY ABOUT 500 MILLISECONDS FOR THE MICRODIAGNOSTIC TO COMPLETE
3730
3731 021776  013701  002316                MOV     DELAY1,R1       ;INITIALIZE COUNTER
3732 022002  105737  002317        2$:     TSTB    DELAY1+1        ;THIS IS A DUMMY INSTRUCTION TO LENGTHEN THE DELAY
3733 022006  005301                        DEC     R1              ;TIME TO GET OUT OF THE DELAY?
3734 022010  001374                        BNE     2$              ;NO.
3735
3736 022012  122777  000000  160332        CMPB    #000,@BSELO     ;YES, CHECK FOR REGISTER TO BE ZERO
3737 022020  001443                        BEQ     24$             ;A MISMATCH IS A DEVICE FATAL ERROR
3738                                                                ;ELSE, END TEST.
3739
3740                    ;--PREPARE FOR THE FAILURE PRINTOUT--
3741
3742 022022  117737  160324  002312        MOVB    @BSELO,BDATA    ;GET THE ACTUAL DATA
3743 022030  004737  004434                JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
3744 022034  105077  160312                CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
3745 022040  012737  000000  002310        MOV     #000,GDATA      ;GET THE EXPECTED DATA
3746 022046  012737  000000  002334        MOV     #0,REGNUM       ;GET THE REGISTER THAT FAILED
3747 022054                                GEDF    EM9,ERR2        ;EXTERNAL BUS RESET FAILURE
                                                                    ;       "DEVICE FATAL" ERROR # 14
022054  104455                                                                TRAP    C$ERDF
```

TEST 6 -- BUS RESET

```
        022056  000016                                                          .WORD   14
        022060  014634                                                          .WORD   EM9
        022062  005304                                                          .WORD   ERR2
  3748  022064  000421                          BR      24$
  3749
  3750  022066  117737  160260  002312  1$:     MOVB    @BSELO,BDATA    ;GET THE ACTUAL DATA
  3751  022074  004737  004434                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
  3752  022100  105077  160246                  CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
  3753  022104  112737  000377  002310          MOVB    #377,GDATA      ;ALL ONES WAS EXPECTED DATA
  3754  022112  012737  000000  002334          MOV     #0,REGNUM       ;GET THE REGISTER THAT FAILED
  3755  022120                                  GEDF    EM8,ERR2        ;BSELO COULD NOT BE SET TO ALL ONES
                                                                          ;       "DEVICE FATAL" ERROR # 15
        022120  104455                                                          TRAP    C$ERDF
        022122  000017                                                          .WORD   15
        022124  014611                                                          .WORD   EM8
        022126  005304                                                          .WORD   ERR2
  3756  022130  105077  160216          24$:    CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
  3757  022134                                  ENDTS1
        022134                                                          L10032:
        022134  104401                                                          TRAP    C$ETST
```

```
3779                                    .SBTTL TEST 7 -- CSR, MAINTENANCE MICROCODE INTERACTION

                                        ;++*************************************************************************
                                        ;*
                                        ;*      TEST 7 -- CSR, MAINTENANCE MICROCODE INTERACTION
                                        ;*
                                        ;* THIS  TEST INVOKES THE MAINTENANCE REQUEST MECHANISM THROUGH WHICH THE LSI-11
                                        ;* AND  6502  CAN  COMMUNICATE.    FIRST, A MASTER CLEAR IS DONE WITH ONLY BIT 0
                                        ;* (MREQ) SET IN BSEL1.   THE PROGRAM THEN CHECKS FOR THE SETTING OF BSEL2 BIT 7
                                        ;* (MRDY)  BY  THE MAINTENANCE MICROCODE WITHIN ABOUT 50 MICRO-SEC., AND IF MRDY
                                        ;* DOES NOT GET SET, AN ERROR IS REPORTED.
                                        ;*
                                        ;* NEXT, THE PROGRAM LOADS SEL4 WITH 000010 AND BSEL6 WITH 125.  THEN, ALL CSR'S
                                        ;* ARE READ AND CHECKED FOR EXPECTED CONTENTS.
                                        ;*
                                        ;* BSEL2  IS  THEN LOADED WITH A WRITE COMMAND, WHICH SHOULD CAUSE THE MICROCODE
                                        ;* TO  TRANSFER  THE  125  INTO  BSEL0.  ALL CSR'S ARE THEN READ AND CHECKED FOR
                                        ;* EXPECTED CONTENTS.
                                        ;*
                                        ;* THEN, THE PROGRAM LOADS 252 INTO BSEL0 AND READS AND CHECKS ALL CSR'S.  BSEL2
                                        ;* IS  THEN  LOADED  WITH  A  READ  COMMAND, WHICH SHOULD CAUSE THE MICROCODE TO
                                        ;* TRANSFER THE 252 INTO BSEL6.  ALL CSR'S ARE READ AND CHECKED.
                                        ;*
                                        ;--*************************************************************************
                                        ;
                                        ;       BGNTST
     022136                                                                     T7::
3780 022136                             BGNSUB
     022136                                                                     T7.1:
     022136  104402                                                                     TRAP    C$BSUB
3781 022140  004737  003762            JSR     PC,MSTCLR       ;PUT THE MICROPROCESSOR IN THE MAINTENANCE LOOP
3782 022144  103003                    BCC     10$             ;IF NO ERROR, PROCEED
3783 022146                            ERROR                   ;ELSE, REPORT IT AND
     022146  104460                                                             TRAP    C$ERROR
3784 022150  000137  022642            JMP     ENDT7           ;       EXIT THIS TEST
3785
3786 022154  012777  000020  160200  10$:    MOV     #SLT0,@SEL4     ;PUT ADDRESS OF SELECT REGISTER 0 IN 'ADDRESS' REG
3787 022162  012777  000125  160176          MOV     #125,@SEL6      ;PUT THE DATA TO BE WRITTEN IN 'DATA' REGISTER
3788
3789 022170  027727  160156  000400          CMP     @SEL0,#400      ;ONLY "MREQ" SHOULD BE SET
3790 022176  001411                    BEQ     1$              ;IF IT IS, PROCEED WITH TESTING
3791                                                            ;ELSE, SETUP FOR (& REPORT) THE ERROR
3792 022200  017737  160146  002312          MOV     @SEL0,BDATA     ;  BAD DATA
3793 022206  012737  000400  002310          MOV     #400,GDATA      ;  GOOD DATA
3794 022214  005037  002334                  CLR     REGNUM          ;  REG. NUMBER
3795 022220  000451                    BR      4$
3796
3797 022222  027727  160130  000200  1$:     CMP     @SEL2,#200      ;"MRDY" SET?  (ALSO CHECKED BY "MSTCLR")
3798 022230  001412                    BEQ     2$              ;YES, PROCEED WITH TESTING
3799 022232  017737  160120  002312          MOV     @SEL2,BDATA     ;  BAD DATA
3800 022240  012737  000200  002310          MOV     #200,GDATA      ;  GOOD DATA
3801 022246  012737  000002  002334          MOV     #2,REGNUM       ;  THE REG. THAT FAILED
3802 022254  000433                    BR      4$              ;EXIT TEST
3803
3804 022256  027727  160100  000020  2$:     CMP     @SEL4,#SLT0     ;COMPARE SELECT REGISTER 4 WITH THE ADDRESS SENT
3805 022264  001412                    BEQ     3$              ;A MISMATCH IS A DEVICE FATAL ERROR
3806 022266  017737  160070  002312          MOV     @SEL4,BDATA     ;GET THE BAD DATA
```

```
3807 022274  012737  000020  002310          MOV     #SLTO,GDATA     ;GET THE GOOD DATA
3808 022302  012737  000004  002334          MOV     #4,REGNUM       ;GET THE REGISTER NUMBER WHICH FAILED
3809 022310  000415                          BR      4$
3810
3811 022312  027727  160050  000125  3$:     CMP     @SEL6,#000125   ;COMPARE SELECT REGISTER 6 WITH THE DATA SENT
3812 022320  001415                          BEQ     60$             ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
3813 022322  017737  160040  002312          MOV     @SEL6,BDATA     ;GET THE BAD DATA
3814 022330  012737  000125  002310          MOV     #000125,GDATA   ;GET THE GOOD DATA
3815 022336  012737  000006  002334          MOV     #6,REGNUM       ;GET THE REGISTER NUMBER
3816
3817
3818                                         ;--PREPARE FOR THE FAILURE PRINTOUT--
3819
3820 022344                          4$:     GEDF    EM7,ERR5        ;ELSE, AN ERROR HAS BEEN FOUND
                                             ;       "DEVICE FATAL" ERROR # 16
     022344  104455                                                          TRAP    C$ERDF
     022346  000020                                                          .WORD   16
     022350  014564                                                          .WORD   EM7
     022352  005552                                                          .WORD   ERR5
3821 022354                          60$:    ENDSUB
     022354                                                          L10034:
     022354  104403                                                          TRAP    C$ESUB
3822
3823 022356                                  ;###################### > P A R T  2 < ##############################################
     022356                                  BGNSUB
     022356                                                          T7.2:
     022356  104402                                                          TRAP    C$BSUB
3824
3825 022360  112777  000002  157770          MOVB    #WRILOC,@BSEL2  ;SEND THE WRITE LOCATION COMMAND
3826
3827 022366  032777  000200  157762          BIT     #200,@BSEL2     ;WE SHOULD HAVE IMEDIATLY LOST "MRDY".
3828 022374  001421                          BEQ     5$              ;GOT WHAT WE EXPECTED,  WAIT FOR READY AGAIN
3829 022376  017737  157754  002312          MOV     @BSEL2,BDATA    ;SOMETHING WRONG,  SETUP FOR AND REPORT ERROR
3830 022404  004737  004434                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
3831 022410  012737  000002  002310          MOV     #002,GDATA      ;EXPECTED DATA
3832 022416  012737  000002  002334          MOV     #2,REGNUM       ;WE WERE TESTING BSEL2
3833 022424                                  GEDF    EM15,ERR2
                                             ;       "DEVICE FATAL" ERROR # 17
     022424  104455                                                          TRAP    C$ERDF
     022426  000021                                                          .WORD   17
     022430  014733                                                          .WORD   EM15
     022432  005304                                                          .WORD   ERR2
3834 022434                                  ESCAPE  TST
     022434  104410                                                          TRAP    C$ESCAPE
     022436  000206                                                          .WORD   L10033-.
3835
3836 022440  132777  000200  157710  5$:     BITB    #200,@BSEL2     ;WAIT FOR "MRDY" TO GO HIGH AGAIN
3837 022446  001774                          BEQ     5$
3838
3839 022450  004737  004576                  JSR     PC,GETWSR       ;WHEN IT DOES, GET CURRENT REGISTER CONTENTS
3840
3841 022454  023727  002246  000525          CMP     WSR0,#000525    ;COMPARE BYTE SELECT REGISTERS 0 AND 1
3842                                                                  ;REG 0 = 125, REG 1 = 001
3843 022462  001412                          BEQ     6$              ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
3844 022464  012737  000525  002310          MOV     #000525,GDATA   ;GET THE GOOD DATA
3845 022472  013737  002246  002312          MOV     WSR0,BDATA      ;GET THE BAD DATA
3846 022500  012737  000000  002334          MOV     #0,REGNUM       ;GET THE REGISTER NUMBER
3847 022506  000451                          BR      9$              ;EXIT TEST
```

```
3848
3849 022510  023727  002250  000200  6$:   CMP     WSR2,#000200    ;COMPARE BYTE SELECT REGISTERS 2 AND 3
3850                                                                ;REG 2 = 200 -- "MRDY" IS SET & COMMAND IS CLEARED
3851                                                                ;REG 3 = 000 SHOULD BE ZEROES.
3852 022516  001412                        BEQ     7$              ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
3853 022520  012737  000200  002310        MOV     #000200,GDATA   ;GET THE GOOD DATA
3854 022526  013737  002250  002312        MOV     WSR2,BDATA      ;GET THE BAD DATA
3855 022534  012737  000002  002334        MOV     #2,REGNUM       ;GET THE REGISTER NUMBER
3856 022542  000433                        BR      9$              ;EXIT TEST
3857
3858                                                                ;SUBROUTINE ATTEMPTED TO ZERO THIS LOCATION.
3859 022544  023727  002252  000020  7$:   CMP     WSR4,#SLTO      ;REG 4 = 020, THE 6502 ADDRESS TO PUT DATA
3860                                                                ; REG 5 = 000, ZEROED BY MSTCLR
3861 022552  001412                        BEQ     8$              ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
3862 022554  012737  000020  002310        MOV     #SLTO,GDATA     ;GET THE GOOD DATA
3863 022562  013737  002252  002312        MOV     WSR4,BDATA      ;GET THE BAD DATA
3864 022570  012737  000004  002334        MOV     #4,REGNUM       ;GET THE REGISTER NUMBER
3865 022576  000415                        BR      9$              ;EXIT TEST
3866
3867 022600  023727  002254  000125  8$:   CMP     WSR6,#000125    ;REG 6 = 125, THE WRITE DATA
3868 022606  001415                        BEQ     ENDT7           ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
3869 022610  012737  000125  002310        MOV     #000125,GDATA   ;GET THE GOOD DATA
3870 022616  013737  002254  002312        MOV     WSR6,BDATA      ;GET THE BAD DATA
3871 022624  012737  000006  002334        MOV     #6,REGNUM       ;GET THE REGISTER NUMBER
3872                                                                ; REG 7 = 000, ZEROED BY MSTCLR.
3873
3874                                        ;--PREPARE FOR THE FAILURE PRINTOUT--
3875
3876 022632                          9$:   GEDF    EM7,ERR5        ;REPORT ERROR.
     022632  104455                ;       "DEVICE FATAL" ERROR # 18
     022634  000022                        TRAP    C$ERDF
     022636  014564                        .WORD   18
     022640  005552                        .WORD   EM7
3877 022642                        ENDT7:  ENDSUB                  .WORD   ERR5
     022642                                                     L10035:
     022642  104403                        TRAP    C$ESUB
3878 022644                                ENDTST                  L10033:
     022644                                                     TRAP    C$ETST
     022644  104401
```

```
3893                                    .SBTTL TEST 8 -- RUN FLIP-FLOP

                                        ;**************************************************************************
                                        ;*
                                        ;*      TEST 8 -- RUN FLIP-FLOP
                                        ;*
                                        ;* THE PROGRAM PUTS THE MICROCODE INTO THE MAINTENANCE LOOP. A 125 CHARACTER
                                        ;* IS LOADED INTO BSEL6 AND A REQUEST IS MADE TO WRITE THE CONTENTS OF BSEL6
                                        ;* INTO BSELO. THE PROGRAM THEN READS AND CHECKS BSELO TO CONTAIN 125.
                                        ;* NEXT, THE RUN FLIP-FLOP IS CLEARED BY LOADING A 0 INTO RUN (BSEL1 BIT 7).
                                        ;* BSELO IS THEN CLEARED AND THE REQUEST IS MADE AGAIN TO WRITE THE CONTENTS
                                        ;* OF BSEL6 INTO BSELO. THE PROGRAM STALLS FOR 50 MICRO-SEC. AND CHECKS FOR
                                        ;* MRDY (BSEL2 BIT 7) NOT SET, AND BSELO STILL CLEARED.
                                        ;* THEN, THE PROGRAM SETS THE RUN FLIP-FLOP AGAIN BY LOADING A 1 INTO RUN,
                                        ;* AND CHECKS FOR MRDY SET WITHIN 50 MICRO-SEC. AND BSELO = 125.
                                        ;*
                                        ;--**************************************************************************
                                        ;
                                        ;       BGNTST
                                                                                        T8::
    022646
3894 022646  004737  003762             T8::    JSR     PC,MSTCLR       ;CALL SUBROUTINE TO INITIALIZE THE CSR'S AND
3895                                            ;PUT THE 6502 INTO THE MAINTENANCE LOOP
3896 022652  103003                             BCC     2$              ;IF NO ERROR, PROCEED
3897 022654                                     ERROR                   ;ELSE, REPORT IT AND
    022654  104460                                                              TRAP    C$ERROR
3898 022656  000137  023212                     JMP     24$             ;       EXIT THIS TEST
3899
3900                                    ; DO NORMAL WRITE INTO LOCATION USED BY BSELO
3901
3902 022662  004537  004322             2$:     JSR     R5,WRITEI       ;WRITE INTO BSELO THROUGH THE BACK DOOR!
3903 022666  000020                             SLTO                    ;  ADDRESS OF BSELO WITHIN RAM
3904 022670  000125                     10$:    125                     ;  TEST DATA
3905 022672  103002                             BCC     5$              ;IF AN ERROR OCCURED,
3906 022674                                     ERROR                   ;REPORT IT &
    022674  104460                                                              TRAP    C$ERROR
3907 022676  000545                             BR      24$             ;  EXIT
3908 022700  123777  022670  157444  5$:       CMPB    10$,@BSELO      ;DID THE DATA GO INTO BSELO?
3909 022706  001416                             BEQ     11$             ;YES, NOW TRY IT WITH THE "RUN" BIT OFF
3910 022710  017737  157436  002312             MOV     @SELO,BDATA     ;NO,  SETUP & PRINT ERROR MESSAGE
3911 022716  013737  022670  002310             MOV     10$,GDATA
3912 022724  005037  002334                     CLR     REGNUM          ;WE'RE SINGLING OUT SELO FOR THE MESSAGE
3913 022730                                     GEDF    EM16,ERR5
                                                ;       "DEVICE FATAL" ERROR # 19
    022730  104455                                                              TRAP    C$ERDF
    022732  000023                                                              .WORD   19
    022734  015013                                                              .WORD   EM16
    022736  005552                                                              .WORD   ERR5
3914 022740                             ESCAPE  TST                     ;IF THIS WRITE DIDN'T WORK, THERE IS NO SENSE
    022740  104410                                                              TRAP    C$ESCAPE
    022742  000250                                                              .WORD   L10036-.
3915                                            ;IN TRYING IT WITH "RUN" OFF!
3916
3917 022744  105077  157402             11$:    CLRB    @BSELO          ;CLEAR BSELO AGAIN
3918                                            ;REG'S ARE ALREADY SETUP FROM PREVIOUS WRITE
3919 022750  142777  000200  157376             BICB    #RUN,@BSEL1     ;TURN OFF THE RUN BIT -- & HOPEFULLY THE 6502 ALSO
3920 022756  112777  000002  157372             MOVB    #WRILOC,@BSEL2  ;TELL MLOOP TO WRITE AGAIN
3921
```

```
                                        ;AT THIS POINT, THE DMV-11 SHOULD BE QUIESCENT.  IT SHOULDN'T EVEN KNOW THAT
                                        ;WE HAVE CLEARED "MRDY".  THEREFOR, THERE SHOULD BE NO CHANGE IN ANY OF THE
                                        ;REGISTERS FOR AS LONG AS WE CARE TO WAIT AND WATCH.  THE ONLY CHANGE THAT WE
                                        ;COULD POSSIBLY SEE WOULD BE "MRDY" BEING SET AGAIN AND/OR BSELO GETTING
                                        ;LOADED WITH THE TEST DATA -- WHICH IS WHAT THE REQUESTED COMMAND SHOULD
                                        ;ACCOMPLISH WHEN THE FUNCTION IS ALLOWED TO RUN AGAIN.

022764  013701  002320                        MOV     DELAY2,R1       ;SETUP AND WAIT FOR A WHILE.
022770  132777  000200  157360  12$:          BITB    @MRDY,@BSEL2    ;WHILE WE'RE WAITING, WE MAY AS WELL CHECK "MRDY"
022776  001042                                BNE     14$             ;IF IT GETS SET, WE HAVE AN ERROR BECAUSE
                                                                        ;NOTHING WAS SUPPOSED TO HAPPEN WITHIN
                                                                        ;THE 6502 MICRO-PROCESSOR
023000  105777  157346                        TSTB    @BSELO          ;WHILE WE'RE AT IT, WE MAY AS WELL LOOK AT
023004  001063                                BNE     15$             ;BSELO.  THAT ALSO ISN'T SUPPOSED TO CHANGE.
023006  077110                                SOB     R1,12$          ;DECREMENT AND CHECK COUNTER -- LOOP TILL DONE

                                        ;IF EVERYTHING GOES OK, WE SHOULD FALL OUT OF THE LOOP TO HERE.  OTHERWISE,
                                        ;"MRDY" OR BSELO COULD CHANGE SENDING US TO "14$" OR "15$" RESPECTIVELY TO
                                        ;PRINT AN APPROPRIATE (WE HOPE) ERROR MESSAGE.

                                        ;IF WE DO GET TO HERE, WE CAN NOW SET "RUN" AND THE MLOOP SHOULD PERFORM THE
                                        ;REQUESTED FUNCTION.

023010  152777  000200  157336                BISB    @RUN,@BSEL1     ;SET "RUN" AND ALLOW THE 6502 TO RUN AGAIN

                                        ;NOW ALL WE HAVE TO DO IS WAIT AGAIN AS BEFORE.  EXCEPT THAT THIS TIME "MRDY"
                                        ;OR BSELO GETTING SET IS THE VALID CONDITION -- NOT THE ERROR.  FAILURE TO
                                        ;PERFORM IS NOW THE ERROR WE'RE LOOKING FOR.

023016  013701  002320                        MOV     DELAY2,R1       ;SETUP AND WAIT FOR A WHILE.
023022  132777  000200  157326  13$:          BITB    @MRDY,@SEL2     ;WHILE WE'RE WAITING, "MRDY" SHOULD GO NON-ZERO
023030  001070                                BNE     24$             ;IF IT GETS SET, WE CAN ASSUME THAT SOMETHING
                                                                        ;COMPLETED.  AT LEASE WE WERE ABLE TO GET THE
                                                                        ;6502 MICRO-PROCESSOR RUNNING AGAIN
023032  077105                                SOB     R1,13$          ;DECREMENT AND CHECK COUNTER -- LOOP TILL DONE

                                        ;IF WE GET HERE, WE WEREN'T ABLE TO RESTORE THE 6502 TO A RUNNING STATE!

023034  117737  157316  002312                MOVB    @SEL2,BDATA     ;SETUP FOR THE ERROR MESSAGE -- GET BAD DATA
023042  004737  004434                        JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
023046  117737  002312  002310                MOVB    BDATA,GDATA     ;PICK THE REGISTER'S DATA.  THE ONLY DIFFERANCE
023054  152737  000200  002310                BISB    @MRDY,GDATA     ;BETWEEN GOOD & BAD IS THE "MRDY" BIT
023062  012737  000002  002334                MOV     @2,REGNUM       ;INDICATE THAT WE'RE LOOKING AT BSEL2
023070                                        GEDF    EM17,ERR2       ;NOW REPORT THE ERROR
                                                                        ;       "DEVICE FATAL" ERROR # 20
023070  104455                                                                TRAP    C$ERDF
023072  000024                                                                .WORD   20
023074  015110                                                                .WORD   EM17
023076  005304                                                                .WORD   ERR2
023100                                        ESCAPE  TST             ;EXIT TEST (OR LOOP, MAYBE?)
023100  104410                                                                TRAP    C$ESCAPE
023102  000110                                                                .WORD   L10036-.

                                        ;IF WE GET HERE, BSEL2 CHANGED WHEN THE 6502 WASN'T SUPPOSED TO BE RUNNING!

023104  117737  157246  002312  14$:          MOVB    @BSEL2,BDATA    ;GET THE UNEXPECTEDLY ALTERED CONTENTS OF BSEL2
023112  004737  004434                        JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
```

TEST 8 -- RUN FLIP-FLOP

```
3972 023116  113737  002312  002310          MOVB    BDATA,GDATA     ;PICK THE REGISTER'S DATA.  THE ONLY DIFFERANCE
3973 023124  142737  000200  002310          BICB    #MRDY,GDATA     ;BETWEEN GOOD & BAD IS THE "MRDY" BIT
3974 023132  012737  000002  002334          MOV     #2,REGNUM       ;INDICATE THAT WE'RE LOOKING AT BSEL2
3975 023140                                  GEDF    EM17A,ERR2      ;NOW REPORT THE ERROR
                                                                     ;       "DEVICE FATAL" ERROR # 21
     023140  104455                                                                  TRAP    C$ERDF
     023142  000025                                                                  .WORD   21
     023144  015170                                                                  .WORD   EM17A
     023146  005304                                                                  .WORD   ERR2
3976 023150                                  ESCAPE  TST             ;EXIT TEST (OR LOOP, MAYBE?)
     023150  104410                                                                  TRAP    C$ESCAPE
     023152  000040                                                                  .WORD   L10036-.
3977
3978                                 ;IF WE GET HERE, BSELO CHANGED WHEN THE 6502 WASN'T SUPPOSED TO BE RUNNING!
3979
3980 023154  117737  157172  002312  15$:    MOVB    @#BSELO,BDATA   ;GET THE UNEXPECTEDLY ALTERED CONTENTS OF BSELO
3981 023162  004737  004434                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
3982 023166  105037  002310                  CLRB    GDATA           ;IT WAS SUPPOSED TO STAY AT ZERO
3983 023172  105037  002334                  CLRB    REGNUM          ;INDICATE THAT WE'RE LOOKING AT BSELO
3984 023176                                  GEDF    EM17A,ERR2      ;NOW REPORT THE ERROR
                                                                     ;       "DEVICE FATAL" ERROR # 22
     023176  104455                                                                  TRAP    C$ERDF
     023200  000026                                                                  .WORD   22
     023202  015170                                                                  .WORD   EM17A
     023204  005304                                                                  .WORD   ERR2
3985 023206                                  ESCAPE  TST             ;EXIT TEST (OR LOOP, MAYBE?)
     023206  104410                                                                  TRAP    C$ESCAPE
     023210  000002                                                                  .WORD   L10036-.
3986
3987                                 ;IF WE GET HERE, THE TEST APPEARS TO HAVE PASSED WITH FLYING COLOURS
3988
3989 023212                          24$:    ENDTST
     023212                                                      L10036:
     023212  104401                                                          TRAP    C$ETST
```

```
4004                                    .SBTTL TEST 9 -- LOW RAM (00-0F) SCRATCHPAD

                                        ;**************************************************************************
                                        ;*
                                        ;*      TEST 9 -- LOW RAM (00-0F) SCRATCHPAD
                                        ;*
                                        ;* THIS TEST FIRST PERFORMS AN ADDRESSING TEST OF RAM LOCATIONS (00-0F), BY
                                        ;* WRITING THE ADRS INTO EACH LOCATION AND AFTER EACH WRITE, ALL THE LOCATIONS
                                        ;* ARE READ AND CHECKED FOR EXPECTED CONTENTS.
                                        ;*
                                        ;* THEN, THE TEST PERFORMS READ/WRITE DATA TESTING OF RAM LOCATIONS 00-0F,
                                        ;* BY WRITING, READING, AND COMPARING ALL BYTES OF DATA PATTERN B IN EACH
                                        ;* LOCATION.
                                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                        ;*
                                        ;--**************************************************************************
                                        ;
                                        ;       BGNTST
     023214                                                                             T9::
4005 023214  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
4006 023220  103003                            BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
4007 023222                                    ERROR                   ;ELSE, REPORT ERROR
     023222  104460                                                                     TRAP    C$ERROR
4008 023224                                    ESCAPE  TST             ;   & EXIT TEST
     023224  104410                                                                     TRAP    C$ESCAPE
     023226  000152                                                                     .WORD   L10037-.
4009 023230  012737  000001  002444  1$:      MOV     #1,TMP2         ;DATA GENERATION ALGORITHM CODE
4010 023236  012737  003777  002474          MOV     #2047.,TMPE     ;LAST VALID ADDRESS
4011 023244  004737  023402          2$:     JSR     PC,T9.RST       ;RESET TMP3, TMPA, & TMPF
4012 023250  005037  002450                  CLR     TMP4            ;TEST DATA
4013 023254  005037  002452                  CLR     TMP5            ;ACTUAL DATA
4014
4015                                    ; IN THIS PHASE OF TESTING WE WRITE, READ & CHECK EACH LOCATION INDIVIDUALLY.
4016
4017 023260  004737  023420          4$:     JSR     PC,WRCRAM       ;WRITE, READ, & CHECK 1 BYTE OF RAM
4018 023264  103003                          BCC     5$              ;IF NO ERROR, PROCEED
4019 023266                                   ERROR                   ;ELSE, REPORT IT
     023266  104460                                                                     TRAP    C$ERROR
4020 023270                                   ESCAPE  TST             ;   & LOOP IF ERROR
     023270  104410                                                                     TRAP    C$ESCAPE
     023272  000106                                                                     .WORD   L10037-.
4021 023274  005237  002464          5$:     INC     TMPA            ;POINT TO NEXT LOCATION
4022 023300  023737  002464  002474          CMP     TMPA,TMPE       ;HAVE WE TESTED ALL OF RAM?
4023 023306  101764                          BLOS    4$              ;NO, TEST ANOTHER BYTE
4024 023310                                   BREAK                   ;ELSE, SEE IF A ^C HAS BEEN STRUCK
     023310  104422                                                                     TRAP    C$BRK
4025                                                                  ;THEN PROCEED TO THE NEXT PHASE OF TESTING
4026
4027                                    ; IN THIS PHASE OF TESTING WE READ & CHECK DATA WHICH SHOULD ALREADY BE IN
4028                                    ; EACH LOCATION OF RAM BEING CHECKED.
4029
4030 023312  004737  023402                  JSR     PC,T9.RST       ;RESET TMP3, TMPA, & TMPF
4031 023316  004737  023616          8$:     JSR     PC,RCRAM        ;READ & CHECK 1 BYTE OF RAM
4032 023322  103001                          BCC     9$              ;IF NO ERROR, PROCEED
4033 023324                                   ERROR                   ;ELSE, REPORT IT
     023324  104460                                                                     TRAP    C$ERROR
```

TEST 9 -- LOW RAM (00-0F) SCRATCHPAD

```
4034 023326  005237  002464          9$:     INC     TMPA            ;POINT TO NEXT LOCATION
4035 023332  023737  002464  002474         CMP     TMPA,TMPE       ;HAVE WE TESTED ALL OF RAM?
4036 023340  101766                         BLOS    8$              ;NO, TEST ANOTHER BYTE
4037 023342                                  BREAK                   ;ELSE, SEE IF A ^C HAS BEEN STRUCK
     023342  104422                                                          TRAP    C$BRK
4038                                                                 ;THEN PROCEED TO THE NEXT PHASE OF TESTING
4039
4040 023344  005037  007104                 CLR     ER47CT          ;RESET ERROR PRINT COUNT
4041 023350  005237  002444                 INC     TMP2            ;  ADVANCE TO NEXT DATA GEN. ALGORITHM CODE
4042 023354  023727  002444  000007         CMP     TMP2,#7         ;HAVE WE DONE ALL THE CODES WE'RE GOING TO DO?
4043 023362  002730                         BLT     2$              ;NO, THEN GO DO THIS PATTERN IN RAM
4044 023364  004537  004322                 JSR     R5,WRITEI       ;ELSE, CLEAR RAM LOCATION 00B3 (HEX) & EXIT
4045 023370  000173                         173                     ;       (THIS CONVERTS TO 00B3 HEX.)
4046 023372  000000                         0                       ;       (THIS WE HOPE, WILL CLEAR IT)
4047 023374  103001                         BCC     .+4             ;IF NO ERROR, PROCEED
4048 023376                                  ERROR                   ;ELSE, REPORT IT
     023376  104460                                                            TRAP    C$ERROR
4049 023400                                  ENDTST
     023400                                                                 L10037:
     023400  104401                                                            TRAP    C$ETST
4050
4051                                 ; RESET THE FOLLOWING THREE REGISTERS
4052
4053 023402  005037  002446          T9.RST: CLR     TMP3            ;TEST DATA PATTERN INDEX
4054 023406  005037  002464                  CLR     TMPA            ;RAM LOCATION ADDRESS
4055 023412  005037  002476                  CLR     TMPF            ;RESET ALL ERROR FLAGS
4056 023416  000207                          RTS     PC
4057
4058                                 ; WRITE, READ, & CHECK ONE LOCATION
4059
4060 023420  010046          WRCRAM: MOV     R0,-(SP)        ;SAVE WORKING REGISTERS
4061
4062 023422  004737  023776                  JSR     PC,PATGEN       ;GENERATE ONE DATA PATTERN BYTE
4063
4064 023426  013700  002464                  MOV     TMPA,R0         ;GET ADDRESS WHERE WE CAN CHECK IT MORE EASILY
4065 023432  020027  000020                  CMP     R0,#SLT0        ;IS ADDRESS BELOW THE SELECT REGESTER AREA?
4066 023436  103412                          BLO     2$              ;YES, GOOD.  IT CAN BE TESTED.
4067 023440  020027  000030                  CMP     R0,#SLT0+8.     ;IS IT ABOVE THE SELECT REGISTER AREA?
4068 023444  103007                          BHIS    2$              ;YES, GOOD.  IT CAN BE TESTED.
4069 023446  023727  002444  000006         CMP     TMP2,#6         ;NO, IF "INCREMENTAL", BACK UP INDEX
4070 023454  001055                         BNE     12$             ;ELSE JUST BYPASS TEST
4071 023456  005337  002446                 DEC     TMP3            ;DECREMENT INDEX TO WHAT IT WAS BEFORE "PATGEN"
4072 023462  000452                         BR      12$             ;  AND THEN BYPASS THE TESTING
4073
4074 023464  010037  023500          2$:     MOV     R0,4$           ;SETUP ALL POINTERS FOR THE CURRENT RAM LOCATION
4075 023470  010037  023512                  MOV     R0,8$
4076
4077 023474  004537  004310                  JSR     R5,WRITE        ;WRITE ONE BYTE OF THE TEST DATA
4078 023500  000000          4$:     .WORD   0               ;**** MODIFIED FROM ABOVE ****
4079 023502  002450                  TMP4                    ;TEST DATA IS IN TMP4
4080 023504  103442                  BCS     14$             ;IF ERROR WRITING, FORGET THE REST
4081
4082 023506  004537  004064                  JSR     R5,READ         ;READ THAT BYTE BACK AGAIN
4083 023512  000000          8$:     .WORD   0               ;**** MODIFIED FROM ABOVE ****
4084 023514  002452                  TMP5
4085 023516  103435                  BCS     14$             ;IF ERROR READING, FORGET THE REST
4086
```

TEST 9 -- LOW RAM (00-0F) SCRATCHPAD

```
4087 023520  123737  002450  002452          CMPB    TMP4,TMP5       ;DID WE READ WHAT WE WROTE?
4088 023526  001430                           BEQ     12$             ;YES, EXIT
4089 023530  132737  000002  002476          BITB    #BIT1,TMPF      ;NO, HAVE WE ALREADY DONE THIS ERROR'S HEADER?
4090 023536  001020                           BNE     9$              ;YES, ONLY REPORT DATA
4091 023540  112737  000002  002476          MOVB    #BIT1,TMPF      ;ELSE, CALL MONITOR & PRINT HEADING
4092 023546                                   GTDF    EM47A,ERR47     ;QUEUE UP THE ERROR MESSAGE
                                                                      ;       QUEUE "DEVICE FATAL" ERROR # 23
     023546  012737  000001  002236                                                       MOV     #T.EDF,ERRTYP
     023554  012737  000027  002240                                                       MOV     #23,ERRNBR
     023562  012737  015675  002242                                                       MOV     #EM47A,ERRMSG
     023570  012737  006724  002244                                                       MOV     #ERR47,ERRBLK
4093 023576  000402                           BR      10$
4094
4095 023600  004737  007110          9$:     JSR     PC,ERR47.       ;JUST PRINT DATA
4096 023604  000261                 10$:     SEC                     ;       & SET THE ERROR FLAG
4097 023606  000401                           BR      14$             ;       & GO DIRECTLY TO THE EXIT "RTS"
4098
4099 023610  000241                 12$:     CLC                     ;NORMAL EXIT - MAKE SURE THE ERROR FLAG IS CLEAR
4100 023612  012600                 14$:     MOV     (SP)+,R0        ;RESTORE WORK REGISTERS
4101 023614  000207                           RTS     PC
4102
4103 023616  010046                 RCRAM:   MOV     R0,-(SP)        ;SAVE WORKING REGISTERS
4104
4105 023620  004737  023776                   JSR     PC,PATGEN       ;GENERATE ONE DATA PATTERN BYTE
4106
4107 023624  013700  002464                   MOV     TMPA,R0         ;GET ADDRESS WHERE WE CAN CHECK IT MORE EASILY
4108 023630  020027  000020                   CMP     R0,#SLT0        ;IS ADDRESS BELOW THE SELECT REGESTER AREA?
4109 023634  103412                           BLO     2$              ;YES, GOOD.  IT CAN BE TESTED.
4110 023636  020027  000030                   CMP     R0,#SLT0+8.     ;IS IT ABOVE THE SELECT REGISTER AREA?
4111 023642  103007                           BHIS    2$              ;YES, GOOD.  IT CAN BE TESTED.
4112 023644  023727  002444  000006           CMP     TMP2,#6         ;NO, IF "INCREMENTAL", BACK UP INDEX
4113 023652  001046                           BNE     12$             ;ELSE JUST BYPASS TEST
4114 023654  005337  002446                   DEC     TMP3            ;DECREMENT INDEX TO WHAT IT WAS BEFORE "PATGEN"
4115 023660  000443                           BR      12$             ;  AND THEN BYPASS THE TESTING
4116
4117 023662  010037  023672          2$:     MOV     R0,8$           ;SETUP POINTER FOR THE CURRENT RAM LOCATION
4118
4119 023666  004537  004064                   JSR     R5,READ         ;READ THAT BYTE BACK AGAIN
4120 023672  000000                 8$:      .WORD   0               ;**** MODIFIED FROM ABOVE ****
4121 023674  002452                           TMP5
4122 023676  103435                           BCS     14$             ;IF ERROR READING, FORGET THE REST
4123
4124 023700  123737  002450  002452          CMPB    TMP4,TMP5       ;WAS THIS LOC. STILL OK?
4125 023706  001430                           BEQ     12$             ;YES, EXIT
4126 023710  132737  000004  002476          BITB    #BIT2,TMPF      ;NO, HAVE WE ALREADY DONE THIS ERROR'S HEADER?
4127 023716  001020                           BNE     9$              ;YES, ONLY REPORT DATA
4128 023720  112737  000004  002476          MOVB    #BIT2,TMPF      ;ELSE, CALL MONITOR & PRINT HEADING
4129 023726                                   GTDF    EM47B,ERR47     ;QUEUE UP THE ERROR MESSAGE
                                                                      ;       QUEUE "DEVICE FATAL" ERROR # 24
     023726  012737  000001  002236                                                       MOV     #T.EDF,ERRTYP
     023734  012737  000030  002240                                                       MOV     #24,ERRNBR
     023742  012737  015735  002242                                                       MOV     #EM47B,ERRMSG
     023750  012737  006724  002244                                                       MOV     #ERR47,ERRBLK
4130 023756  000402                           BR      10$
4131
4132 023760  004737  007110          9$:     JSR     PC,ERR47.       ;JUST PRINT DATA
4133 023764  000261                 10$:     SEC                     ;       & SET THE ERROR FLAG
```

TEST 9 -- LOW RAM (00-0F) SCRATCHPAD

```
                                        BR      14$             ;       & GO DIRECTLY TO THE EXIT "RTS"

                                12$:    CLC                     ;NORMAL EXIT - MAKE SURE THE ERROR FLAG IS CLEAR
                                14$:    MOV     (SP)+,R0        ;RESTORE WORK REGISTERS
                                        RTS     PC

                                ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                ; PATGEN -- SUBROUTINE TO GENERATE A TEST DATA BYTE FOR A SPECIFIC ELEMENT
                                ;
                                ;       CALLING SEQUENCE:
                                ;
                                ;       <SET TEST PATTERN CODE # IN "TMP2">
                                ;       <SET TEST PATTERN INDEX IN "TMP3">
                                ;       JSR     PC,PATGEN
                                ;       <NEXT SEQUENCIAL INSTRUCTION>
                                ;
                                ;  TEST PATTERN CODES:
                                ;
                                ;       1 -- ALL ONES
                                ;       2 -- ALL ZEROES
                                ;       3 -- 1 BIT ALTERNATING
                                ;       4 -- 2 BITS ALTERNATING
                                ;       5 -- ADDRESS IN ADDRESS
                                ;       6 -- INCREMENTAL  (INDEX IN ADDRESS)
                                ;
                                ;  THE TEST PATTERN INDEX INDICATES HOW FAR INTO THE TEST PATTERN STRING OF
                                ;  BYTES WE ARE.  I.E. IT SPECIFIES THE NUMBER OF THE BYTE OF THE WHOLE STRING
                                ;  OF BYTES COMPOSING THE COMPLETE TEST PATTERN.
                                ;
                                ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

023776                  PATGEN:
023776  023727  002444  000002          CMP     TMP2,#2         ;DECODE THE TEST PATTERN IDENTIFIER
024004  002414                          BLT     1$              ;0, 1, OR NEGITIVE WILL GIVE "ALL ONES"
024006  001417                          BEQ     2$              ;2 = "ALL ZEROES"
024010  023727  002444  000004          CMP     TMP2,#4
024016  002416                          BLT     3$              ;3 = "1 BIT ALTERNATING"
024020  001431                          BEQ     4$              ;4 = "2 BIT ALTERNATING PATTERN"
024022  023727  002446  000006          CMP     TMP3,#6
024030  002441                          BLT     5$              ;5 = "ADDRESS IN ADDRESS"
024032  001444                          BEQ     6$              ;6 = "INCREMENTAL"  (INDEX IN ADDRESS)
024034  000404                          BR      2$              ;UNDEFINED = "ALL ZEROES"

024036  112737  000377  002450  1$:     MOVB    #377,TMP4       ;"ALL ONES" DATA PATTERN
024044  000443                          BR      60$

024046  105037  002450          2$:     CLRB    TMP4            ;"ALL ZEROES" DATA PATTERN
024052  000440                          BR      60$

024054  132737  000001  002446  3$:     BITB    #1,TMP3         ;"1 BIT ALTERNATING" PATTERN
024062  001404                          BEQ     20$             ;IF EVEN, USE "252"
024064  112737  000125  002450          MOVB    #125,TMP4       ;IF ODD, USE "125"
024072  000430                          BR      60$             ; PATTERN:  10101010
024074  112737  000252  002450  20$:    MOVB    #252,TMP4
024102  000424                          BR      60$             ; PATTERN:  01010101
```

TEST 9 -- LOW RAM (00-0F) SCRATCHPAD

```
4191 024104  132737  000001  002446  4$:     BITB    #1,TMP3         ;"2 BIT ALTERNATING" PATTERN
4192 024112  001404                          BEQ     22$             ;IF EVEN, USE "214"
4193 024114  112737  000063  002450          MOVB    #063,TMP4       ;IF ODD, USE "063"
4194 024122  000414                          BR      60$             ; PATTERN:  11001100
4195 024124  112737  000214  002450  22$:    MOVB    #214,TMP4
4196 024132  000410                          BR      60$             ; PATTERN:  00110011
4197
4198 024134  113737  002464  002450  5$:     MOVB    TMPA,TMP4       ;"ADDRESS IN ADDRESS"
4199 024142  000404                          BR      60$
4200
4201 024144  113737  002446  002450  6$:     MOVB    TMP3,TMP4       ;"INCREMENTAL"  (INDEX IN ADDRESS)
4202 024152  000400                          BR      60$
4203
4204 024154  005237  002446          60$:    INC     TMP3            ;INCREMENT PATTERN INDEX FOR NEXT CALL
4205 024160  000207                  62$:    RTS     PC
4206
4207
```

TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)

```
4279                    .SBTTL TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)

                        ;+*****************************************************************************
                        ;*
                        ;*      TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)
                        ;*
                        ;* GENERAL DESCRIPTION:
                        ;*  FIRST, THE 2K BYTE LOCATIONS IN RAM ARE LOADED WITH 0'S (SEE NOTE BELOW).
                        ;* THEN, THE FIRST LOCATION IS READ AND CHECKED, A SINGLE 1 IS WRITTEN INTO
                        ;* THE LOW BIT POSITION, AND THIS IS READ AND CHECKED. THIS IS DONE FOR ALL
                        ;* BYTES IN THE RAM, BY INCREMENTING THE ADDRESS TO POINT TO THE NEXT RAM
                        ;* LOCATION.
                        ;*  THEN, THE NEXT BIT POSITION IS CHOSEN TO INSERT A 1, AND ALL LOCATIONS
                        ;* ARE READ, WRITTEN, AND READ AS BEFORE. THIS IS CONTINUED FOR ALL BIT
                        ;* POSITIONS UNTIL THE ENTIRE RAM IS WRITTEN TO ALL 1'S. THE ABOVE OPERATIONS
                        ;* ARE PERFORMED A SECOND TIME, WITH 0'S INSERTED INTO THE RAM INSTEAD OF 1'S,
                        ;* THIS RESULTS IN THE ENTIRE RAM BEING WRITTEN TO ALL 0'S.
                        ;*  THIS TEST CONSTITUTES A THOROUGH TEST OF THE RAM. IT IS CAPABLE OF
                        ;* DETECTING THE FOLLOWING FAULTS :  STUCK ADDRESS BITS, UNI- AND BI-DIRECT-
                        ;* IONAL COUPLING BETWEEN ADDRESS BITS, STUCK MEMORY BITS, AND UNI- AND
                        ;* BI-DIRECTIONAL COUPLING BETWEEN MEMORY BITS IN BOTH ROWS AND COLUMNS OF THE
                        ;* MEMORY MATRIX.
                        ;*
                        ;* NOTE:
                        ;*  THIS TEST DOES NOT CHECK LOCATIONS 0010-001F, SO THAT THE PRIMARY CSR'S
                        ;* ARE NOT WRITTEN. IT DOES TEST LOCATIONS 0000-000F (SCRATCHPAD RAM) AND
                        ;* LOCATIONS 0020-002F (SECONDARY CSR'S), AS WELL AS 0030-0800 (BASIC RAM).
                        ;*
                        ;* THE "TMP#" REGISTERS ARE USED HERE TO CONTAIN THE VARIOUS CONSTANTS &
                        ;* VARIABLES USED THROUGHOUT THIS TEST.  A LIST OF THEIR ASSIGNMENTS SEEMS
                        ;* USEFUL SO HERE IT IS:
                        ;*
                        ;*      TMP0    POINTS TO THE FIRST LOCATION AFTER THE SELECT REGISTERS.
                        ;*
                        ;*      TMP1    ----
                        ;*
                        ;*      TMP2    TEST PATTERN ID CODE -- UNUSED BY THIS TEST.
                        ;*
                        ;*      TMP3    TEST DATA PATTERN INDEX -- UNUSED BY THIS TEST.
                        ;*
                        ;*      TMP4    TEST DATA PATTERN.  THE HIGH BYTE IS THE PATTERN BEING WRITTEN
                        ;*              ON ANY GIVEN PASS AND THE LOW BYTE IS THE PATTERN THAT WAS
                        ;*              WRITTEN BY THE PREVIOUS PASS THROUGH THE RAM.
                        ;*
                        ;*      TMP5    DATA READ FROM THE RAM.  ONLY THE LOW BYTE IS USED.
                        ;*
                        ;*      TMP6    ----
                        ;*      TMP7    ----
                        ;*      TMP8    ----
                        ;*      TMP9    ----
                        ;*
                        ;*      TMPA    RAM ADDRESS BEING TESTED.
                        ;*
                        ;*      TMPB    BIT POINTER.  NUMBER OF THE BIT WITHIN THE DATA FIELD WHICH IS
                        ;*              BEING SWITCHED ON EACH WRITE WITHIN THE CURRENT PASS.
                        ;*
                        ;*      TMPC    DATA FLAG.  BIT 0 OF THIS WORD IS THE VALUE TO WHICH THE BIT
```

```
                                ;*              IDENTIFIED IN TMPB IS BEING SET ON EACH WRITE IN THE CURRENT
                                ;*              PASS.
                                ;*
                                ;*      TMPD    DIRECTION SWITCH.  0 = FORWARD    NON-ZERO = BACKWARD
                                ;*
                                ;*      TMPE    LAST VALID ADDRESS TO BE TESTED.  (I.E. THE END OF RAM)
                                ;*
                                ;*      TMPF    ERROR FLAGS.  BIT 1 SET = THE LAST DETECTED ERROR WAS THE READ
                                ;*              OF THE PREVIOUS DATA BEFORE WRITING THE NEW DATA.  IF BIT2 IS
                                ;*              SET, THE READ AFTER WRITE FAILED.  IF EITHER IS SET WHEN AN
                                ;*              ERROR IS DETECTED, THE SUPERVISOR IS NOT CALL'D AND THEREFOR
                                ;*              IT'S ERROR COUNTER WILL NOT REFLECT THE ERROR -- INSTEAD, THE
                                ;*              DATA LINE IS PRINTED.  (UNLESS THE ERROR HANDLER'S DATA LINE
                                ;*              PRINT COUNT HAS EXCEDED ITS LIMIT -- IN WHICH CASE ITS
                                ;*              INVOCATION IS IGNORED.)
                                ;*
                                ;--*************************************************************************
                                ;
                                ;       BGNTST
     024162                                                                     T10::
4280 024162  004737  003762            JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
4281 024166  103003                    BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
4282 024170                            ERROR                   ;ELSE, REPORT ERROR
     024170  104460                                                             TRAP    C$ERROR
4283 024172                            ESCAPE  TST             ;   & EXIT TEST
     024172  104410                                                             TRAP    C$ESCAPE
     024174  000744                                                             .WORD   L10040-.
4284 024176                    1$:
4285                           ;========== ACTUAL MOVING INVERSIONS ALGORITHM ==============================
4286
4287                           ;---------  INITIALIZE OUTER LOOP  ------------------------------------------
4288
4289 024176  012737  000030  002440          MOV     #24.,TMP0       ;INIT. POINTER TO 1'ST RAM LOC. AFTER SEL REG'S
4290 024204  012737  003777  002474          MOV     #2047.,TMPE     ;IDENTIFY LAST ADDRESS TO BE TESTED
4291 024212  005037  002462                  CLR     TMP9
4292 024216  005037  002476                  CLR     TMPF            ;ERROR FLAG -- INDICATE NO ERRORS YET
4293 024222  012737  177777  002470          MOV     #-1,TMPC        ;DATA = 1'S FIRST
4294
4295                           ;---------  INITIALIZE THE AREA BEING TESTED BY CLEARING IT TO ZEROES  --------
4296
4297                           ;   ZERO OUT LOCATIONS 0 THROUGH 10 (HEX) -- THOSE BELOW THE SELECT REGISTERS
4298
4299 024230  005037  024244          CLR     3$              ;INITIALIZE ADDRESS
4300 024234  012703  000020          MOV     #SLTO,R3        ;RAM ADDRESS OF BSELO WILL DO AS BYTE COUNT
4301
4302 024240  004537  004322    2$:   JSR     R5,WRITEI       ;ZERO OUT LOC'S 0 --> 10 (HEX)
4303 024244  000000    3$:   .WORD   0               ;  ADDRESS
4304 024246  000000          0                       ;  DATA
4305 024250  103003          BCC     .+10            ;IF NO ERROR, PROCEED
4306 024252                  ERROR                   ;ELSE, REPORT IT
     024252  104460                                                     TRAP    C$ERROR
4307 024254                  ESCAPE  TST             ;       AND EXIT THIS TEST
     024254  104410                                                     TRAP    C$ESCAPE
     024256  000662                                                     .WORD   L10040-.
4308 024260  005237  024244          INC     3$              ;POINT TO NEXT LOCATION
4309 024264  077313          SOB     R3,2$           ;IF MORE TO BE DONE, DO IT
4310
```

TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)

```
4311                                    ;   ZERO OUT THE REST OF RAM -- ALL LOC'S ABOVE THE SELECT REGISTERS
4312
4313 024266  013737  002440  024312          MOV     TMP0,6$         ;FIRST LOCATION OF TEST AREA (18 HEX)
4314 024274  013703  002474                  MOV     TMPE,R3         ;START WITH "LAST ADDR. TO BE TESTED" AND CALC.
4315 024300  163703  002440                  SUB     TMP0,R3         ;THE # OF LOCATIONS TO BE TESTED (800-18 (HEX))
4316 024304  005203                          INC     R3              ; (THIS MAKES SURE WE GET EVERY SINGLE BYTE)
4317
4318 024306  004537  004322          4$:     JSR     R5,WRITEI       ;ZERO OUT THE ALL OF THE TEST AREA
4319 024312  000000                  6$:     .WORD   0
4320 024314  000000                          0
4321 024316  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
4322 024320                                  ERROR                   ;ELSE, REPORT IT
     024320  104460                                                          TRAP    C$ERROR
4323 024322                                  ESCAPE  TST             ;       AND EXIT THIS TEST
     024322  104410                                                          TRAP    C$ESCAPE
     024324  000614                                                          .WORD   L10040-.
4324 024326  005237  024312                  INC     6$              ;POINT TO NEXT LOCATION
4325 024332  077313                          SOB     R3,4$           ;IF MORE TO BE DONE, DO IT
4326 024334  105037  002450                  CLRB    TMP4            ;THIS IS WHAT WE JUST SET ALL RAM LOCATIONS TO
4327
4328                                    ;---------- BEGINNING OF OUTER LOOP ----------------------------------------
4329
4330 024340  005037  002472          8$:     CLR     TMPD            ;"SET FWD SEQUENCE"  (DIRECTION FLAG)
4331 024344  005037  002466                  CLR     TMPB            ;"SET BIT POSITION = 0"  (BIT POINTER)
4332                                                                  ;"SET ADDRESS = 0"  BUT OUR MEMORY STARTS @
4333                                                                  ;    18 HEX.  SO:
4334 024350  005037  002464                  CLR     TMPA            ;       INITIALIZE ADDRESS POINTER
4335 024354  112737  000001  002451          MOVB    #BIT0,TMP4+1    ;INITIALIZE CURRENT & NEXT DATA BYTES
4336
4337                                    ;---------- "READ CURRENT ADDRESS" ------------------------------------------
4338
4339 024362  000240                  10$:    NOP
4340 024364  000240                          NOP
4341 024366                                  BREAK                   ;FIRST SEE IF A ↑C HAS BEEN STRUCK BY OPERATOR
     024366  104422                                                          TRAP    C$BRK
4342 024370  013737  002464  024402          MOV     TMPA,40$        ;NO,  PUT ADDRESS INTO READ CALL
4343 024376  004537  004064                  JSR     R5,READ         ;GO READ ONE LOCATION
4344 024402  000000                  40$:    0                       ;**** MODIFIED ABOVE **** (ADDRESS)
4345 024404  002452                          TMP5                    ;ADDRESS OF DATA READ
4346 024406  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
4347 024410                                  ERROR                   ;ELSE, REPORT IT
     024410  104460                                                          TRAP    C$ERROR
4348 024412                                  ESCAPE  TST             ;       AND EXIT THIS TEST
     024412  104410                                                          TRAP    C$ESCAPE
     024414  000524                                                          .WORD   L10040-.
4349
4350                                    ;---------- CHECK DATA (FIRST TIME) -----------------------------------------
4351
4352 024416  000240                          NOP
4353 024420  000240                          NOP
4354 024422  123737  002452  002450          CMPB    TMP5,TMP4       ;CHECK AGAINST EXPECTED DATA
4355 024430  001421                          BEQ     12$             ;IF OK, PROCEED
4356 024432  032737  000006  002476          BIT     #BIT1+BIT2,TMPF ;NO,  HAS AN ERROR ALREADY BEEN REPORTED?
4357 024440  001010                          BNE     42$             ;YES, JUST PRINT DATA IF WANTED
4358 024442  012737  000002  002476          MOV     #BIT1,TMPF      ;NO,  SET FLAG FOR NEXT TIME
4359 024450                                  GEDF    EM48A,ERR48     ;  AND PRINT COMPLETE ERROR MESSAGE
                                                                     ;       "DEVICE FATAL" ERROR # 25
```

TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)

```
        024450  104455                                                                   TRAP    C$ERDF
        024452  000031                                                                   .WORD   25
        024454  016016                                                                   .WORD   EM48A
        024456  007632                                                                   .WORD   ERR48
4360    024460  000405                  BR      12$             ;PROCEED WITH TESTING
4361    024462  012737  000002  002476  42$:    MOV     #BIT1,TMPF      ;INDICATE A "PRE" WRITE ERROR
4362    024470  004737  010030          JSR     PC,ERR48.       ;USE ERROR HANDLER ONLY -- NO HEADER
4363
4364                                    ;----------  WRITE NEW DATA  ----------------------------------------------------
4365
4366    024474  013737  002464  024506  12$:    MOV     TMPA,44$        ;GET THIS ADDRESS FOR THIS WRITE CALL
4367    024502  004537  004310          JSR     R5,WRITE        ;WRITE THE UPDATED DATA IN THIS LOCATION
4368    024506  000000                  44$:    .WORD   0
4369    024510  002451                          TMP4+1          ;NEW DATA ELEMENT RESIDES IN TMPD+1
4370    024512  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
4371    024514                          ERROR                   ;ELSE, REPORT IT
        024514  104460                                                                   TRAP    C$ERROR
4372    024516                          ESCAPE  TST             ;       AND EXIT THIS TEST
        024516  104410                                                                   TRAP    C$ESCAPE
        024520  000420                                                                   .WORD   L10040-.
4373
4374                                    ;----------  RE-"READ CURRENT ADDRESS"  ------------------------------------------
4375
4376    024522  013737  002464  024534  MOV     TMPA,46$        ;GET ADDRESS FOR THIS READ
4377    024530  004537  004064          JSR     R5,READ         ;READ DATA JUST WRITTEN
4378    024534  000000                  46$:    .WORD   0
4379    024536  002452                          TMP5
4380    024540  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
4381    024542                          ERROR                   ;ELSE, REPORT IT
        024542  104460                                                                   TRAP    C$ERROR
4382    024544                          ESCAPE  TST             ;       AND EXIT THIS TEST
        024544  104410                                                                   TRAP    C$ESCAPE
        024546  000372                                                                   .WORD   L10040-.
4383
4384                                    ;----------  CHECK NEW DATA VALUE  ----------------------------------------------
4385
4386    024550  000240                  NOP
4387    024552  000240                  NOP
4388    024554  123737  002451  002452  CMPB    TMP4+1,TMP5     ;DID THE WRITE WORK CORRECTLY?
4389    024562  001421                  BEQ     14$             ;YES,  PROCEED WITH TESTING
4390    024564  032737  000006  002476  BIT     #BIT1+BIT2,TMPF ;NO,  HAS AN ERROR ALREADY BEEN REPORTED?
4391    024572  001010                  BNE     48$             ;YES, ONLY USE ERROR HANDLER -- NO HEADER PLEASE
4392    024574  012737  000004  002476  MOV     #BIT2,TMPF      ;NO,  INDICATE THAT WE'RE PRINTING A HEADER HERE
4393    024602                          GEDF    EM48A,ERR48     ;REPORT RE-WRITE ERROR
                                                                ;       "DEVICE FATAL" ERROR # 26
        024602  104455                                                                   TRAP    C$ERDF
        024604  000032                                                                   .WORD   26
        024606  016016                                                                   .WORD   EM48A
        024610  007632                                                                   .WORD   ERR48
4394    024612  000405                  BR      14$             ;PROCEED WITH TESTING
4395
4396    024614  012737  000004  002476  48$:    MOV     #BIT2,TMPF      ;INDICATE A "POST" WRITE ERROR
4397    024622  004737  010030          JSR     PC,ERR48.       ;JUST REPORT DATA -- NO HEADER
4398
4399
4400                                    ;----------  "FORWARD SEQUENCE ?"  -----------------------------------------------
4401    024626  000240                  14$:    NOP
```

TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)

```
4402 024630  005737  002472                    TST     TMPD            ;CHECK DIRECTION -- 0 = FORWARD
4403 024634  001056                            BNE     26$             ;REVERSE ===> PROCESS REVERSE ADDRESSING
4404                                                                   ;FORWARD
4405
4406                                ;----------  PROCESS FORWARD SEQUENCE -- "LAST ADDRESS"  ----------
4407
4408 024636  000240                16$:    NOP
4409 024640  023737  002464  002474          CMP     TMPA,TMPE       ;WAS THIS ADDR. THE LAST ONE?
4410 024646  001413                          BEQ     18$             ;YES, THEN CHECK THE BIT POSITION
4411 024650  005237  002464        50$:    INC     TMPA            ;NO,  THEN INCREMENT THE ADDR.
4412
4413                                ;  HERE WE MAKE SURE THE ADDRESS IS NOT WITHIN THE SELECT REGISTER AREA.  IF IT
4414                                ;  IS, WE WON'T USE IT -- BUT GO BACK AND DECREMENT TO THE NEXT ADDRESS AGAIN.
4415
4416 024654  022737  000020  002464  51$:    CMP     @SLTO,TMPA      ;IS IT BELOW THE AREA WE CAN'T CHECK?
4417 024662  101237                          BHI     10$             ;YES, THEN WE CAN CHECK THIS LOCATION -- DO IT
4418 024664  023737  002440  002464          CMP     TMPO,TMPA       ;IS IT BELOW THE BOTTOM ADDRESS?
4419 024672  101633                          BLOS    10$             ;NO,  TEST THIS LOCATION
4420 024674  000765                          BR      50$             ;YES, PERFORM THE INCREMENT AGAIN
4421
4422                                ;----------  "FWD" SEQUENCE -- "LAST BIT POSITION?"  ----------
4423
4424 024676  000240                18$:    NOP
4425 024700  005037  010024                CLR     ER48CT          ;RESET ERROR PRINT COUNT
4426 024704  023727  002466  000007        CMP     TMPB,#7         ;DID WE JUST PROCESS THE LAST BIT POSITION?
4427 024712  002016                          BGE     20$             ;YES, THEN WERE WE DOING 1'S OR 0'S
4428 024714  005237  002466                INC     TMPB            ;NO,  THEM INCREMENT THE BIT COUNTER
4429 024720  005037  002464        24$:    CLR     TMPA            ;RE-INITIALIZE ADDRESS POINTER
4430 024724  113737  002451  002450  57$:    MOVB    TMP4+1,TMP4     ;USE "NEXT" DATA AS "CURRENT" DATA
4431 024732  013700  002470                MOV     TMPC,R0         ;USE ONE BIT OF THE "DATA" SWITCH TO
4432 024736  006000                          ROR     R0
4433 024740  106137  002451                ROLB    TMP4+1          ;BUILD A NEW "NEXT" DATA VALUE
4434 024744  000137  024362        55$:    JMP     10$             ;       & TEST IT
4435
4436                                ;----------  "FWD" SEQUENCE -- "DATA = 1?"  ----------
4437
4438 024750  000240                20$:    NOP
4439 024752  005037  002466                CLR     TMPB            ;POINT TO BIT 0,
4440 024756  005137  002470                COM     TMPC            ;SWITCH DATA.  IF 1'S, DO 0'S;  IF 0'S DO 1'S
4441 024762  001756                          BEQ     24$             ;IF WENT TO FORWARD, .....
4442 024764  005137  002472                COM     TMPD            ;SWITCH DIRECTION
4443 024770  000755                          BR      57$             ;ELSE, BACKWARD.....
4444
4445                                ;----------  "BKWD" SEQUENCE -- "ADDRESS = 0?"  ----------
4446
4447 024772  000240                26$:    NOP
4448 024774  005737  002464                TST     TMPA            ;HAVE WE JUST PROCESSED THE FIRST ADDRESS?
4449 025000  001413                          BEQ     28$             ;YES,  CHECK BIT POSITION
4450 025002  005337  002464        52$:    DEC     TMPA            ;NO,   DECREMENT THE ADDRESS
4451
4452                                ;  HERE WE MAKE SURE THE ADDRESS IS NOT WITHIN THE SELECT REGISTER AREA.  IF IT
4453                                ;  IS, WE WON'T USE IT -- BUT GO BACK AND DECREMENT TO THE NEXT ADDRESS AGAIN.
4454
4455 025006  022737  000020  002464  56$:    CMP     @SLTO,TMPA      ;IS IT BELOW THE AREA WE CAN'T CHECK?
4456 025014  101031                          BHI     58$             ;YES, THEN WE CAN CHECK THIS LOCATION -- DO IT
4457 025016  023737  002440  002464          CMP     TMPO,TMPA       ;IS IT BELOW THE BOTTOM ADDRESS?
4458 025024  101425                          BLOS    58$             ;NO,  TEST THIS LOCATION
```

```
4459 025026  000765                        BR      52$             ;YES, PERFORM THE DECREMENT AGAIN
4460
4461                                ;---------- "BKWD" SEQUENCE -- "LAST BIT POSITION" ----------
4462
4463 025030  000240                 28$:   NOP
4464 025032  005037  010024                CLR     ER48CT          ;RESET ERROR PRINT COUNT
4465 025036  022737  000007  002466        CMP     #7,TMPB         ;LAST BIT POSITION?
4466 025044  003417                        BLE     30$             ;YES, CHECK DATA
4467 025046  005237  002466                INC     TMPB            ;NO,  INCREMENT BIT POINTER,
4468 025052  113737  002451  002450 29$:   MOVB    TMP4+1,TMP4     ;USE "NEXT" DATA AS "CURRENT" DATA
4469 025060  013700  002470                MOV     TMPC,R0         ;USE ONE BIT OF THE "DATA" SWITCH TO
4470 025064  006000                        ROR     R0
4471 025066  106137  002451                ROLB    TMP4+1          ;BUILD A NEW "NEXT" DATA VALUE
4472 025072  013737  002474  002464        MOV     TMPE,TMPA       ;       POINT TO LAST ADDRESS AGAIN,
4473 025100  000137  024362          58$:  JMP     10$             ;       & TEST IT
4474
4475                                ;---------- "BKWD" SEQUENCE -- "DATA = 1?" ----------
4476
4477 025104  000240                 30$:   NOP
4478 025106  005137  002470                COM     TMPC            ;SWITCH DATA TYPE
4479 025112  001003                        BNE     32$             ;NOW 1'S -- CHECK ADDRESS'S "LSB"
4480 025114  005037  002466                CLR     TMPB            ;NOW 0'S -- POINT TO BIT POSITION 0 AGAIN
4481 025120  000754                        BR      29$             ;       RESET ADDRESS & TEST IT
4482
4483
4484                                ;---------- "STOP" ----------
4485
4486 025122  000240                 32$:   NOP
4487 025124  004537  004322          38$:  JSR     R5,WRITEI       ;CLEAR RAM LOCATION 0083 (HEX) & EXIT
4488 025130  000173                        173                     ;       (THIS CONVERTS TO 0083 HEX.)
4489 025132  000000                        0                       ;       (THIS WE HOPE, WILL CLEAR IT)
4490 025134  103001                        BCC     .+4             ;IF NO ERROR, PROCEED
4491 025136                                ERROR                   ;ELSE, REPORT IT
     025136  104460                                                                TRAP    C$ERROR
4492 025140                                ENDTST                  ;THATS ALL FOLKS!
     025140                                                                L10040:
     025140  104401                                                            TRAP    C$ETST
4493
4494                                ;=============================================================================
                                    .EVEN
```

```
                                        .SBTTL TEST 11 -- VIA REGISTER ADRESSING

                                        ;*+*******************************************************************
                                        ;*
                                        ;*      TEST 11 -- VIA REGISTER ADRESSING
                                        ;*
                                        ;*      VIA == "6522 VERSATILE INTERFACE ADAPTER"
                                        ;*
                                        ;* A MASTER CLEAR IS PERFORMED, NEXT, TIMER 1 LATCHES
                                        ;* ARE CLEARED BY WRITING 000 INTO VIA REGS 6 & 7
                                        ;* THEN, 377 IS LOADED INTO DATA DIRECTION REGISTERS A, B (DDRA,DDRB) TO
                                        ;* SET THE PORT PINS FOR OUTPUT MODE.
                                        ;* THEN, A DIFFERENT BYTE OF DATA PATTERN C IS WRITTEN INTO EACH VIA
                                        ;* LOCATION, (EXCEPT THE TIMER REGS 4,5,10,11 OCT) AND AFTER EACH IS WRITTEN,
                                        ;* ALL VIA REGS (EXCEPT 4,5,10,11) ARE READ AND COMPARED TO EXPECTED
                                        ;* CONTENTS. NOTE THAT SOME VIA REGS ARE ALTERED BY THE LOADING OF OTHERS,
                                        ;* AND THE PROGRAM TAKES THIS INTO ACCOUNT, IN THE SETTING OF EXPECTED REG
                                        ;* VALUES. THE DATA PATTERN IS CHOSEN TO AVOID ACTIVATING THE VIA CHIP (SUCH
                                        ;* AS GENERATING OUTPUTS ON CA1, CA2, CB1, CB2, OR CAUSING 6502
                                        ;* INTERRUPT REQUESTS).
                                        ;*  DATA PATTERN C (WITH VIA REGS AND THEIR DATA SHOWN IN OCTAL) :
                                        ;*   REGISTER =  00   01   02   03   06   07   12   13   14   15   16   17
                                        ;*       DATA = 100, 101, 377, 377, 106, 107, 112, 040, 042, 000, 200, 117
                                        ;* NEXT, 000 IS LOADED INTO DDRA, AND DDRB IS READ AND COMPARED TO 377. THEN,
                                        ;* THE 377 IS LOADED BACK INTO DDRA, AND DDRB IS LOADED WITH 000 AND DDRA IS
                                        ;* READ AND COMPARED TO 377.
                                        ;*
                                        ;--*******************************************************************
                                        ;       BGNTST
     025142                                                                                 T11::
     025142  004737  003762                     JSR     PC,MSTCLR       ;INIT DMV AND START UP THE MAINT. LOOP
     025146  103002                             BCC     1$              ;IF NO ERROR, PROCEED
     025150                                     ERROR                   ;ELSE,  REPORT IT AND
     025150  104460                                                                         TRAP    C$ERROR
     025152  000546                             BR      25$             ;       EXIT THIS CLEAR

     025154  004537  004322             1$:     JSR     R5,WRITEI       ;CLEAR THE TIMER 1 LATCHES
     025160  120006                             T1LL
     025162  000000                             0
     025164  103002                             BCC     30$             ;IF AN ERROR OCCURED,
     025166                                     ERROR                   ;REPORT IT &
     025166  104460                                                                         TRAP    C$ERROR
     025170  000537                             BR      25$             ;  EXIT
     025172  004537  004322             30$:    JSR     R5,WRITEI
     025176  120007                             T1LH
     025200  000000                             0
     025202  103002                             BCC     31$             ;IF AN ERROR OCCURED,
     025204                                     ERROR                   ;REPORT IT &
     025204  104460                                                                         TRAP    C$ERROR
     025206  000530                             BR      25$             ;  EXIT


                                        ; LOAD UP THE VIA'S REGISTERS WITH THE FIXED DATA STREAM OF PATTERN "C"

     025210  013703  002556             31$:    MOV     PATC,R3         ;GET COUNT OF # OF WRITES TO BE PERFORMED
     025214  012702  002560                     MOV     #PATC+2,R2      ;SETUP POINTER TO REGISTER ADDRESSES & DATA

```

```
4544 025220  012737  120000  025242  2$:     MOV     #ORB,4$         ;ADDRESS OF FIRST REGISTER
4545 025226  152237  025242                  BISB    (R2)+,4$        ;OR IN REGISTER # TO BUILD REGISTER ADDRESS
4546 025232  112237  025244                  MOVB    (R2)+,5$        ;THIS IS THE DATA WE WANT TO WRITE
4547
4548 025236  004537  004322                  JSR     R5,WRITEI       ;WRITE ONE REGISTER WITH THE DESIRED DATA
4549 025242  000000                  4$:     0                       ;*** MODIFIED FROM ABOVE ***  DESTINATION ADDR.
4550 025244  000000                  5$:     0                       ;*** MODIFIED FROM ABOVE ***  DATA
4551
4552 025246  103002                          BCC     32$             ;IF AN ERROR OCCURED,
4553 025250                                  ERROR                   ;REPORT IT &
     025250  104460                                                                  TRAP    C$ERROR
4554 025252  000506                          BR      25$             ;  EXIT
4555 025254  077317                  32$:    SOB     R3,2$           ;LOOP UNTIL THE WHOLE TABLE HAS BEEN WRITTEN
4556
4557                                 ; READ BACK THE VIA'S REGISTERS
4558
4559 025256  012703  000020                  MOV     #PATCM-PATCR,R3 ;GET COUNT OF # OF REG'S TO BE READ
4560 025262  012737  120000  025302          MOV     #ORB,7$         ;ADDRESS OF FIRST REGISTER
4561 025270  012737  003122  025304          MOV     #BT1,8$         ;DESTINATION BUFFER AREA
4562
4563 025276  004537  004064          6$:     JSR     R5,READ         ;READ ONE REGISTER
4564 025302  000000                  7$:     0                       ;*** MODIFIED FROM ABOVE ***  SOURCE ADDRESS
4565 025304  000000                  8$:     0                       ;*** MODIFIED IN LINE *** DESTINATION ADDRESS
4566 025306  103002                          BCC     33$             ;IF AN ERROR OCCURED,
4567 025310                                  ERROR                   ;REPORT IT &
     025310  104460                                                                  TRAP    C$ERROR
4568 025312  000466                          BR      25$             ;  EXIT
4569
4570 025314  005237  025302          33$:    INC     7$              ;POINT TO NEXT REGISTER
4571 025320  005237  025304                  INC     8$              ;POINT TO NEXT BUFFER LOCATION
4572 025324  077314                          SOB     R3,6$           ;LOOP UNTIL ALL REGISTERS HAVE BEEN READ
4573
4574                                 ; CHECK THE VALUES READ AGAINST THE EXPECTED VALUES
4575
4576 025326  012701  002604                  MOV     #PATCR,R1       ;POINTER TO EXPECTED DATA VALUES
4577 025332  012702  003122                  MOV     #BT1,R2         ;POINTER TO DATA READ
4578 025336  012704  003206                  MOV     #BT2,R4         ;POINTER TO "XOR" VALUES
4579 025342  012705  002624                  MOV     #PATCM,R5       ;POINTER TO "MASK" VALUES
4580 025346  012703  000010                  MOV     #8.,R3          ;NUMBER OF WORDS TO BE PROCESSED
4581 025352  005037  002332                  CLR     ERRFLG          ;RESET THE ERROR FLAG
4582
4583 025356  012114                  9$:     MOV     (R1)+,(R4)      ;GET EXPECTED VALUE (2 BYTES AT A TIME)
4584 025360  012200                          MOV     (R2)+,R0        ;GET ACTUAL VALUE AND SETUP FOR "XOR"
4585 025362  074014                          XOR     R0,(R4)         ;DEVELOPE "XOR"
4586 025364  042524                          BIC     (R5)+,(R4)+     ;CLEAR THOSE BITS WE DON'T CARE ABOUT
4587 025366  001402                          BEQ     10$             ;IF NO ERROR, SKIP NEXT INSTRUCTION
4588 025370  005237  002332                  INC     ERRFLG          ;IF ERROR,  SET FLAG TO SAY SO!
4589 025374  077310                  10$:    SOB     R3,9$           ;LOOP UNTIL ALL VALUES CHECKED
4590
4591 025376  005737  002332                  TST     ERRFLG          ;WAS THERE AN ERROR DETECTED?
4592 025402  001406                          BEQ     12$             ;NO,  PROCEED WITH TESTING
4593 025404                                  GEDF    EM20,ERR6       ;YES, REPORT A VIA REGISTER ERROR
                                             ;       "DEVICE FATAL" ERROR # 27
     025404  104455                                                                  TRAP    C$ERDF
     025406  000033                                                                  .WORD   27
     025410  015243                                                                  .WORD   EM20
     025412  005650                                                                  .WORD   ERR6
```

TEST 11 -- VIA REGISTER ADRESSING

```
4594 025414                                ESCAPE  TST             ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
     025414  104410                                                                TRAP    C$ESCAPE
     025416  000344                                                                .WORD   L10041-.
4595
4596
4597
4598 025420  004537  004176        12$:    JSR     R5,READI        ;GET THE CURRENT VALUE OF THE VIA'S
4599 025424  120003                        DDRA                    ;    "DDRA" REGISTER FOR LATER ERROR CHECKING
4600 025426  000000                15$:    0
4601 025430  103002                        BCC     34$             ;IF AN ERROR OCCURED,
4602 025432                                ERROR                   ;REPORT IT &
     025432  104460                                                                TRAP    C$ERROR
4603 025434  000415                        BR      25$             ;  EXIT
4604 025436  004537  004322        34$:    JSR     R5,WRITEI       ;LOAD DDRB WITH 000
4605 025442  120002                        DDRB
4606 025444  000000                        0
4607 025446  103002                        BCC     35$             ;IF AN ERROR OCCURED,
4608 025450                                ERROR                   ;REPORT IT &
     025450  104460                                                                TRAP    C$ERROR
4609 025452  000406                        BR      25$             ;  EXIT
4610 025454  004537  004064        35$:    JSR     R5,READ         ;READ IT BACK AND CHECK IT
4611 025460  120002                        DDRB
4612 025462  002312                        BDATA
4613 025464  103002                        BCC     36$             ;IF AN ERROR OCCURED,
4614 025466                                ERROR                   ;REPORT IT &
     025466  104460                                                                TRAP    C$ERROR
4615 025470  000534                25$:    BR      24$             ;  EXIT
4616 025472  105737  002312        36$:    TSTB    BDATA           ;THIS SHOULD NOW BE ZERO
4617 025476  001413                        BEQ     14$             ;IT IS, PRECEDE TESTING
4618 025500  105037  002310                CLRB    GDATA           ;IT ISN'T!  SETUP FOR & REPORT ERROR
4619 025504  012737  000002  002334        MOV     #2,REGNUM       ;IDENTIFY THE DDRB REG.
4620 025512                                GEDF    EM21,ERR7       ;       REPORT ERROR
                                                                   ;       "DEVICE FATAL" ERROR # 28
     025512  104455                                                                TRAP    C$ERDF
     025514  000034                                                                .WORD   28
     025516  015442                                                                .WORD   EM21
     025520  006612                                                                .WORD   ERR7
4621 025522                                ESCAPE TST              ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
     025522  104410                                                                TRAP    C$ESCAPE
     025524  000236                                                                .WORD   L10041-.
4622
4623 025526  113737  025426  002310  14$:    MOVB    15$,GDATA       ;THIS IS WHAT WE EXPECT TO READ NOW
4624 025534  004537  004064                JSR     R5,READ         ;READ BACK DDRA -- IT SHOULD BE = 366
4625 025540  120003                        DDRA
4626 025542  002312                        BDATA
4627 025544  103002                        BCC     37$             ;IF AN ERROR OCCURED,
4628 025546                                ERROR                   ;REPORT IT &
     025546  104460                                                                TRAP    C$ERROR
4629 025550  000504                        BR      24$             ;  EXIT
4630 025552  123737  002310  002312  37$:    CMPB    GDATA,BDATA     ;IS IT REALLY A 377?
4631 025560  001411                        BEQ     16$             ;YES, PROCEED WITH TESTING
4632 025562  012737  000003  002334        MOV     #3,REGNUM       ;IDENTIFY THE DDRA REG.
4633 025570                                GEDF    EM22,ERR7       ;NO.    REPORT ERROR
                                                                   ;       "DEVICE FATAL" ERROR # 29
     025570  104455                                                                TRAP    C$ERDF
     025572  000035                                                                .WORD   29
     025574  015477                                                                .WORD   EM22
```

```
        025576  006612                                                          .WORD   ERR7
4634    025600                          ESCAPE TST              ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
        025600  104410                                                          TRAP    C$ESCAPE
        025602  000160                                                          .WORD   L10041-.
4635
4636    025604  004537  004322    16$:  JSR     R5,WRITEI       ;RE-LOAD DDRB WITH 377
4637    025610  120002                  DDRB
4638    025612  177777              17$:-1
4639    025614  103002                  BCC     38$             ;IF AN ERROR OCCURED,
4640    025616                          ERROR                   ;REPORT IT &
        025616  104460                                                          TRAP    C$ERROR
4641    025620  000460                  BR      24$             ;  EXIT
4642    025622  004537  004322    38$:  JSR     R5,WRITEI       ;AND NOW CLEAR DDRA TO ZEROS
4643    025626  120003                  DDRA
4644    025630  000000                  0
4645    025632  103002                  BCC     39$             ;IF AN ERROR OCCURED,
4646    025634                          ERROR                   ;REPORT IT &
        025634  104460                                                          TRAP    C$ERROR
4647    025636  000451                  BR      24$             ;  EXIT
4648
4649    025640  004537  004064    39$:  JSR     R5,READ         ;NOW, DID DDRA GO TO ZEROES
4650    025644  120003                  DDRA
4651    025646  002312                  BDATA
4652    025650  105737  002312          TSTB    BDATA
4653    025654  001413                  BEQ     18$             ;YES, BUT WHAT ABOUT DDRB?
4654    025656  105037  002310          CLRB    GDATA           ;NO,  SETUP FOR AND
4655    025662  012737  000003  002334  MOV     #3,REGNUM       ;IDENTIFY THE DDRA REG.
4656    025670                          GEDF    EM21,ERR7       ;       REPORT THE ERROR
                                                                ;       "DEVICE FATAL" ERROR # 30
        025670  104455                                                          TRAP    C$ERDF
        025672  000036                                                          .WORD   30
        025674  015442                                                          .WORD   EM21
        025676  006612                                                          .WORD   ERR7
4657    025700                          ESCAPE  TST             ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
        025700  104410                                                          TRAP    C$ESCAPE
        025702  000060                                                          .WORD   L10041-.
4658
4659    025704  004537  004064    18$:  JSR     R5,READ         ;WHAT ABOUT DDRB -- IT SHOULD BE 377 NOW
4660    025710  120002                  DDRB
4661    025712  002312                  BDATA
4662    025714  103002                  BCC     40$             ;IF AN ERROR OCCURED,
4663    025716                          ERROR                   ;REPORT IT &
        025716  104460                                                          TRAP    C$ERROR
4664    025720  000420                  BR      24$             ;  EXIT
4665    025722  123737  002312  025612  40$:  CMPB    BDATA,17$       ;IS IT?
4666    025730  001414                  BEQ     24$             ;YES, EXIT TEST
4667    025732  113737  025612  002310  MOVB    17$,GDATA       ;NO,  SETUP FOR AND
4668    025740  012737  000002  002334  MOV     #2,REGNUM       ;IDENTIFY THE DDRB REG.
4669    025746                          GEDF    EM22A,ERR7      ;       REPORT ERROR
                                                                ;       "DEVICE FATAL" ERROR # 31
        025746  104455                                                          TRAP    C$ERDF
        025750  000037                                                          .WORD   31
        025752  015532                                                          .WORD   EM22A
        025754  006612                                                          .WORD   ERR7
4670    025756                          ESCAPE  TST             ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
        025756  104410                                                          TRAP    C$ESCAPE
        025760  000002                                                          .WORD   L10041-.
```

```
   4671
   4672 025762                            24$:    ENDTST
        025762                                                                          L10041:
        025762  104401                                                                          TRAP    C$ETST
```

```
4684                                         .SBTTL TEST 12 -- VIA'S DDRB DATA READ/WRITE

                                             ;*-*****************************************************************************
                                             ;*
                                             ;*       TEST 12. -- VIA'S DDRB DATA READ/WRITE
                                             ;*
                                             ;*       DDRB == "DATA DIRECTION REGISTER B"
                                             ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
                                             ;* READ/WRITE BITS 0-7 OF VIA DATA DIRECTION REGISTER B ARE TESTED BY WRITING,
                                             ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
                                             ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                             ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                             ;*
                                             ;--*****************************************************************************
                                             ;
                                             ;        BGNTST
      025764                                                                                  T12::
4685  025764  004737  003762                          JSR     PC,MSTCLR        ;INIT DMV & START UP THE MAINT. LOOP
4686  025770  103003                                  BCC     30$              ;IF AN ERROR OCCURED,
4687  025772                                          ERROR                    ;REPORT IT &
      025772  104460                                                                                     TRAP    C$ERROR
4688  025774                                          ESCAPE  TST              ;  EXIT
      025774  104410                                                                                     TRAP    C$ESCAPE
      025776  000046                                                                                     .WORD   L10042-.
4689
4690  026000  012701  002526                 30$:     MOV     #PATB,R1         ;POINT TO PATTERN TABLE
4691  026004  012103                                  MOV     (R1)+,R3         ;GET # OF ENTRIES IN TABLE
4692
4693  026006                                 T12.LP:
4694  026006                                          BGNSUB                   ;THE SUBTEST ONLY TESTS THE ONE PATTERN
      026006                                                                                  T12.1:
      026006  104402                                                                                     TRAP    C$BSUB
4695
4696  026010  111137  002306                          MOVB    (R1),TDATA       ;SETUP TEST DATA BYTE FOR "STREG"
4697  026014  112137  002310                          MOVB    (R1)+,GDATA      ;SETUP EXPECTED DATA BYTE FOR "STREG"
4698  026020  012700  120002                          MOV     #DDRB,R0         ;SPECIFY THE REGISTER BEING TESTED
4699  026024  004737  005034                          JSR     PC,STREG         ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
4700  026030  103003                                  BCC     10$              ;WAS AN ERROR FOUND?
4701  026032                                          ERROR                    ;YES, REPORT IT AND...
      026032  104460                                                                                     TRAP    C$ERROR
4702  026034                                          ESCAPE  TST              ;      EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
      026034  104410                                                                                     TRAP    C$ESCAPE
      026036  000006                                                                                     .WORD   L10042-.
4703
4704  026040                                 10$:     ENDSUB
      026040                                                                                  L10043:
      026040  104403                                                                                     TRAP    C$ESUB
4705
4706  026042  077317                                  SOB     R3,T12.LP        ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
4707                                                                           ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
4708
4709  026044                                          ENDTST
      026044                                                                                  L10042:
      026044  104401                                                                                     TRAP    C$ETST
```

```
                                   .SBTTL TEST 13 -- VIA'S DDRA DATA READ/WRITE

                                   ;+*************************************************************************
                                   ;*
                                   ;*      TEST 13 -- VIA'S DDRA DATA READ/WRITE
                                   ;*
                                   ;*      DDRA == "DATA DIRECTION REGISTER A"
                                   ;*
                                   ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
                                   ;* READ/WRITE BITS 0-7 OF VIA DATA DIRECTION REGISTER A ARE TESTED BY WRITING,
                                   ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
                                   ;*    DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                   ;*                     200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                   ;*
                                   ;--*************************************************************************
                                   ;       BGNTST
026046                                                                               T13::
026046  004737  003762                     JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
026052  103003                             BCC     30$             ;IF AN ERROR OCCURED,
026054                                     ERROR                   ;REPORT IT &
026054  104460                                                                               TRAP    C$ERROR
026056                                     ESCAPE  TST             ;  EXIT
026056  104410                                                                               TRAP    C$ESCAPE
026060  000046                                                                    .          .WORD   L10044-.

026062  012701  002526             30$:    MOV     #PATB,R1        ;POINT TO PATTERN TABLE
026066  012103                             MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE

026070                             T13.LP:
026070                                     BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
026070                                                                               T13.1:
026070  104402                                                                               TRAP    C$BSUB

026072  111137  002306                     MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
026076  112137  002310                     MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
026102  012700  120003                     MOV     #DDRA,R0        ;SPECIFY THE REGISTER BEING TESTED
026106  004737  005034                     JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
026112  103003                             BCC     10$             ;WAS AN ERROR FOUND?
026114                                     ERROR                   ;YES, REPORT IT AND
026114  104460                                                                               TRAP    C$ERROR
026116                                     ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
026116  104410                                                                               TRAP    C$ESCAPE
026120  000006                                                                               .WORD   L10044-.

026122                             10$:    ENDSUB
026122                                                                               L10045:
026122  104403                                                                               TRAP    C$ESUB

026124  077317                             SOB     R3,T13.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
                                                                   ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST

026126                                     ENDTST
026126                                                                               L10044:
026126  104401                                                                               TRAP    C$ETST
```

```
4761                                   .SBTTL TEST 14 -- VIA'S ORB DATA READ/WRITE

                                       ;++*********************************************************************
                                       ;*
                                       ;*        TEST 14 -- VIA'S ORB DATA READ/WRITE
                                       ;*
                                       ;*        ORB == "OUTPUT REGISTER PORT B"
                                       ;*
                                       ;* FIRST, A MASTER CLEAR IS PERFORMED. NEXT, 377 IS LOADED INTO DATA
                                       ;* DIR. REG. B (DDRB) TO SET ALL B PORT PINS FOR OUTPUT MODE. THEN ,
                                       ;* READ/WRITE BITS 0-7 OF VIA OUTPUT REG. PORT B ARE TESTED BY WRITING,
                                       ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
                                       ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                       ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                       ;*
                                       ;--*********************************************************************
                                       ;
                                       ;        BGNTST
     026130                                                                 T14::
4762 026130  004737  003762                      JSR     PC,MSTCLR          ;INIT DMV & START UP THE MAINT. LOOP
4763 026134  103003                              BCC     30$                ;IF AN ERROR OCCURED,
4764 026136                                      ERROR                      ;REPORT IT &
     026136  104460                                                                 TRAP    C$ERROR
4765 026140                                      ESCAPE  TST                ;  EXIT
     026140  104410                                                                 TRAP    C$ESCAPE
     026142  000066                                                                 .WORD   L10046-.
4766
4767 026144  004537  004322          30$:        JSR     R5,WRITEI          ;INITIALIZE PORT B FOR I/O
4768 026150  120002                              DDRB
4769 026152  177777                              -1
4770 026154  103003                              BCC     31$                ;IF AN ERROR OCCURED,
4771 026156                                      ERROR                      ;REPORT IT &
     026156  104460                                                                 TRAP    C$ERROR
4772 026160                                      ESCAPE  TST                ;  EXIT
     026160  104410                                                                 TRAP    C$ESCAPE
     026162  000046                                                                 .WORD   L10046-.
4773
4774 026164  012701  002526          31$:        MOV     #PATB,R1           ;POINT TO PATTERN TABLE
4775 026170  012103                              MOV     (R1)+,R3           ;GET # OF ENTRIES IN TABLE
4776
4777 026172                          T14.LP:
4778 026172                                      BGNSUB                     ;THE SUBTEST ONLY TESTS THE ONE PATTERN
     026172                                                                 T14.1:
     026172  104402                                                                 TRAP    C$BSUB
4779
4780 026174  111137  002306                      MOVB    (R1),TDATA         ;SETUP TEST DATA BYTE FOR "STREG"
4781 026200  112137  002310                      MOVB    (R1)+,GDATA        ;SETUP EXPECTED DATA BYTE FOR "STREG"
4782 026204  012700  120000                      MOV     #ORB,R0            ;SPECIFY THE REGISTER BEING TESTED
4783 026210  004737  005034                      JSR     PC,STREG           ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
4784 026214  103003                              BCC     10$                ;WAS AN ERROR FOUND?
4785 026216                                      ERROR                      ;YES, REPORT IT AND
     026216  104460                                                                 TRAP    C$ERROR
4786 026220                                      ESCAPE  TST                ;      EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
     026220  104410                                                                 TRAP    C$ESCAPE
     026222  000006                                                                 .WORD   L10046-.
4787
4788 026224                          10$:        ENDSUB
```

TEST 14 -- VIA'S ORB DATA READ/WRITE

```
        026224                                                          L10047:
        026224  104403                                                         TRAP    C$ESUB
  4789
  4790 026226  077317                    SOB     R3,T14.LP        ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
  4791                                                            ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
  4792
  4793 026230                            ENDTST
        026230                                                          L10046:
        026230  104401                                                         TRAP    C$ETST
```

```
   4854                         .SBTTL TEST 15 -- VIA'S T1 DATA READ/WRITE

                         ;+*****************************************************************************
                         ;*
                         ;*      TEST 15 -- VIA'S T1 DATA READ/WRITE
                         ;*
                         ;*      T1 == "TIMER #1"
                         ;*
                         ;* THIS TEST WRITES, READS, AND CHECKS THE T1 LATCHES AND COUNTER REGISTERS
                         ;* WITH DATA PATTERNS IN EACH OF 3 SUBTESTS.
                         ;*
                         ;*
                         ;* FIRST SUBTEST:  CHECKS FOR PROPER LOADING OF LATCHES
                         ;*      IT ALSO CHECKS TO BE SURE THAT THE COUNTER APPEARS TO BE DOING
                         ;*      SOMETHING TO THE COUNTERS.  AS LONG AS THEY HAVE CHANGED FROM THE
                         ;*      VALUE LOADED INTO THEM, WE WILL BE SATISFIED.
                         ;*
                         ;* A. A MASTER CLEAR IS PERFORMED.
                         ;* B. ALL LATCHES ARE LOADED TO ZEROES (JUST IN CASE), ACR6 & ACR7 ARE SET
                         ;*    TO ZERO (MODE 00), AND "T1" INTERRUPT ENABLE FLAG IS CLEARED.
                         ;*
                         ;* C. T1L-L(ADR 04) IS LOADED WITH THE CURRENT BYTE OF DATA PATTERN B.
                         ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
                         ;* E. T1C-L(ADR 04) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
                         ;*
                         ;* F. T1L-L(ADR 06) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
                         ;* G. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
                         ;*
                         ;* H. T1L-L(ADR 06) IS RE-LOADED WITH 0 TO MAKE T1C-H DECREMENT FAST.
                         ;*    T1L-H(ADR 05) IS LOADED WITH THE ORIGINAL TEST DATA PATTERN BYTE.
                         ;* I. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE LOADED INTO T1L-H.
                         ;*
                         ;* J. T1C-H(ADR 05) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
                         ;*
                         ;* K. T1L-H(ADR 07) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
                         ;* L. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE JUST LOADED.
                         ;*
                         ;* M. STEPS C-L ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
                         ;*
                         ;*
                         ;* SECOND SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
                         ;*                  FROM T1L-L TO T1L-H
                         ;*
                         ;* A. T1L-H(ADR 07) IS LOADED WITH 000 TO CLEAR IT.
                         ;* B. T1L-L(ADR 06) IS LOADED WITH A BYTE OF DATA PATTERN B.
                         ;* C. T1L-L(ADR 06) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
                         ;* D. T1L-H(ADR 07) IS READ AND COMPARED TO 000.
                         ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
                         ;*
                         ;*
                         ;* THIRD SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
                         ;*                  FROM T1L-H TO T1L-L
                         ;*
                         ;* A. T1L-L(ADR 04) IS LOADED WITH 000 TO CLEAR IT
                         ;* B. T1L-H(ADR 07) IS LOADED WITH A BYTE OF DATA PATTERN B.
                         ;* C. T1L-H(ADR 07) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
                         ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO 000.
```

```
                                ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
                                ;*
                                ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                ;*
                                ;--*************************************************************************
                                ;
                                ;       BGNTST
     026232                                                                     T15::
4855
4856
4857
                                ; ***---*** STEP A ***---***
4858 026232  004737  003762            JSR     PC,MSTCLR       ;INIT DMV & START UP M-LOOP
4859 026236  103003                    BCC     1$              ;IF NO ERRORS, PROCEED
4860 026240                            ERROR                   ;ELSE, REPORT ERROR &
     026240  104460                                                             TRAP    C$ERROR
4861 026242                            ESCAPE  TST             ;       GET OUT OF THE TEST
     026242  104410                                                             TRAP    C$ESCAPE
     026244  001030                                                             .WORD   L10050-.
4862 026246                    1$:
4863
4864
4865
                                ; ***---*** STEP B ***---***
4866 026246  004537  004660            JSR     R5,INITT1       ;INITIALIZE THE TIMER'S REGISTERS
4867 026252  000000                    0                       ; WITH ZEROES
4868 026254  000000                    .WORD   0               ; 00 --> ACR6 & ACR7 AND DISABLE INTERRUPTS
4869 026256  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
4870 026260                            ERROR                   ;ELSE, REPORT IT
     026260  104460                                                             TRAP    C$ERROR
4871 026262                            ESCAPE  TST             ;       AND EXIT THIS TEST
     026262  104410                                                             TRAP    C$ESCAPE
     026264  001010                                                             .WORD   L10050-.
4872
4873                            ;WE WANT THE LEAST ACTIVE OPERATING MODE FOR THIS TIMER WHILE WE ARE TESTING
4874                            ;IT.  THE MODE WE'RE USING HERE IS DOCUMENTED THUSLY:  "GENERATE A SINGLE
4875                            ;TIME-OUT INTERRUPT EACH TIME T1 IS LOADED.  PB7 DISABLED."
4876                            ;AS AN ADDED PRECAUTION, WE ARE DISABLING INTERRUPTS BY CLEARING THE "T1" FLAG
4877                            ;WITHIN "IER".
4878
4879 026266                            BGNSUB                  ;BEGIN THE FIRST SUBTEST
     026266                                                                     $T15.1:
     026266  104402                                                             TRAP    C$BSUB
4880 026270  012701  002526            MOV     #PATB,R1        ;POINT TO THE APPROPRIATE PATTERN TABLE
4881 026274  012103                    MOV     (R1)+,R3        ;EXTRACT THE BYTE COUNT FROM THE TABLE
4882
4883 026276                    T16.LP:
4884 026276  112137  002306            MOVB    (R1)+,TDATA     ;GET ONE BYTE OF THE TEST DATA
4885 026302  013737  002306  002310    MOV     TDATA,GDATA     ;THE TEST DATA IS NORMALLY THE GOOD DATA TOO
4886
4887 026310                            BGNSEG
     026310  104404                                                             TRAP    C$BSEG
4888
4889
                                ; ***---*** STEP C ***---***
4890
4891 026312  004537  004310            JSR     R5,WRITE        ;LOAD T1L-L(ADDR 04)
4892 026316  120004                    T1CL
4893 026320  002306                    TDATA                   ;THE TEST DATA FROM "TDATA"
```

```
                                    ; ***---*** STEP D *** --***
026322  004537  004064                      JSR     R5,READ         ;READ T1L-L(ADDR 06)
026326  120006                              T1LL
026330  002312                              BDATA
026332  123737  002310  002312              CMPB    GDATA,BDATA     ;AND CHECK IT
026340  001407                              BEQ     2$              ;IF OK, PROCEED
026342  012737  000006  002334              MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
026350                                      GEDF    EM20,ERR7       ; REPORT FAILURE
                                            ;       "DEVICE FATAL" ERROR # 32
026350  104455                                                      TRAP    C$ERDF
026352  000040                                                      .WORD   32
026354  015243                                                      .WORD   EM20
026356  006612                                                      .WORD   ERR7

                                    ; ***---*** STEP E ***---***
026360  004537  004064          2$:         JSR     R5,READ         ;READ T1C-L(ADDR 04)
026364  120004                              T1CL
026366  002312                              BDATA
026370  123737  002310  002312              CMPB    GDATA,BDATA     ;AND CHECK IT. SEEING AS THE TIMER IS RUNNING,
026376  001017                              BNE     4$              ;THIS MUST NOT EQUAL THE SET VALUE!
026400  004537  004064                      JSR     R5,READ         ;IF IT IS, MAYBE WE JUST READ IT AT THE WRONG
026404  120004                              T1CL                    ;TIME!  RE-READ AND CHECK ONE MORE TIME.
026406  002312                              BDATA
026410  123737  002310  002312              CMPB    GDATA,BDATA     ;CHECK IT AGAIN, SAM.
026416  001007                              BNE     4$              ;THIS TIME IT SHOULD BE DIFFERENT.
                                                                    ;OTHERWISE, WE HAVE A LEGITIMATE FAILURE
026420  012737  000004  002334              MOV     #4,REGNUM       ;  IDENTIFY THE FAILING REGISTER &
026426                                      GEDF    EM20A,ERR7      ;  REPORT FAILURE
                                            ;       "DEVICE FATAL" ERROR # 33
026426  104455                                                      TRAP    C$ERDF
026430  000041                                                      .WORD   33
026432  015275                                                      .WORD   EM20A
026434  006612                                                      .WORD   ERR7

                                    ; ***---*** STEP F ***---***
026436  105137  002306          4$:         COMB    TDATA           ;USE THE ONE'S COMPLEMENT THIS TIME
026442  105137  002310                      COMB    GDATA           ;THE EXPECTED DATA IS ALSO THE COMPLEMENT
026446  004537  004310                      JSR     R5,WRITE        ;LOAD T1L-L(ADDR 06)
026452  120006                              T1LL
026454  002306                              TDATA                   ;THE TEST DATA FROM "TDATA"

                                    ; ***---*** STEP G ***---***
026456  004537  004064          6$:         JSR     R5,READ         ;READ T1L-L(ADDR 06)
026462  120006                              T1LL
026464  002312                              BDATA
026466  123737  002310  002312              CMPB    GDATA,BDATA     ;AND CHECK IT
026474  001407                              BEQ     8$              ;IF OK, PROCEED
026476  012737  000006  002334              MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
026504                                      GEDF    EM20,ERR7       ; REPORT FAILURE
                                            ;       "DEVICE FATAL" ERROR # 34
026504  104455                                                      TRAP    C$ERDF
```

```
        026506  000042                                                          .WORD   34
        026510  015243                                                          .WORD   EM20
        026512  006612                                                          .WORD   ERR7
 4939
 4940                                   ; ***---*** STEP H ***---***
 4941
 4942 026514  105137  002306     8$:     COMB    TDATA           ;RESTORE THE DATA TO THE ORIGINAL VALUE
 4943 026520  105137  002310             COMB    GDATA
 4944 026524  004537  004322             JSR     R5,WRITEI       ;SET THE LOW LATCH TO MAKE SURE THE HIGH
 4945 026530  120006                     T1LL                    ;COUNTER IS DOING MOST OF THE WORK
 4946 026532  000001                     1
 4947 026534  004537  004310             JSR     R5,WRITE        ;LOAD T1L-H(ADDR 05)
 4948 026540  120005                     T1CH
 4949 026542  002306                     TDATA                   ;THE TEST DATA FROM "TDATA"
 4950
 4951                                   ; ***---*** STEP I ***---***
 4952
 4953 026544  004537  004064             JSR     R5,READ         ;READ T1L-H(ADDR 07)
 4954 026550  120007                     T1LH
 4955 026552  002312                     BDATA
 4956 026554  123737  002310  002312     CMPB    GDATA,BDATA     ;AND CHECK IT
 4957 026562  001407                     BEQ     10$             ;IF OK, PROCEED
 4958 026564  012737  000007  002334     MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
 4959 026572                             GEDF    EM20,ERR7       ; REPORT FAILURE
                                        ;       "DEVICE FATAL" ERROR # 35
        026572  104455                                                          TRAP    C$ERDF
        026574  000043                                                          .WORD   35
        026576  015243                                                          .WORD   EM20
        026600  006612                                                          .WORD   ERR7
 4960
 4961                                   ; ***---*** STEP J ***---***
 4962
 4963 026602  004537  004064     10$:    JSR     R5,READ         ;READ T1C-H(ADDR 05)
 4964 026606  120005                     T1CH
 4965 026610  002312                     BDATA
 4966 026612  012737  000005  002334     MOV     #5,REGNUM       ;IDENTIFY THE REGISTER BEING CHECKED
 4967 026620  105737  002306             TSTB    TDATA           ;WAS THE TEST DATA "000"?
 4968 026624  001410                     BEQ     14$             ;YES, THEN WE CAN'T BE SURE OF THE RESULTS!
 4969 026626  123737  002310  002312     CMPB    GDATA,BDATA     ;NO, CHECK IT
 4970 026634  001004                     BNE     14$             ;IT SHOULDN'T = THE LOADED VALUE
 4971 026636                             GEDF    EM20A,ERR7      ;IT DID!  REPORT FAILURE
                                        ;       "DEVICE FATAL" ERROR # 36
        026636  104455                                                          TRAP    C$ERDF
        026640  000044                                                          .WORD   36
        026642  015275                                                          .WORD   EM20A
        026644  006612                                                          .WORD   ERR7
 4972                                                                   ;AND CONTINUE TESTING
 4973                                   ; ***---*** STEP K ***---***
 4974
 4975 026646  105137  002306     14$:    COMB    TDATA           ;USE THE ONE'S COMPLEMENT THIS TIME
 4976 026652  105137  002310             COMB    GDATA           ;THE EXPECTED DATA IS ALSO THE COMPLEMENT
 4977 026656  004537  004310             JSR     R5,WRITE        ;LOAD T1L-H(ADDR 07)
 4978 026662  120007                     T1LH
 4979 026664  002306                     TDATA                   ;THE TEST DATA FROM "TDATA"
 4980
 4981                                   ; ***---*** STEP L ***---***
 4982
```

```
4983 026666  004537  004064          JSR     R5,READ         ;READ T1L-H(ADDR 07)
4984 026672  120007                  T1LH
4985 026674  002312                  BDATA
4986 026676  123737  002310  002312  CMPB    GDATA,BDATA     ;AND CHECK IT
4987 026704  001407                  BEQ     16$             ;IF OK, PROCEED
4988 026706  012737  000007  002334  MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
4989 026714                          GEDF    EM20,ERR7       ; REPORT FAILURE
                                                             ;       "DEVICE FATAL" ERROR # 37
     026714  104455                                                          TRAP    C$ERDF
     026716  000045                                                          .WORD   37
     026720  015243                                                          .WORD   EM20
     026722  006612                                                          .WORD   ERR7
4990
4991                                 ; ***---*** STEP M ***---***
4992
4993 026724                  16$:    ENDSEG
     026724                                                                  10000$:
     026724  104405                                                          TRAP    C$ESEG
4994
4995 026726  000402                  BR      21$
4996 026730  000137  026276  20$:    JMP     T16.LP
4997 026734  077303          21$:    SOB     R3,20$          ;IF MORE DATA, DO ANOTHER BYTE
4998                                                         ;ELSE, EXIT SUBTEST
4999 026736                          ENDSUB
     026736                                                                  L10051:
     026736  104403                                                          TRAP    C$ESUB
5000
5001
5002 026740                          BGNSUB                  ;BEGIN THE SECOND SUBTEST
     026740                                                                  T15.2:
     026740  104402                                                          TRAP    C$BSUB
5003 026742  012701  002526          MOV     #PATB,R1        ;POINT TO THE APPROPRIATE PATTERN TABLE
5004 026746  012103                  MOV     (R1)+,R3        ;EXTRACT THE BYTE COUNT FROM THE TABLE
5005
5006 026750                  T16.L1:
5007 026750  112137  002306          MOVB    (R1)+,TDATA     ;GET ONE BYTE OF THE TEST DATA
5008 026754  013737  002306  002310  MOV     TDATA,GDATA     ;THE TEST DATA IS NORMALLY THE GOOD DATA TOO
5009
5010
5011                                 ; ***---*** STEP A ***---***
5012
5013 026762  004537  004322          JSR     R5,WRITEI       ;CLEAR T1L-H(ADDR 07)
5014 026766  120007                  T1LH
5015 026770  000000                  0                       ;THE TEST DATA FROM "TDATA"
5016
5017 026772                          BGNSEG
     026772  104404                                                                  TRAP    C$BSEG
5018
5019                                 ; ***---*** STEP B ***---***
5020
5021 026774  004537  004310          JSR     R5,WRITE        ;LOAD T1L-L(ADDR 06)
5022 027000  120006                  T1LL
5023 027002  002306                  TDATA                   ;THE TEST DATA FROM "TDATA"
5024
5025                                 ; ***---*** STEP C ***---***
5026
5027 027004  004537  004064          JSR     R5,READ         ;READ T1L-L(ADDR 06)
```

TEST 15 -- VIA'S T1 DATA READ/WRITE

```
5028 027010  120006                          T1LL
5029 027012  002312                          BDATA
5030 027014  123737  002310  002312          CMPB    GDATA,BDATA     ;AND CHECK IT
5031 027022  001407                          BEQ     2$              ;IF OK, PROCEED
5032 027024  012737  000006  002334          MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
5033 027032                                  GEDF    EM20,ERR7       ; REPORT FAILURE
                                                                     ;       "DEVICE FATAL" ERROR # 38
     027032  104455                                                                  TRAP    C$ERDF
     027034  000046                                                                  .WORD   38
     027036  015243                                                                  .WORD   EM20
     027040  006612                                                                  .WORD   ERR7
5034
5035                                 ; ***---*** STEP D ***---***
5036
5037 027042  004537  004064          2$:     JSR     R5,READ         ;READ T1L-H(ADDR 07)
5038 027046  120007                          T1LH
5039 027050  002312                          BDATA
5040 027052  105737  002312                  TSTB    BDATA           ;AND CHECK IT -- THIS SHOULD STILL BE ZERO
5041 027056  001411                          BEQ     10$             ;IF OK, PROCEED
5042 027060  005037  002310                  CLR     GDATA
5043 027064  012737  000007  002334          MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
5044 027072                                  GEDF    EM20B,ERR7      ; REPORT FAILURE
                                                                     ;       "DEVICE FATAL" ERROR # 39
     027072  104455                                                                  TRAP    C$ERDF
     027074  000047                                                                  .WORD   39
     027076  015355                                                                  .WORD   EM20B
     027100  006612                                                                  .WORD   ERR7
5045
5046                                 ; ***---*** STEP E ***---***
5047
5048 027102                          10$:    ENDSEG
     027102  104405                                                          10000$:
                                                                                     TRAP    C$ESEG
5049
5050 027104  000402                          BR      21$
5051 027106  000137  026750          20$:    JMP     T16.L1
5052 027112  077303                21$:    SOB     R3,20$          ;IF MORE DATA, DO ANOTHER BYTE
5053                                                                 ;ELSE, EXIT SUBTEST
5054 027114                                  ENDSUB
     027114                                                                  L10052:
     027114  104403                                                                  TRAP    C$ESUB
5055
5056
5057 027116                                  BGNSUB                  ;BEGIN THE THIRD SUBTEST
     027116                                                                  T15.3:
     027116  104402                                                                  TRAP    C$BSUB
5058 027120  012701  002526                  MOV     #PATB,R1        ;POINT TO THE APPROPRIATE PATTERN TABLE
5059 027124  012103                          MOV     (R1)+,R3        ;EXTRACT THE BYTE COUNT FROM THE TABLE
5060
5061 027126                          T16.L2:
5062 027126  112137  002306                  MOVB    (R1)+,TDATA     ;GET ONE BYTE OF THE TEST DATA
5063 027132  013737  002306  002310          MOV     TDATA,GDATA     ;THE TEST DATA IS NORMALLY THE GOOD DATA TOO
5064
5065
5066                                 ; ***---*** STEP A ***---***
5067
5068 027140  004537  004322                  JSR     R5,WRITEI       ;CLEAR T1L-L(ADDR 04)
```

```
027144  120004                                  T1CL
027146  000000                                  0
027150                                          BGNSEG
027150  104404                                                                                   TRAP    C$BSEG
                                        ; ***---*** STEP B ***---***
027152  004537  004310                          JSR     R5,WRITE        ;LOAD T1L-H(ADDR 07)
027156  120007                                  T1LH
027160  002306                                  TDATA                   ;THE TEST DATA FROM "TDATA"
                                        ; ***---*** STEP C ***---***
027162  004537  004064                          JSR     R5,READ         ;READ T1L-H(ADDR 07)
027166  120007                                  T1LH
027170  002312                                  BDATA
027172  123737  002310  002312                  CMPB    GDATA,BDATA     ;AND CHECK IT
027200  001407                                  BEQ     10$             ;IF OK, PROCEED
027202  012737  000007  002334                  MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
027210                                          GEDF    EM20,ERR7       ; REPORT FAILURE
                                                                        ;        "DEVICE FATAL" ERROR # 40
027210  104455                                                                                   TRAP    C$ERDF
027212  000050                                                                                   .WORD   40
027214  015243                                                                                   .WORD   EM20
027216  006612                                                                                   .WORD   ERR7
                                        ; ***---*** STEP D ***---***
027220  004537  004064                  10$:    JSR     R5,READ         ;READ T1L-L(ADDR 06)
027224  120006                                  T1LL
027226  002312                                  BDATA
027230  105737  002312                          TSTB    BDATA           ;AND CHECK IT
027234  001411                                  BEQ     2$              ;IF OK, PROCEED
027236  005037  002310                          CLR     GDATA
027242  012737  000006  002334                  MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
027250                                          GEDF    EM20B,ERR7      ; REPORT FAILURE
                                                                        ;        "DEVICE FATAL" ERROR # 41
027250  104455                                                                                   TRAP    C$ERDF
027252  000051                                                                                   .WORD   41
027254  015355                                                                                   .WORD   EM20B
027256  006612                                                                                   .WORD   ERR7
                                        ; ***---*** STEP E ***---***
027260                                  2$:     ENDSEG
027260                                                                                   10000$:
027260  104405                                                                                   TRAP    C$ESEG
027262  000402                                  BR      21$
027264  000137  027126                  20$:    JMP     T16.L2
027270  077303                          21$:    SOB     R3,20$          ;IF MORE DATA, DO ANOTHER BYTE
                                                                        ;ELSE, EXIT SUBTEST
027272                                          ENDSUB
027272                                                                                   L10053:
027272  104403                                                                                   TRAP    C$ESUB
```

TEST 15 -- VIA'S T1 DATA READ/WRITE

```
   5111 027274                          ENDTST
        027274                                      L10050:
        027274  104401                                      TRAP    C$ETST
```

```
5124                                    .SBTTL TEST 16 -- VIA'S SR DATA READ/WRITE

                                        ;+*****************************************************************************
                                        ;*
                                        ;*      TEST 16 -- VIA'S SR DATA READ/WRITE
                                        ;*
                                        ;*      SR == "SHIFT REGISTER"
                                        ;*
                                        ;* FIRST, A MASTER CLEAR IS PERFORMED AND THE ACR IS SET TO 000. THEN :
                                        ;* READ/WRITE BITS 0-7 OF VIA SHIFT REGISTER ARE TESTED BY WRITING, READING,
                                        ;* AND COMPARING EACH BYTE OF DATA PATTERN B.
                                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                        ;*
                                        ;--*****************************************************************************
                                        ;
                                        ;       BGNTST
     027276                                                                                     T16::
5125 027276  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5126 027302  103003                            BCC     30$             ;IF AN ERROR OCCURED,
5127 027304                                    ERROR                   ;REPORT IT &
     027304  104460                                                                     TRAP    C$ERROR
5128 027306                                    ESCAPE  TST             ;  EXIT
     027306  104410                                                                     TRAP    C$ESCAPE
     027310  000046                                                                     .WORD   L10054-.
5129
5130 027312  012701  002526          30$:     MOV     #PATB,R1        ;POINT TO PATTERN TABLE
5131 027316  012103                            MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
5132
5133 027320                          T18.LP:
5134 027320                                    BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
     027320                                                                             T16.1:
     027320  104402                                                                     TRAP    C$BSUB
5135
5136 027322  111137  002306                    MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
5137 027326  112137  002310                    MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
5138 027332  012700  120012                    MOV     #SR,R0          ;SPECIFY THE REGISTER BEING TESTED
5139 027336  004737  005034                    JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
5140 027342  103003                            BCC     10$             ;WAS AN ERROR FOUND?
5141 027344                                    ERROR                   ;YES, REPORT IT AND
     027344  104460                                                                     TRAP    C$ERROR
5142 027346                                    ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
     027346  104410                                                                     TRAP    C$ESCAPE
     027350  000006                                                                     .WORD   L10054-.
5143
5144 027352                          10$:      ENDSUB
     027352                                                                     L10055:
     027352  104403                                                                     TRAP    C$ESUB
5145
5146 027354  077317                            SOB     R3,T18.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
5147                                                                    ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
5148
5149 027356                                    ENDTST
     027356                                                                     L10054:
     027356  104401                                                                     TRAP    C$ETST
```

```
5162                                    .SBTTL TEST 17 -- VIA'S ACR DATA READ/WRITE

                                        ;+**********************************************************************
                                        ;*
                                        ;*      TEST 17 -- VIA'S ACR DATA READ/WRITE
                                        ;*
                                        ;*      ACR == "AUXILIARY CONTROL REGISTER"
                                        ;*
                                        ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
                                        ;* READ/WRITE BITS 0-7 OF THE ACR ARE TESTED BY WRITING, READING,
                                        ;* AND COMPARING EACH BYTE OF DATA PATTERN B.
                                        ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
                                        ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
                                        ;*
                                        ;--**********************************************************************
                                        ;
                                        ;       BGNTST
     027360
5163 027360  004737  003762                                                    T17::
                                                JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5164 027364  103003                             BCC     30$             ;IF AN ERROR OCCURED,
5165 027366                                     ERROR                   ;REPORT IT &
     027366  104460                                                                     TRAP    C$ERROR
5166 027370                                     ESCAPE  TST             ;  EXIT
     027370  104410                                                                     TRAP    C$ESCAPE
     027372  000046                                                                     .WORD   L10056-.
5167
5168 027374  012701  002526        30$:        MOV     #PATB,R1        ;POINT TO PATTERN TABLE
5169 027400  012103                             MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
5170
5171 027402                     T19.LP:
5172 027402                                     BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
     027402                                                                        T17.1:
     027402  104402                                                                 TRAP    C$BSUB
5173
5174 027404  111137  002306                     MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
5175 027410  112137  002310                     MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
5176 027414  012700  120013                     MOV     #ACR,R0         ;SPECIFY THE REGISTER BEING TESTED
5177 027420  004737  005034                     JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
5178 027424  103003                             BCC     10$             ;WAS AN ERROR FOUND?
5179 027426                                     ERROR                   ;YES, REPORT IT AND
     027426  104460                                                                     TRAP    C$ERROR
5180 027430                                     ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
     027430  104410                                                                     TRAP    C$ESCAPE
     027432  000006                                                                     .WORD   L10056-.
5181
5182 027434                     10$:        ENDSUB
     027434                                                                 L10057:
     027434  104403                                                                   TRAP    C$ESUB
5183
5184 027436  077317                             SOB     R3,T19.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
5185                                                                    ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
5186
5187 027440                                     ENDTST
     027440                                                                 L10056:
     027440  104401                                                                   TRAP    C$ETST
```

```
5200                                    .SBTTL TEST 18 -- VIA'S PCR DATA READ/WRITE

                                        ;+*********************************************************************************
                                        ;*
                                        ;*      TEST 18 -- VIA'S PCR DATA READ/WRITE
                                        ;*
                                        ;*      PCR == "PERIPHERAL CONTROL REGISTER"
                                        ;*
                                        ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
                                        ;* READ/WRITE BITS 0-7 OF THE PCR REGISTER ARE TESTED BY WRITING, READING,
                                        ;* AND COMPARING EACH BYTE OF A SUBSET OF DATA PATTERN B.
                                        ;*   DATA PATTERN B (SUBSET) =  125, 252, 000, 377, 001, 002, 004, 010, 020,
                                        ;*                              040, 100, 200.
                                        ;*
                                        ;---*********************************************************************************
                                        ;
                                        ;       BGNTST
     027442                                                                                     T18::
5201 027442  004737  003762                     JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5202 027446  103003                             BCC     30$             ;IF AN ERROR OCCURED,
5203 027450                                     ERROR                   ;REPORT IT &
     027450  104460                                                                             TRAP    C$ERROR
5204 027452                                     ESCAPE  TST             ;  EXIT
     027452  104410                                                                             TRAP    C$ESCAPE
     027454  000050                                                                             .WORD   L10060-.
5205
5206 027456  012701  002530          30$:       MOV     #PATB+2,R1      ;POINT TO PATTERN TABLE
5207 027462  012703  002543                     MOV     #PATB+15,R3     ;GET # OF ENTRIES IN TABLE
5208
5209 027466                          T20.LP:
5210 027466                                     BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
     027466                                                                                     T18.1:
     027466  104402                                                                             TRAP    C$BSUB
5211
5212 027470  111137  002306                     MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
5213 027474  112137  002310                     MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
5214 027500  012700  120014                     MOV     @PCR,R0         ;SPECIFY THE REGISTER BEING TESTED
5215 027504  004737  005034                     JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
5216 027510  103003                             BCC     10$             ;WAS AN ERROR FOUND?
5217 027512                                     ERROR                   ;YES, REPORT IT AND
     027512  104460                                                                             TRAP    C$ERROR
5218 027514                                     ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
     027514  104410                                                                             TRAP    C$ESCAPE
     027516  000006                                                                             .WORD   L10060-.
5219
5220 027520                          10$:       ENDSUB
     027520                                                                                     L10061:
     027520  104403                                                                             TRAP    C$ESUB
5221
5222 027522  077317                             SOB     R3,T20.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
5223                                                                     ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
5224 027524                                     ENDTST
     027524                                                                                     L10060:
     027524  104401                                                                             TRAP    C$ETST
```

```
5243                                    .SBTTL TEST 19 -- VIA'S IER DATA READ/WRITE

                                        ;++*************************************************************************
                                        ;*
                                        ;*      TEST 19 -- VIA'S IER DATA READ/WRITE
                                        ;*
                                        ;*      IER == "INTERRUPT ENABLE REGISTER"
                                        ;*
                                        ;* BITS 0-6 OF THE IER CAN BE SET OR CLEARED ON A WRITE, UNDER CONTROL OF THE
                                        ;* SET/CLEAR CONTROL BIT 7. TO TEST THIS , EACH BYTE OF DATA PATTERN D IS
                                        ;* WRITTEN INTO IER, AND THE REGISTER IS READ AND COMPARED TO THE CORRESPOND-
                                        ;* ING BYTE OF DATA PATTERN E.
                                        ;*
                                        ;*   DATA PATTERN D = 200, 201, 202, 204, 210, 220, 240, 300, 200, 000, 001,
                                        ;*                    002, 004, 010, 020, 040, 100, 000, 325, 125, 252, 052
                                        ;*
                                        ;*   DATA PATTERN E = 000, 001, 003, 007, 017, 037, 077, 177, 177, 177, 176,
                                        ;*                    174, 170, 160, 140, 100, 000, 000, 125, 000, 052, 000
                                        ;*
                                        ;*
                                        ;--*************************************************************************
                                        ;
                                        ;       BGNTST
    027526                                                                          T19::
5244 027526  004737  003762             JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5245 027532  103003                     BCC     30$             ;IF AN ERROR OCCURED,
5246 027534                             ERROR                   ;REPORT IT &
    027534  104460                                                              TRAP    C$ERROR
5247 027536                             ESCAPE  TST             ;  EXIT
    027536  104410                                                              TRAP    C$ESCAPE
    027540  000052                                                              .WORD   L10062-.
5248
5249 027542  012701  002644     30$:    MOV     #PATD,R1        ;POINT TO PATTERN TABLE
5250 027546  012103                     MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
5251 027550  012702  002676             MOV     #PATE+2,R2      ;POINT TO "EXPECTED" DATA PATTERN TABLE
5252
5253 027554                     T21.LP:
5254 027554                             BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
    027554                                                                  T19.1:
    027554  104402                                                              TRAP    C$BSUB
5255
5256 027556  112137  002306             MOVB    (R1)+,TDATA     ;SETUP TEST DATA BYTE FOR "STREG"
5257 027562  112237  002310             MOVB    (R2)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
5258 027566  012700  120016             MOV     #IENR,R0        ;SPECIFY THE REGISTER BEING TESTED
5259 027572  004737  005034             JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
5260 027576  103003                     BCC     10$             ;WAS AN ERROR FOUND?
5261 027600                             ERROR                   ;YES, REPORT IT AND
    027600  104460                                                              TRAP    C$ERROR
5262 027602                             ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
    027602  104410                                                              TRAP    C$ESCAPE
    027604  000006                                                              .WORD   L10062-.
5263
5264 027606                     10$:    ENDSUB
    027606                                                              L10063:
    027606  104403                                                              TRAP    C$ESUB
5265
5266 027610  077317                     SOB     R3,T21.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
```

```
5267                                                    ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
5268                                                    ;
5269 027612                   ENDTST                    ;
     027612                                                       L10062:
     027612  104401                                                       TRAP    C$ETST
```

```
 5282                                   .SBTTL TEST 20 -- VIA'S ORB/DDRB MASTER CLEAR TEST

                                        ;+++*************************************************************************
                                        ;*
                                        ;*      TEST 20 -- VIA'S ORB/DDRB MASTER CLEAR TEST
                                        ;*
                                        ;*      ORB == "OUTPUT REGISTER PORT B"
                                        ;*      DDRB == "DATA DIRECTION REGISTER B"
                                        ;*
                                        ;* FIRST, A MASTER CLEAR IS PERFORMED. NEXT, 377 IS LOADED INTO DDRB TO SET
                                        ;* ALL B PORT PINS FOR OUTPUT MODE. THEN, A 000 BYTE IS WRITTEN INTO ORB AND
                                        ;* THE REGISTER IS READ BACK AND CHECKED FOR 000. THEN, A MASTER CLEAR IS
                                        ;* PERFORMED AND ORB IS READ AND CHECKED FOR 377.
                                        ;*
                                        ;---*************************************************************************
                                        ;
                                        ;       BGNTST
     027614                                                                                     T20::
 5283
 5284 027614  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
 5285 027620  103003                            BCC     1$              ;IF AN ERROR OCCURED,
 5286 027622                                    ERROR                   ;REPORT IT &
      027622  104460                                                                        TRAP    C$ERROR
 5287 027624                                    ESCAPE  TST             ;  EXIT
      027624  104410                                                                        TRAP    C$ESCAPE
      027626  000252                                                                       .WORD   L10064-.
 5288
 5289 027630  012737  000377  002310  1$:      MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
 5290 027636  013737  002310  002306          MOV     GDATA,TDATA
 5291
 5292                                   ;  WE'LL USE "STREG" TO LOAD & CHECK "DDRB" WITH 377 THEREBY SETTING UP
 5293                                   ;  "ORB" FOR BI-DIRECTIONAL TRANSFERS
 5294
 5295 027644  012700  120002                    MOV     #DDRB,R0                ;POINT TO ORB
 5296 027650  004737  005034                    JSR     PC,STREG        ;LOAD & TEST IT
 5297 027654  103003                            BCC     4$              ;IF OK, PROCEED WITH TESTING
 5298 027656                                    ERROR                   ;ELSE, REPORT THE ERROR
      027656  104460                                                                        TRAP    C$ERROR
 5299 027660                                    ESCAPE  TST             ;       & QUIT
      027660  104410                                                                        TRAP    C$ESCAPE
      027662  000216                                                                       .WORD   L10064-.
 5300
 5301                                   ;  NOW WE'LL USE "STREG" TO SET & CHECK "ORB"
 5302
 5303 027664  012700  120000            4$:     MOV     #ORB,R0         ;POINT TO DDRB
 5304 027670  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "ORB"
 5305 027674  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
 5306 027676                                    ERROR                   ;ELSE, REPORT THE ERROR
      027676  104460                                                                        TRAP    C$ERROR
 5307 027700                                    ESCAPE  TST             ;       & QUIT
      027700  104410                                                                        TRAP    C$ESCAPE
      027702  000176                                                                       .WORD   L10064-.
 5308
 5309 027704  004737  003762            5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
 5310 027710  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
 5311 027712                                    ERROR                   ;ELSE, REPORT IT
      027712  104460                                                                        TRAP    C$ERROR
```

```
5312 027714                                    ESCAPE  TST             ;       & QUIT
     027714  104410                                                                    TRAP    C$ESCAPE
     027716  000162                                                                    .WORD   L10064-.
5313
5314 027720  005037  002310          10$:      CLR     GDATA           ;FOR TESTING PURPOSES LATER
5315
5316 027724  004537  004064                    JSR     R5,READ         ;READ THE "RESET" VALUE OF THE "DDRB"
5317 027730  120002                            DDRB
5318 027732  002312                            BDATA
5319 027734  103003                            BCC     12$             ;IF NO ERROR READING IT, PROCEED
5320 027736                                    ERROR                   ;ELSE, REPORT IT
     027736  104460                                                                    TRAP    C$ERROR
5321 027740                                    ESCAPE  TST             ;       & QUIT
     027740  104410                                                                    TRAP    C$ESCAPE
     027742  000136                                                                    .WORD   L10064-.
5322
5323 027744  123737  002312  002310  12$:     CMPB    BDATA,GDATA     ;DID IT GET CLEARE?
5324 027752  001407                            BEQ     14$             ;YES, GOOD.  NOW CHECK "ORB"
5325 027754  012737  000002  002334            MOV     #DDRB&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
5326 027762                                    GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                       ;       "DEVICE FATAL" ERROR # 42
     027762  104455                                                                    TRAP    C$ERDF
     027764  000052                                                                    .WORD   42
     027766  014515                                                                    .WORD   EM5
     027770  006612                                                                    .WORD   ERR7
5327
5328 027772  012737  000377  002310  14$:     MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
5329 030000  013737  002310  002306            MOV     GDATA,TDATA
5330
5331                                           ;  WE'LL USE "STREG" TO LOAD & CHECK "DDRB" WITH 377 THEREBY SETTING UP
5332                                           ;  "ORB" FOR BY-DIRECTIONAL TRANSFERS
5333
5334 030006  012700  120002                    MOV     #DDRB,R0                ;POINT TO ORB
5335 030012  004737  005034                    JSR     PC,STREG        ;LOAD & TEST IT
5336 030016  103003                            BCC     16$             ;IF OK, PROCEED WITH TESTING
5337 030020                                    ERROR                   ;ELSE, REPORT THE ERROR
     030020  104460                                                                    TRAP    C$ERROR
5338 030022                                    ESCAPE  TST             ;       & QUIT
     030022  104410                                                                    TRAP    C$ESCAPE
     030024  000054                                                                    .WORD   L10064-.
5339
5340 030026  005037  002310          16$:      CLR     GDATA           ;SETUP FOR TESTING ORB
5341 030032  004537  004064                    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "ORB"
5342 030036  120000                            ORB
5343 030040  002312                            BDATA
5344 030042  103003                            BCC     18$             ;IF NO ERROR READING IT, PROCEED
5345 030044                                    ERROR                   ;ELSE, REPORT IT
     030044  104460                                                                    TRAP    C$ERROR
5346 030046                                    ESCAPE  TST             ;       & QUIT
     030046  104410                                                                    TRAP    C$ESCAPE
     030050  000030                                                                    .WORD   L10064-.
5347
5348 030052  123737  002310  002312  18$:     CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
5349 030060  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
5350 030062  012737  000000  002334            MOV     #ORB&<17>,REGNUM        ;NO!    BUILD REGISTER # POINTER
5351 030070                                    GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                       ;       "DEVICE FATAL" ERROR # 43
```

```
        030070  104455                                          TRAP    C$ERDF
        030072  000053                                          .WORD   43
        030074  014515                                          .WORD   EM5
        030076  006612                                          .WORD   ERR7
  5352
  5353  030100                          32$:    ENDTST
        030100                                                  L10064:
        030100  104401                                          TRAP    C$ETST
```

```
5367                                    .SBTTL TEST 21 -- VIA'S DDRB MASTER CLEAR TEST

                                        ;+*****************************************************************************
                                        ;*
                                        ;*      TEST 21 -- VIA'S DDRB MASTER CLEAR TEST
                                        ;*
                                        ;*      DDRB -- "DATA DIRECTION REGISTER B"
                                        ;*
                                        ;* A 377 BYTE IS WRITTEN INTO DDRB AND THE REGISTER IS READ BACK AND CHECKED
                                        ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND DDRB IS READ AND CHECKED FOR
                                        ;* 000.
                                        ;*
                                        ;* NOTE:  THIS TESTING IS ALSO DONE IN TEST 23.  IT IS INCLUDED HERE ONLY TO
                                        ;*        PROVIDE TIGHTER LOOPING ON JUST THE DDRB MASTER CLEAR CHECKING.
                                        ;*
                                        ;--*****************************************************************************
                                        ;
                                        ;       BGNTST
    030102                                                                                  T21::
5368
5369 030102  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5370 030106  103003                            BCC     1$              ;IF AN ERROR OCCURED,
5371 030110                                    ERROR                   ;REPORT IT &
     030110  104460                                                                     TRAP    C$ERROR
5372 030112                                    ESCAPE  TST             ;  EXIT
     030112  104410                                                                     TRAP    C$ESCAPE
     030114  000114                                                                     .WORD   L10065-.
5373
5374 030116  012737  000377  002310  1$:      MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
5375 030124  013737  002310  002306          MOV     GDATA,TDATA
5376 030132  012700  120002                    MOV     #DDRB,R0
5377
5378                                    ;  NOW WE'LL USE "STREG" TO SET & CHECK "DDRB"
5379
5380 030136  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "DDRB"
5381 030142  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
5382 030144                                    ERROR                   ;ELSE, REPORT IT
     030144  104460                                                                     TRAP    C$ERROR
5383 030146                                    ESCAPE  TST             ;       & QUIT
     030146  104410                                                                     TRAP    C$ESCAPE
     030150  000060                                                                     .WORD   L10065-.
5384
5385 030152  004737  003762          5$:       JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
5386 030156  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
5387 030160                                    ERROR                   ;ELSE, REPORT IT
     030160  104460                                                                     TRAP    C$ERROR
5388 030162                                    ESCAPE  TST             ;       & QUIT
     030162  104410                                                                     TRAP    C$ESCAPE
     030164  000044                                                                     .WORD   L10065-.
5389
5390 030166  005037  002310          10$:      CLR     GDATA           ;FOR TESTING PURPOSES LATER
5391 030172  004537  004064                    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "DDRB"
5392 030176  120002                            DDRB
5393 030200  002312                            BDATA
5394
5395 030202  123737  002310  002312            CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
5396 030210  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
```

TEST 21 -- VIA'S DDRB MASTER CLEAR TEST SEQ 0146

```
5397 030212  012737  000002  002334        MOV     #DDRB&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
5398 030220                                 GEDF    EM5,ERR7                ;REPORT MASTER CLEAR FAILURE
                                                                            ;       "DEVICE FATAL" ERROR # 44
     030220  104455                                                                    TRAP    C$ERDF
     030222  000054                                                                    .WORD   44
     030224  014515                                                                    .WORD   EM5
     030226  006612                                                                    .WORD   ERR7
5399
5400 030230                         32$:    ENDTST
     030230                                                                 L10065:
     030230  104401                                                                   TRAP    C$ETST
```

```
5411                                    .SBTTL TEST 22 -- VIA'S DDRA MASTER CLEAR TEST

                                        ;+++*****************************************************************************
                                        ;*
                                        ;*      TEST 22 -- VIA'S DDRA MASTER CLEAR TEST
                                        ;*
                                        ;*      DDRA == "DATA DIRECTION REGISTER A"
                                        ;*
                                        ;* A 377 BYTE IS WRITTEN INTO DDRA AND THE REGISTER IS READ BACK AND CHECKED
                                        ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND DDRA IS READ AND CHECKED FOR
                                        ;* 000.
                                        ;*
                                        ;---*****************************************************************************
                                        ;
                                        ;       BGNTST
     030232                                                                                     T22::
5412
5413 030232  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5414 030236  103003                            BCC     1$              ;IF AN ERROR OCCURED,
5415 030240                                    ERROR                   ;REPORT IT &
     030240  104460                                                                             TRAP    C$ERROR
5416 030242                                    ESCAPE  TST             ;  EXIT
     030242  104410                                                                             TRAP    C$ESCAPE
     030244  000114                                                                             .WORD   L10066-.
5417
5418 030246  012737  000377  002310  1$:      MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
5419 030254  013737  002310  002306           MOV     GDATA,TDATA
5420 030262  012700  120003                    MOV     #DDRA,R0
5421
5422                                    ;  NOW WE'LL USE "STREG" TO SET & CHECK "DDRA"
5423
5424 030266  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "DDRA"
5425 030272  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
5426 030274                                    ERROR                   ;ELSE, REPORT IT
     030274  104460                                                                             TRAP    C$ERROR
5427 030276                                    ESCAPE  TST             ;       & QUIT
     030276  104410                                                                             TRAP    C$ESCAPE
     030300  000060                                                                             .WORD   L10066-.
5428
5429 030302  004737  003762           5$:      JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
5430 030306  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
5431 030310                                    ERROR                   ;ELSE, REPORT IT
     030310  104460                                                                             TRAP    C$ERROR
5432 030312                                    ESCAPE  TST             ;       & QUIT
     030312  104410                                                                             TRAP    C$ESCAPE
     030314  000044                                                                             .WORD   L10066-.
5433
5434 030316  005037  002310           10$:     CLR     GDATA           ;FOR TESTING PURPOSES LATER
5435 030322  004537  004064                    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "DDRA"
5436 030326  120003                            DDRA
5437 030330  002312                            BDATA
5438
5439 030332  123737  002310  002312           CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
5440 030340  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
5441 030342  012737  000003  002334           MOV     #DDRA&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
5442 030350                                    GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                       ;       "DEVICE FATAL" ERROR # 45
```

```
        030350  104455                                          TRAP    C$ERDF
        030352  000055                                          .WORD   45
        030354  014515                                          .WORD   EM5
        030356  006612                                          .WORD   ERR7
   5443
   5444 030360                          32$:    ENDTST
        030360                                                  L10066:
        030360  104401                                          TRAP    C$ETST
```

TEST 23 -- VIA'S SR MASTER CLEAR TEST

```
5455                                    .SBTTL TEST 23 -- VIA'S SR MASTER CLEAR TEST

                                        ;+*****************************************************************************
                                        ;*
                                        ;*      TEST 23 -- VIA'S SR MASTER CLEAR TEST
                                        ;*
                                        ;*      SR == "SHIFT REGISTER"
                                        ;*
                                        ;* A 123 BYTE IS WRITTEN INTO SR AND THE REGISTER IS READ BACK AND CHECKED
                                        ;* FOR 123. THEN, A MASTER CLEAR IS PERFORMED AND SR IS READ AND CHECKED FOR
                                        ;* NO CHANGE.
                                        ;*
                                        ;--*****************************************************************************
                                        ;
                                        ;       BGNTST
     030362                                                                                     T23::
5456
5457 030362  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5458 030366  103003                            BCC     1$              ;IF AN ERROR OCCURED,
5459 030370                                    ERROR                   ;REPORT IT &
     030370  104460                                                                     TRAP    C$ERROR
5460 030372                                    ESCAPE  TST             ;  EXIT
     030372  104410                                                                     TRAP    C$ESCAPE
     030374  000120                                                                     .WORD   L10067-.
5461
5462 030376  004537  004322            1$:     JSR     R5,WRITEI       ;FORCE SR TO MODE 0
5463 030402  120013                            ACR
5464 030404  000000                            0
5465 030406  012737  000123  002310            MOV     #123,GDATA      ;SETUP FOR CALL TO STREG
5466 030414  013737  002310  002306            MOV     GDATA,TDATA
5467 030422  012700  120012                    MOV     #SR,R0
5468
5469                                    ;  NOW WE'LL USE "STREG" TO SET & CHECK "SR"
5470
5471 030426  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "SR"
5472 030432  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
5473 030434                                    ERROR                   ;ELSE, REPORT IT
     030434  104460                                                                     TRAP    C$ERROR
5474 030436                                    ESCAPE  TST             ;       & QUIT
     030436  104410                                                                     TRAP    C$ESCAPE
     030440  000054                                                                     .WORD   L10067-.
5475
5476 030442  004737  003762            5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
5477 030446  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
5478 030450                                    ERROR                   ;ELSE, REPORT IT
     030450  104460                                                                     TRAP    C$ERROR
5479 030452                                    ESCAPE  TST             ;       & QUIT
     030452  104410                                                                     TRAP    C$ESCAPE
     030454  000040                                                                     .WORD   L10067-.
5480
5481 030456  004537  004064            10$:    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "SR"
5482 030462  120012                            SR                      ;       (IT SHOULDN'T HAVE CHANGED)
5483 030464  002312                            BDATA
5484
5485 030466  123737  002310  002312            CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
5486 030474  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
5487 030476  012737  000012  002334            MOV     #SR&<17>,REGNUM ;NO!    BUILD REGISTER # POINTER
```

TEST 23 -- VIA'S SR MASTER CLEAR TEST SEQ 0150

```
5488 030504                                GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                   ;       "DEVICE FATAL" ERROR # 46
     030504  104455                                                                TRAP    C$ERDF
     030506  000056                                                                .WORD   46
     030510  014515                                                                .WORD   EM5
     030512  006612                                                                .WORD   ERR7
5489
5490 030514                          32$:  ENDTST
     030514                                                                L10067:
     030514  104401                                                                TRAP    C$ETST
```

```
 5501                                   .SBTTL TEST 24 -- VIA'S ACR MASTER CLEAR TEST
                                        ;++*************************************************************************
                                        ;*
                                        ;*      TEST 24 -- VIA'S ACR MASTER CLEAR TEST
                                        ;*
                                        ;*      ACR == "AUXILIARY CONTROL REGISTER"
                                        ;*
                                        ;* A 252 BYTE IS WRITTEN INTO ACR AND THE REGISTER IS READ BACK AND CHECKED
                                        ;* FOR 252. THEN, A MASTER CLEAR IS PERFORMED AND ACR IS READ AND CHECKED FOR
                                        ;* 000, TO VERIFY THAT IT IS CLEARED BY MASTER CLEAR.
                                        ;*
                                        ;--*************************************************************************
                                        ;
                                        ;       BGNTST
     030516                                                                     T24::
 5502
 5503 030516  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
 5504 030522  103003                            BCC     1$              ;IF AN ERROR OCCURED,
 5505 030524                                    ERROR                   ;REPORT IT &
      030524  104460                                                                TRAP    C$ERROR
 5506 030526                                    ESCAPE  TST             ;  EXIT
      030526  104410                                                                TRAP    C$ESCAPE
      030530  000114                                                                .WORD   L10070-.
 5507
 5508 030532  012737  000252  002310  1$:      MOV     #252,GDATA      ;SETUP FOR CALL TO STREG
 5509 030540  013737  002310  002306          MOV     GDATA,TDATA
 5510 030546  012700  120013                    MOV     #ACR,R0
 5511
 5512                                   ;  NOW WE'LL USE "STREG" TO SET & CHECK "ACR" .
 5513
 5514 030552  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "ACR"
 5515 030556  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
 5516 030560                                    ERROR                   ;ELSE, REPORT IT
      030560  104460                                                                TRAP    C$ERROR
 5517 030562                                    ESCAPE  TST             ;       & QUIT
      030562  104410                                                                TRAP    C$ESCAPE
      030564  000060                                                                .WORD   L10070-.
 5518
 5519 030566  004737  003762          5$:       JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
 5520 030572  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
 5521 030574                                    ERROR                   ;ELSE, REPORT IT
      030574  104460                                                                TRAP    C$ERROR
 5522 030576                                    ESCAPE  TST             ;       & QUIT
      030576  104410                                                                TRAP    C$ESCAPE
      030600  000044                                                                .WORD   L10070-.
 5523
 5524 030602  005037  002310          10$:      CLR     GDATA           ;FOR TESTING PURPOSES LATER
 5525 030606  004537  004064                    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "ACR"
 5526 030612  120013                            ACR
 5527 030614  002312                            BDATA
 5528
 5529 030616  123737  002310  002312          CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
 5530 030624  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
 5531 030626  012737  000013  002334          MOV     #ACR&<17>,REGNUM        ;NO!    BUILD REGISTER # POINTER
 5532 030634                                    GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                        ;       "DEVICE FATAL" ERROR # 47
```

J12

SEQ 0152

TEST 24 -- VIA'S ACR MASTER CLEAR TEST

```
        030634  104455                                                  TRAP    C$ERDF
        030636  000057                                                  .WORD   47
        030640  014515                                                  .WORD   EM5
        030642  006612                                                  .WORD   ERR7
   5533
   5534 030644                          32$:    ENDTST
        030644                                                  L10070:
        030644  104401                                                  TRAP    C$ETST
```

TEST 25 -- VIA'S PCR MASTER CLEAR TEST

```
5545                                    .SBTTL TEST 25 -- VIA'S PCR MASTER CLEAR TEST

                                        ;+**********************************************************************
                                        ;*
                                        ;*      TEST 25 -- VIA'S PCR MASTER CLEAR TEST
                                        ;*
                                        ;*      PCR == "PERIPHERAL CONTROL REGISTER"
                                        ;*
                                        ;* A 377 BYTE IS WRITTEN INTO PCR AND THE REGISTER IS READ BACK AND CHECKED
                                        ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND PCR IS READ AND CHECKED FOR
                                        ;* 000.
                                        ;*
                                        ;--**********************************************************************
                                        ;
                                        ;       BGNTST
    030646                                                                          T25::
5546
5547 030646  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5548 030652  103003                            BCC     1$              ;IF AN ERROR OCCURED,
5549 030654                                    ERROR                   ;REPORT IT &
     030654  104460                                                             TRAP    C$ERROR
5550 030656                                    ESCAPE  TST             ;  EXIT
     030656  104410                                                             TRAP    C$ESCAPE
     030660  000114                                                             .WORD   L10071-.
5551
5552 030662  012737  000377  002310  1$:      MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
5553 030670  013737  002310  002306          MOV     GDATA,TDATA
5554 030676  012700  120014                    MOV     #PCR,R0
5555
5556                                    ;  NOW WE'LL USE "STREG" TO SET & CHECK "PCR"
5557
5558 030702  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "PCR"
5559 030706  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
5560 030710                                    ERROR                   ;ELSE, REPORT IT
     030710  104460                                                             TRAP    C$ERROR
5561 030712                                    ESCAPE  TST             ;       & QUIT
     030712  104410                                                             TRAP    C$ESCAPE
     030714  000060                                                             .WORD   L10071-.
5562
5563 030716  004737  003762          5$:       JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
5564 030722  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
5565 030724                                    ERROR                   ;ELSE, REPORT IT
     030724  104460                                                             TRAP    C$ERROR
5566 030726                                    ESCAPE  TST             ;       & QUIT
     030726  104410                                                             TRAP    C$ESCAPE
     030730  000044                                                             .WORD   L10071-.
5567
5568 030732  005037  002310          10$:      CLR     GDATA           ;FOR TESTING PURPOSES LATER
5569 030736  004537  004064                    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "PCR"
5570 030742  120014                            PCR
5571 030744  002312                            BDATA
5572
5573 030746  123737  002310  002312            CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
5574 030754  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
5575 030756  012737  000014  002334            MOV     #PCR&<17>,REGNUM        ;NO!    BUILD REGISTER # POINTER
5576 030764                                    GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                        ;       "DEVICE FATAL" ERROR # 48
```

TEST 25 -- VIA'S PCR MASTER CLEAR TEST

```
        030764  104455                                          TRAP    C$ERDF
        030766  000060                                          .WORD   48
        030770  014515                                          .WORD   EM5
        030772  006612                                          .WORD   ERR7
   5577
   5578 030774                          32$:    ENDTST
        030774                                              L10071:
        030774  104401                                          TRAP    C$ETST
```

```
5589                                    .SBTTL TEST 26 -- VIA'S IER MASTER CLEAR TEST

                                        ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                        ;*
                                        ;*      TEST 26 -- VIA'S IER MASTER CLEAR TEST
                                        ;*
                                        ;*      IER == "INTERRUPT ENABLE REGISTER"
                                        ;*
                                        ;* A 377 BYTE IS WRITTEN INTO IER AND THE REGISTER IS READ BACK AND CHECKED
                                        ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND IER IS READ AND CHECKED FOR
                                        ;* 200.
                                        ;*
                                        ;---++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                        ;
                                        ;       BGNTST
    030776                                                                      T26::
5590
5591 030776  004737  003762                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
5592 031002  103003                            BCC     1$              ;IF AN ERROR OCCURED,
5593 031004                                    ERROR                   ;REPORT IT &
     031004  104460                                                             TRAP    C$ERROR
5594 031006                                    ESCAPE  TST             ;  EXIT
     031006  104410                                                             TRAP    C$ESCAPE
     031010  000122                                                             .WORD   L10072-.
5595
5596 031012  105077  151334            1$:     CLRB    @BSELO          ;MAKE SURE NO Q-BUS INTERRUPTS RESULT FROM
5597                                                                    ;       TESTING THE IER REGISTER
5598 031016  012737  000377  002310            MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
5599 031024  013737  002310  002306            MOV     GDATA,TDATA
5600 031032  012700  120016                    MOV     #IENR,R0
5601
5602                                    ;  NOW WE'LL USE "STREG" TO SET & CHECK "IER"
5603
5604 031036  004737  005034                    JSR     PC,STREG        ;LOAD & TEST "IER"
5605 031042  103003                            BCC     5$              ;IF NO ERROR HERE, PROCEED
5606 031044                                    ERROR                   ;ELSE, REPORT IT
     031044. 104460                                                             TRAP    C$ERROR
5607 031046                                    ESCAPE  TST             ;       & QUIT
     031046  104410                                                             TRAP    C$ESCAPE
     031050  000062                                                             .WORD   L10072-.
5608
5609 031052  004737  003762            5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
5610 031056  103003                            BCC     10$             ;IF NO ERROR HERE, PROCEED
5611 031060                                    ERROR                   ;ELSE, REPORT IT
     031060  104460                                                             TRAP    C$ERROR
5612 031062                                    ESCAPE  TST             ;       & QUIT
     031062  104410                                                             TRAP    C$ESCAPE
     031064  000046                                                             .WORD   L10072-.
5613
5614 031066  012737  000200  002310    10$:    MOV     #200,GDATA      ;FOR TESTING PURPOSES LATER
5615 031074  004537  004064                    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "IER"
5616 031100  120016                            IENR
5617 031102  002312                            BDATA
5618
5619 031104  123737  002310  002312            CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
5620 031112  001407                            BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
5621 031114  012737  000016  002334            MOV     #IENR&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
```

TEST 26 -- VIA'S IER MASTER CLEAR TEST SEQ 0156

```
5622 031122                                    GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
                                                                       ;       "DEVICE FATAL" ERROR # 49
     031122  104455                                                                   TRAP    C$ERDF
     031124  000061                                                                   .WORD   49
     031126  014515                                                                   .WORD   EM5
     031130  006612                                                                   .WORD   ERR7
5623
5624 031132                              32$:   ENDTST
     031132                                                                L10072:
     031132  104401                                                                   TRAP    C$ETST
5625
```

```
 5672                                   .SBTTL TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

                                        ;*******************************************************************************
                                        ;*
                                        ;*      TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE
                                        ;*
                                        ;* THIS TEST VERIFIES THAT THE TIMER 1 COUNTER IS OPERATIONAL IN ONE-SHOT
                                        ;* MODE, IN EACH OF TWO SUBTESTS.
                                        ;*
                                        ;* IN THE FIRST SUBTEST, THE FOLLOWING IS PERFORMED :
                                        ;*
                                        ;*    A  MASTER  CLEAR IS DONE AND THE TIMER IS PLACED IN ONE-SHOT MODE BY
                                        ;*    SETTING BOTH ACR7 & ACR6 TO 0.
                                        ;*
                                        ;*    THE  PROGRAM  CHECKS  FOR  THE  "T1"  FLAG  (BIT 6) IN THE IFR TO BE
                                        ;*    INITIALLY CLEARED.
                                        ;*
                                        ;*    T1L-L  (ADR  04)  & T1C-H (ADR 05) ARE BOTH LOADED WITH 252 (OCTAL).
                                        ;*    (THIS  IS  EQUIVALENT  TO  AAAA  (HEX) OR 43,690 (DECIMAL).) LOADING
                                        ;*    T1C-H STARTS THE COUNTER.
                                        ;*
                                        ;*    THE  PROGRAM  PERIODICALLY  CHECKS  THE COUNTER TO VERIFY THAT IT IS
                                        ;*    DECREMENTING  AND THAT IT EVENTUALLY UNDERFLOWS PAST 0 AND CONTINUES
                                        ;*    TO  DECREMENT.
                                        ;*
                                        ;*    T1L-L  (ADR  04)  IS LOADED WITH 001 & T1C-H (ADR 05) IS LOADED WITH
                                        ;*    000  IN  ORDER TO SET "T1" WITH A QUICK UNDERFLOW. THE "T1" FLAG BIT
                                        ;*    IN IFR IS READ AND CHECKED TO BE SET.
                                        ;*
                                        ;*    T1C-H, T1L-L, & T1L-H (ADDR'S 05, 06, & 07 RESP.) ARE READ AND AFTER
                                        ;*    EACH THE "T1" INTERRUPT FLAG IS CHECKED TO BE STILL SET.
                                        ;*
                                        ;*    T1C-L (ADDR 04) IS READ AND "T1" IS CHECKED TO BE CLEARED.
                                        ;*
                                        ;*    T1C-H  IS  LOADED  WITH  0 AGAIN TO INITIATE A NEW COUNT DOWN (WHICH
                                        ;*    SHOULD  UNDERFLOW  ALMOST  IMMEDIATELY)  AND  THE "T1" BIT IN IFR IS
                                        ;*    CHECKED TO BE SET AGAIN.
                                        ;*
                                        ;*    T1L-L IS LOADED WITH 125 (OCTAL) AND "T1" BIT IS CHECKED TO BE STILL
                                        ;*    SET.
                                        ;*
                                        ;*    T1C-H IS LOADED WITH 125, AND THE "T1" BIT IS READ AND CHECKED TO BE
                                        ;*    CLEARED BY THE LOADING OF T1C-H.
                                        ;*
                                        ;*
                                        ;*  IN THE SECOND SUBTEST,  ALL OF THE ABOVE OPERATIONS ARE REPEATED.
                                        ;*    WITH ACR BIT 7 SET TO 1, AND ACR BIT 6 SET TO 0. "PB7" (BIT 7 OF ORB)
                                        ;*    WILL BE MONITORED FOR ITS EXPECTED LEVELS DURING THIS SUBTEST.
                                        ;*
                                        ;--*****************************************************************************
                                        ;
      031134                            ;       BGNTST
 5673 031134                                                                  T27::
      031134                                    BGNSUB
      031134  104402                                                          T27.1:
 5674                                                                                 TRAP    C$BSUB
                                        ;-------------------------------------------------------------------------------
```

```
5675
5676 031136  004737  003762          JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
5677 031142  103003                  BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
5678 031144                          ERROR                   ;ELSE, REPORT ERROR
     031144  104460                                                  TRAP    C$ERROR
5679 031146                          ESCAPE  TST             ;   & EXIT TEST
     031146  104410                                                  TRAP    C$ESCAPE
     031150  004742                                                  .WORD   L10073-.
5680 031152  004537  004660    1$:   JSR     R5,INITT1       ;INITIALIZE TIMER # 1
5681 031156  000000                  0                       ;       0 ==> LATCHES
5682 031160  000000                  0                       ;       MODE 0 & "T1" INT. ENABLE FLAG CLEARED
5683 031162  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
5684 031164                          ERROR                   ;ELSE, REPORT IT
     031164  104460                                                  TRAP    C$ERROR
5685 031166                          ESCAPE  TST             ;       AND EXIT THIS TEST
     031166  104410                                                  TRAP    C$ESCAPE
     031170  004722                                                  .WORD   L10073-.
5686 031172  004737  036146          JSR     PC,GETT1        ;IS "T1" SET?
5687 031176  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
5688 031200                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     031200  104410                                                  TRAP    C$ESCAPE
     031202  002202                                                  .WORD   L10074-.
5689 031204  103143                  BCC     6$              ;NO, GOOD.
5690 031206  004537  004064          JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
5691 031212  120004                  T1CL
5692 031214  002450                  TMP4
5693 031216  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
5694 031220                          ERROR                   ;ELSE, REPORT IT
     031220  104460                                                  TRAP    C$ERROR
5695 031222                          ESCAPE  TST             ;       AND EXIT THIS TEST
     031222  104410                                                  TRAP    C$ESCAPE
     031224  004666                                                  .WORD   L10073-.
5696 031226  004537  004064          JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
5697 031232  120005                  T1CH
5698 031234  002452                  TMP5
5699 031236  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
5700 031240                          ERROR                   ;ELSE, REPORT IT
     031240  104460                                                  TRAP    C$ERROR
5701 031242                          ESCAPE  TST             ;       AND EXIT THIS TEST
     031242  104410                                                  TRAP    C$ESCAPE
     031244  004646                                                  .WORD   L10073-.
5702 031246  004537  004064          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
5703 031252  120006                  T1LL
5704 031254  002454                  TMP6
5705 031256  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
5706 031260                          ERROR                   ;ELSE, REPORT IT
     031260  104460                                                  TRAP    C$ERROR
5707 031262                          ESCAPE  TST             ;       AND EXIT THIS TEST
     031262  104410                                                  TRAP    C$ESCAPE
     031264  004626                                                  .WORD   L10073-.
5708 031266  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
5709 031272  120007                  T1LH
5710 031274  002456                  TMP7
5711 031276  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
5712 031300                          ERROR                   ;ELSE, REPORT IT
     031300  104460                                                  TRAP    C$ERROR
5713 031302                          ESCAPE  TST             ;       AND EXIT THIS TEST
```

```
                031302  104410                                                          TRAP    C$ESCAPE
                031304  004606                                                          .WORD   L10073-.
5714            031306  004537  004064          JSR     R5,READ         ;GET ACR FOR ERROR MESSAGE
5715            031312  120013                  ACR
5716            031314  002466                  TMPB
5717            031316  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
5718            031320                          ERROR                   ;ELSE, REPORT IT
                031320  104460                                                          TRAP    C$ERROR
5719            031322                          ESCAPE  TST             ;       AND EXIT THIS TEST
                031322  104410                                                          TRAP    C$ESCAPE
                031324  004566                                                          .WORD   L10073-.
5720            031326                          GEDF    EM50A,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
                                                                        ;       "DEVICE FATAL" ERROR # 50
                031326  104455                                                          TRAP    C$ERDF
                031330  000062                                                          .WORD   50
                031332  016067                                                          .WORD   EM50A
                031334  010762                                                          .WORD   ERR50
5721            031336                          PRINTX  #FMT50M         ;  & SAY THE COUNTERS HAVEN'T BEEN LOADED YET!
                031336  012746  013174                                                  MOV     #FMT50M,-(SP)
                031342  012746  000001                                                  MOV     #1,-(SP)
                031346  010600                                                          MOV     SP,R0
                031350  104415                                                          TRAP    C$PNTX
                031352  062706  000004                                                  ADD     #4,SP
5722
5723                                    ;-----------------------------------------------------------------------
5724
5725            031356  112737  000002  002453      MOVB    #2,TMP5+1
5726            031364  004537  004310              JSR     R5,WRITE        ;INIT TIMER # 1 BY WRITING INTO
5727            031370  120005                      T1CH                    ;T1C-H (ADDR 05)
5728            031372  002453                      TMP5+1
5729            031374  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
5730            031376                              ERROR                   ;ELSE, REPORT IT
                031376  104460                                                          TRAP    C$ERROR
5731            031400                              ESCAPE  TST             ;       AND EXIT THIS TEST
                031400  104410                                                          TRAP    C$ESCAPE
                031402  004510                                                          .WORD   L10073-.
5732            031404  004737  036146              JSR     PC,GETT1        ;IS "T1" SET?
5733            031410  102002                      BVC     .+6             ;IF NO ERROR, PROCEED
5734            031412                              ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                031412  104410                                                          TRAP    C$ESCAPE
                031414  001770                                                          .WORD   L10074-.
5735            031416  103036                      BCC     6$              ;NO, GOOD.
5736            031420  004537  004064              JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
5737            031424  120004                      T1CL
5738            031426  002450                      TMP4
5739            031430  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
5740            031432                              ERROR                   ;ELSE, REPORT IT
                031432  104460                                                          TRAP    C$ERROR
5741            031434                              ESCAPE  TST             ;       AND EXIT THIS TEST
                031434  104410                                                          TRAP    C$ESCAPE
                031436  004454                                                          .WORD   L10073-.
5742            031440  004537  004064              JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
5743            031444  120005                      T1CH
5744            031446  002452                      TMP5
5745            031450  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
5746            031452                              ERROR                   ;ELSE, REPORT IT
                031452  104460                                                          TRAP    C$ERROR
```

```
5747 031454
     031454  104410                     ESCAPE  TST             ;       AND EXIT THIS TEST
     031456  004434                                                             TRAP    C$ESCAPE
                                                                                 .WORD   L10073-.
5748 031460  004537  004064             JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
5749 031464  120007                     T1LH
5750 031466  002456                     TMP7
5751 031470  103003                     BCC     .+10            ;IF NO ERROR, PROCEED
5752 031472                             ERROR                   ;ELSE, REPORT IT
     031472  104460                                                             TRAP    C$ERROR
5753 031474                             ESCAPE  TST             ;       AND EXIT THIS TEST
     031474  104410                                                             TRAP    C$ESCAPE
     031476  004414                                                             .WORD   L10073-.
5754 031500                             GEDF    EM50B,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
                                                                ;       "DEVICE FATAL" ERROR # 51
     031500  104455                                                             TRAP    C$ERDF
     031502  000063                                                             .WORD   51
     031504  016135                                                             .WORD   EM50B
     031506  010762                                                             .WORD   ERR50
5755 031510                             ESCAPE  SUB             ;AND EXIT SUBTEST
     031510  104410                                                             TRAP    C$ESCAPE
     031512  001672                                                             .WORD   L10074-.
5756
5757                         ;-------------------------------------------------------------------------
5758
5759 031514  004537  004064     6$:     JSR     R5,READ         ;GET ACR FOR LATER ERROR MESSAGES
5760 031520  120013                     ACR
5761 031522  002466                     TMPB
5762 031524  103003                     BCC     .+10            ;IF NO ERROR, PROCEED
5763 031526                             ERROR                   ;ELSE, REPORT IT
     031526  104460                                                             TRAP    C$ERROR
5764 031530                             ESCAPE  TST             ;       AND EXIT THIS TEST
     031530  104410                                                             TRAP    C$ESCAPE
     031532  004360                                                             .WORD   L10073-.
5765 031534  112737  000377  002445             MOVB    #377,TMP2+1     ;INITIALIZE ORB FOR INPUT/OUTPUT
5766 031542  004537  004310                     JSR     R5,WRITE
5767 031546  120002                             DDRB
5768 031550  002445                             TMP2+1
5769 031552  103003                             BCC     .+10            ;IF NO ERROR, PROCEED
5770 031554                                     ERROR                   ;ELSE, REPORT IT
     031554  104460                                                             TRAP    C$ERROR
5771 031556                                     ESCAPE  TST             ;       AND EXIT THIS TEST
     031556  104410                                                             TRAP    C$ESCAPE
     031560  004332                                                             .WORD   L10073-.
5772 031562  112737  000377  002441             MOVB    #377,TMP0+1     ;SETUP VALUE FOR ORB
5773 031570  004537  004310                     JSR     R5,WRITE        ;DO IT
5774 031574  120000                             ORB
5775 031576  002441                             TMP0+1
5776 031600  103003                             BCC     .+10            ;IF NO ERROR, PROCEED
5777 031602                                     ERROR                   ;ELSE, REPORT IT
     031602  104460                                                             TRAP    C$ERROR
5778 031604                                     ESCAPE  TST             ;       AND EXIT THIS TEST
     031604  104410                                                             TRAP    C$ESCAPE
     031606  004304                                                             .WORD   L10073-.
5779 031610  004537  036114                     JSR     R5,LODT1C       ;LOAD TIMER # 1
5780 031614     252             7$:     .BYTE   252
5781 031615     252             8$:     .BYTE   252
5782
```

```
5783                                    ;-------------------------------------------------------------------------------
5784
5785 031616  004737  036332                JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
5786 031622  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
5787 031624                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     031624  1044^0                                                                    TRAP    C$ESCAPE
     031626  001556                                                                    .WORD   L10074-.
5788 031630  103404                        BCS     9$              ;IT IS.  (SET BY LOADING DDRB & ORB ABOVE)
5789 031632                                GEDF    EM50W,ERR1      ;IF NOT, TIMER 1 CLEARED IT!!!
                                                                   ;       "DEVICE FATAL" ERROR # 52
     031632  104455                                                                    TRAP    C$ERDF
     031634  000064                                                                    .WORD   52
     031636  017305                                                                    .WORD   EM50W
     031640  005276                                                                    .WORD   ERR1
5790 031642  004737  036204        9$:     JSR     PC,KICKT1       ;IT TAKES SO MUCH TIME TO CHECK FOR (& MAYBE
5791                                                               ;  EVEN REPORT) THIS ERROR THAT WE SHOULD
5792                                                               ;  KICK OFF THE TIMER AGAIN
5793 031646  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5794 031650                                ERROR                   ;ELSE, REPORT IT
     031650  104460                                                                    TRAP    C$ERROR
5795 031652                                ESCAPE  TST             ;       AND EXIT THIS TEST
     031652  104410                                                                    TRAP    C$ESCAPE
     031654  004236                                                                    .WORD   L10073-.
5796 031656  000240                        NOP                     ;
5797 031660  000240                        NOP                     ;NOW WAIT A LITTLE WHILE -- LET T1CL CHANGE
5798 031662  000240                        NOP                     ;
5799 031664  004537  004064                JSR     R5,READ         ;READ THE LOW COUNTER
5800 031670  120004                        T1CL
5801 031672  002450                        TMP4
5802 031674  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5803 031676                                ERROR                   ;ELSE, REPORT IT
     031676  104460                                                                    TRAP    C$ERROR
5804 031700                                ESCAPE  TST             ;       AND EXIT THIS TEST
     031700  104410                                                                    TRAP    C$ESCAPE
     031702  004210                                                                    .WORD   L10073-.
5805 031704  123737  002450  031614        CMPB    TMP4,7$         ;MAKE SURE THE COUNTER IS DECREMENTING
5806 031712  001024                        BNE     12$             ;IT IS, NOW SEE IF THE HIGH COUNTER IS TOO
5807 031714  004537  004064                JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
5808 031720  120005                        T1CH
5809 031722  002452                        TMP5
5810 031724  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5811 031726                                ERROR                   ;ELSE, REPORT IT
     031726  104460                                                                    TRAP    C$ERROR
5812 031730                                ESCAPE  TST             ;       AND EXIT THIS TEST
     031730  104410                                                                    TRAP    C$ESCAPE
     031732  004160                                                                    .WORD   L10073-.
5813 031734  004537  004064                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
5814 031740  120006                        T1LL
5815 031742  002454                        TMP6
5816 031744  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5817 031746                                ERROR                   ;ELSE, REPORT IT
     031746  104460                                                                    TRAP    C$ERROR
5818 031750                                ESCAPE  TST             ;       AND EXIT THIS TEST
     031750  104410                                                                    TRAP    C$ESCAPE
     031752  004140                                                                    .WORD   L10073-.
5819 031754                                GEDF    EM50D,ERR50     ;IT WASN'T -- REPORT THE ERROR
                                                                   ;       "DEVICE FATAL" ERROR # 53
```

```
        031754  104455                                                          TRAP    C$ERDF
        031756  000065                                                          .WORD   53
        031760  016251                                                          .WORD   EM50D
        031762  010762                                                          .WORD   ERR50
 5820   031764  012703  000100          12$:    MOV     #100,R3         ;INIT. TIMEOUT VALUE
 5821   031770  004537  004064          13$:    JSR     R5,READ         ;READ THE HIGH COUNTER
 5822   031774  120005                          T1CH
 5823   031776  002452                          TMP5
 5824   032000  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 5825   032002                          ERROR                   ;ELSE, REPORT IT
        032002  104460                                                          TRAP    C$ERROR
 5826   032004                          ESCAPE  TST             ;       AND EXIT THIS TEST
        032004  104410                                                          TRAP    C$ESCAPE
        032006  004104                                                          .WORD   L10073-.
 5827   032010  123737  002452  031615      CMPB    TMP5,#8$        ;DID IT CHANGE FROM THE LOADED VALUE?
 5828   032016  001037                      BNE     17$             ;YES, PROCEED WITH TESTING
 5829   032020  077315                      SOB     R3,13$          ;NO,  IF NO TIMEOUT, TRY AGAIN
 5830   032022  004537  004064              JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
 5831   032026  120015                      IFR
 5832   032030  002472                      TMPD
 5833   032032  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 5834   032034                          ERROR                   ;ELSE, REPORT IT
        032034  104460                                                          TRAP    C$ERROR
 5835   032036                          ESCAPE  TST             ;       AND EXIT THIS TEST
        032036  104410                                                          TRAP    C$ESCAPE
        032040  004052                                                          .WORD   L10073-.
 5836   032042  004537  004064              JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 5837   032046  120006                      T1LL
 5838   032050  002454                      TMP6
 5839   032052  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 5840   032054                          ERROR                   ;ELSE, REPORT IT
        032054  104460                                                          TRAP    C$ERROR
 5841   032056                          ESCAPE  TST             ;       AND EXIT THIS TEST
        032056  104410                                                          TRAP    C$ESCAPE
        032060  004032                                                          .WORD   L10073-.
 5842   032062  004537  004064              JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 5843   032066  120007                      T1LH
 5844   032070  002456                      TMP7
 5845   032072  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 5846   032074                          ERROR                   ;ELSE, REPORT IT
        032074  104460                                                          TRAP    C$ERROR
 5847   032076                          ESCAPE  TST             ;       AND EXIT THIS TEST
        032076  104410                                                          TRAP    C$ESCAPE
        032100  004012                                                          .WORD   L10073-.
 5848   032102                          GEDF    EM50E,ERR50     ;ELSE, REPORT THAT HIGH COUNTER ISN'T RUNNING
                                                                ;       "DEVICE FATAL" ERROR # 54
        032102  104455                                                          TRAP    C$ERDF
        032104  000066                                                          .WORD   54
        032106  016305                                                          .WORD   EM50E
        032110  010762                                                          .WORD   ERR50
 5849   032112                          ESCAPE  SUB             ;IN THAT CASE, WE CAN'T PROCEED WITH TESTING EITHER
        032112  104410                                                          TRAP    C$ESCAPE
        032114  001270                                                          .WORD   L10074-.
 5850
 5851                   ;-------------------------------------------------------------------------------
 5852   032116  112737  000377  002445  17$:    MOVB    #377,TMP2+1     ;INITIALIZE ORB FOR INPUT/OUTPUT
 5853   032124  004537  004310              JSR     R5,WRITE
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
5854 032130  120002                        DDRB
5855 032132  002445                        TMP2+1
5856 032134  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5857 032136                                ERROR                   ;ELSE, REPORT IT
     032136  104460                                                                TRAP    C$ERROR
5858 032140                                ESCAPE  TST             ;       AND EXIT THIS TEST
     032140  104410                                                                TRAP    C$ESCAPE
     032142  003750                                                                .WORD   L10073-.
5859 032144  023737  002440  002441        CMP     TMP0,TMP0+1     ;CLEAR PB7 BY WRITING INTO ORB
5860 032152  004537  004322                JSR     R5,WRITEI
5861 032156  120000                        ORB
5862 032160  000030                        30                      ;  (THIS CLEARS DTR & RTS! ALSO)
5863 032162  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5864 032164                                ERROR                   ;ELSE, REPORT IT
     032164  104460                                                                TRAP    C$ERROR
5865 032166                                ESCAPE  TST             ;       AND EXIT THIS TEST
     032166  104410                                                                TRAP    C$ESCAPE
     032170  003722                                                                .WORD   L10073-.
5866 032172  004537  036114                JSR     R5,LODT1C       ;RE-LOAD TIMER # 1 WITH A VALUE WHICH CAUSE AN
5867 032176     001            18$:        .BYTE   1               ;ALMOST IMMEDIATE TIMEOUT
5868 032177     000            19$:        .BYTE   0               ; (ADDRESS OF HIGH BYTE FOR T1C-H (ADDR 05))
5869                                       ;-------------------------------------------------------------------------
5870
5871 032200  004737  036146                JSR     PC,GETT1        ;WAS "T1" SET BY THE ABOVE OPERATION?
5872 032204  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
5873 032206                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     032206  104410                                                                TRAP    C$ESCAPE
     032210  001174                                                                .WORD   L10074-.
5874 032212  103426                        BCS     20$             ;YES, OK -- CONTINUE ERROR CHECKING
5875 032214  004537  004064                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
5876 032220  120006                        T1LL
5877 032222  002454                        TMP6
5878 032224  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5879 032226                                ERROR                   ;ELSE, REPORT IT
     032226  104460                                                                TRAP    C$ERROR
5880 032230                                ESCAPE  TST             ;       AND EXIT THIS TEST
     032230  104410                                                                TRAP    C$ESCAPE
     032232  003660                                                                .WORD   L10073-.
5881 032234  004537  004064                JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
5882 032240  120007                        T1LH
5883 032242  002456                        TMP7
5884 032244  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
5885 032246                                ERROR                   ;ELSE, REPORT IT
     032246  104460                                                                TRAP    C$ERROR
5886 032250                                ESCAPE  TST             ;       AND EXIT THIS TEST
     032250  104410                                                                TRAP    C$ESCAPE
     032252  003640                                                                .WORD   L10073-.
5887 032254                                GEDF    EM50F,ERR50     ;NO,  BAD NEWS!  REPORT THE FAILURE
                                                                   ;       "DEVICE FATAL" ERROR # 55
     032254  104455                                                                TRAP    C$ERDF
     032256  000067                                                                .WORD   55
     032260  016341                                                                .WORD   EM50F
     032262  010762                                                                .WORD   ERR50
5888 032264                                ESCAPE  SUB             ;  AND GET OUT OF SUBTEST
     032264  104410                                                                TRAP    C$ESCAPE
     032266  001116                                                                .WORD   L10074-.
5889 032270  004737  036332          20$:  JSR     PC,GETPB7       ;GET "PB7".  IS IT CLEARED?
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
5890 032274  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
5891 032276                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     032276  104410                                                    TRAP    C$ESCAPE
     032300  001104                                                    .WORD   L10074-.
5892 032302  103024                    BCC     40$             ;IF CLEARED, DDRB IS STILL IN CONTROL OF IT
5893 032304  004537  004064            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
5894 032310  120006                    T1LL
5895 032312  002454                    TMP6
5896 032314  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
5897 032316                            ERROR                   ;ELSE, REPORT IT
     032316  104460                                                    TRAP    C$ERROR
5898 032320                            ESCAPE  TST             ;       AND EXIT THIS TEST
     032320  104410                                                    TRAP    C$ESCAPE
     032322  003570                                                    .WORD   L10073-.
5899 032324  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
5900 032330  120007                    T1LH
5901 032332  002456                    TMP7
5902 032334  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
5903 032336                            ERROR                   ;ELSE, REPORT IT
     032336  104460                                                    TRAP    C$ERROR
5904 032340                            ESCAPE  TST             ;       AND EXIT THIS TEST
     032340  104410                                                    TRAP    C$ESCAPE
     032342  003550                                                    .WORD   L10073-.
5905 032344                            GEDF    EM50W,ERR50     ;ELSE, IT'S BEING SET BY TIMER 1 IN MODE 0!
                                                               ;       "DEVICE FATAL" ERROR # 56
     032344  104455                                                    TRAP    C$ERDF
     032346  000070                                                    .WORD   56
     032350  017305                                                    .WORD   EM50W
     032352  010762                                                    .WORD   ERR50
5906 032354  004537  004064    40$:    JSR     R5,READ         ;READ T1C-H (ADDR 05) TO SEE IF THIS CLEARS "T1"
5907 032360  120005                    T1CH                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
5908 032362  002452                    TMP5                    ; ALMOST ANYTHING)
5909 032364  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
5910 032366                            ERROR                   ;ELSE, REPORT IT
     032366  104460                                                    TRAP    C$ERROR
5911 032370                            ESCAPE  TST             ;       AND EXIT THIS TEST
     032370  104410                                                    TRAP    C$ESCAPE
     032372  003520                                                    .WORD   L10073-.
5912 032374  004737  036146            JSR     PC,GETT1        ;PUT THE CURRENT "T1" VALUE INTO THE CARRY BIT
5913 032400  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
5914 032402                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     032402  104410                                                    TRAP    C$ESCAPE
     032404  001000                                                    .WORD   L10074-.
5915 032406  103425                    BCS     21$             ;IF SET, READING T1CH DIDN'T CLEAR IT -- OK!
5916 032410  004537  004064            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
5917 032414  120006                    T1LL
5918 032416  002454                    TMP6
5919 032420  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
5920 032422                            ERROR                   ;ELSE, REPORT IT
     032422  104460                                                    TRAP    C$ERROR
5921 032424                            ESCAPE  TST             ;       AND EXIT THIS TEST
     032424  104410                                                    TRAP    C$ESCAPE
     032426  003464                                                    .WORD   L10073-.
5922 032430  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
5923 032434  120007                    T1LH
5924 032436  002456                    TMP7
5925 032440  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
```

```
032442                                      ERROR                           ;ELSE, REPORT IT
032442  104460                                                                                      TRAP    C$ERROR
032444                                      ESCAPE  TST                     ;       AND EXIT THIS TEST
032444  104410                                                                                      TRAP    C$ESCAPE
032446  003444                                                                                      .WORD   L10073-.
032450                                      GEDF    EM50G,ERR50             ;IF CLEARED!  BAD VIA CHIP!
                                                                            ;       "DEVICE FATAL" ERROR # 57
032450  104455                                                                                      TRAP    C$ERDF
032452  000071                                                                                      .WORD   57
032454  016406                                                                                      .WORD   EM50G
032456  010762                                                                                      .WORD   ERR50
032460  000507                              BR      28$                     ;BYPASS THE REST OF THIS SECTION OF TESTING

032462  004537  004064          21$:        JSR     R5,READ                 ;READ T1L-L (ADDR 06)
032466  120006                              T1LL
032470  002454                              TMP6                            ;THIS SHOULD RETURN A 001
032472  103003                              BCC     .+10                    ;IF NO ERROR, PROCEED
032474                                      ERROR                           ;ELSE, REPORT IT
032474  104460                                                                                      TRAP    C$ERROR
032476                                      ESCAPE  TST                     ;       AND EXIT THIS TEST
032476  104410                                                                                      TRAP    C$ESCAPE
032500  003412                                                                                      .WORD   L10073-.
032502  123737  002454  032176              CMPB    TMP6,18$                ;CHECK T1L-L (ADDR 06) AGAINST LOADED VALUE
032510  001415                              BEQ     23$                     ;IF SAME, PROCEED
032512  004537  004064                      JSR     R5,READ                 ;GET T1LH FOR ERROR MESSAGE
032516  120007                              T1LH
032520  002456                              TMP7
032522  103003                              BCC     .+10                    ;IF NO ERROR, PROCEED
032524                                      ERROR                           ;ELSE, REPORT IT
032524  104460                                                                                      TRAP    C$ERROR
032526                                      ESCAPE  TST                     ;       AND EXIT THIS TEST
032526  104410                                                                                      TRAP    C$ESCAPE
032530  003362                                                                                      .WORD   L10073-.
032532                                      GEDF    EM50H,ERR50             ;ELSE, REPORT BAD LOAD OF T1L-L (ADDR 06)
                                                                            ;       "DEVICE FATAL" ERROR # 58
032532  104455                                                                                      TRAP    C$ERDF
032534  000072                                                                                      .WORD   58
032536  016450                                                                                      .WORD   EM50H
032540  010762                                                                                      .WORD   ERR50
032542  000456                              BR      28$                     ;BYPASS THE REST OF THIS SECTION OF TESTING

032544  004737  036146          23$:        JSR     PC,GETT1                ;IS "T1" STILL SET?
032550  102002                              BVC     .+6                     ;IF NO ERROR, PROCEED
032552                                      ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
032552  104410                                                                                      TRAP    C$ESCAPE
032554  000630                                                                                      .WORD   L10074-.
032556  103415                              BCS     24$                     ;YES, ALL'S OK
032560  004537  004064                      JSR     R5,READ                 ;GET T1LH FOR ERROR MESSAGE
032564  120007                              T1LH
032566  002456                              TMP7
032570  103003                              BCC     .+10                    ;IF NO ERROR, PROCEED
032572                                      ERROR                           ;ELSE, REPORT IT
032572  104460                                                                                      TRAP    C$ERROR
032574                                      ESCAPE  TST                     ;       AND EXIT THIS TEST
032574  104410                                                                                      TRAP    C$ESCAPE
032576  003314                                                                                      .WORD   L10073-.
032600                                      GEDF    EM50I,ERR50             ;NO!  BAD VIA CHIP!
```

```
                                                        ;       "DEVICE FATAL" ERROR # 59
     032600  104455                                                              TRAP    C$ERDF
     032602  000073                                                              .WORD   59
     032604  016536                                                              .WORD   EM50I
     032606  010762                                                              .WORD   ERR50
5959 032610  000433                    BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
5960
5961 032612  004537  004064    24$:    JSR     R5,READ         ;READ T1L-H (ADDR 07)
5962 032616  120007                    T1LH
5963 032620  002456                    TMP7                    ;THIS SHOULD RETURN A 000
5964 032622  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
5965 032624                            ERROR                   ;ELSE, REPORT IT
     032624  104460                                                              TRAP    C$ERROR
5966 032626                            ESCAPE  TST             ;       AND EXIT THIS TEST
     032626  104410                                                              TRAP    C$ESCAPE
     032630  003262                                                              .WORD   L10073-.
5967 032632  123737  002456  032177    CMPB    TMP7,19$        ;CHECK T1L-H (ADDR 07) AGAINST LOADED VALUE
5968 032640  001405                    BEQ     26$             ;IF SAME, PROCEED
5969 032642                            GEDF    EM50J,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-H (ADDR 07)
                                                        ;       "DEVICE FATAL" ERROR # 60
     032642  104455                                                              TRAP    C$ERDF
     032644  000074                                                              .WORD   60
     032646  016600                                                              .WORD   EM50J
     032650  010762                                                              .WORD   ERR50
5970 032652  000412                    BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
5971
5972 032654  004737  036146    26$:    JSR     PC,GETT1        ;IS "T1" STILL SET?
5973 032660  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
5974 032662                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     032662  104410                                                              TRAP    C$ESCAPE
     032664  000520                                                              .WORD   L10074-.
5975 032666  103404                    BCS     28$             ;YES, ALL'S OK
5976 032670                            GEDF    EM50K,ERR50     ;NO!  BAD VIA CHIP!
                                                        ;       "DEVICE FATAL" ERROR # 61
     032670  104455                                                              TRAP    C$ERDF
     032672  000075                                                              .WORD   61
     032674  016666                                                              .WORD   EM50K
     032676  010762                                                              .WORD   ERR50
5977
5978                        ;-------------------------------------------------------------------------
5979
5980 032700  004537  004064    28$:    JSR     R5,READ         ;READ T1C-L (ADDR 04)
5981 032704  120004                    T1CL                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
5982 032706  002450                    TMP4                    ; ALMOST ANYTHING)
5983 032710  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
5984 032712                            ERROR                   ;ELSE, REPORT IT
     032712  104460                                                              TRAP    C$ERROR
5985 032714                            ESCAPE  TST             ;       AND EXIT THIS TEST
     032714  104410                                                              TRAP    C$ESCAPE
     032716  003174                                                              .WORD   L10073-.
5986 032720  004737  036146            JSR     PC,GETT1        ;IS "T1" CLEARED NOW
5987 032724  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
5988 032726                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     032726  104410                                                              TRAP    C$ESCAPE
     032730  000454                                                              .WORD   L10074-.
5989 032732  103024                    BCC     29$             ;YES, ALL'S OK
5990 032734  004537  004064            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
 5991 032740  120006                    T1LL
 5992 032742  002454                    TMP6
 5993 032744  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 5994 032746                            ERROR                   ;ELSE, REPORT IT
      032746  104460                                                    TRAP    C$ERROR
 5995 032750                            ESCAPE  TST             ;       AND EXIT THIS TEST
      032750  104410                                                    TRAP    C$ESCAPE
      032752  003140                                                    .WORD   L10073-.
 5996 032754  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 5997 032760  120007                    T1LH
 5998 032762  002456                    TMP7
 5999 032764  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 6000 032766                            ERROR                   ;ELSE, REPORT IT
      032766  104460                                                    TRAP    C$ERROR
 6001 032770                            ESCAPE  TST             ;       AND EXIT THIS TEST
      032770  104410                                                    TRAP    C$ESCAPE
      032772  003120                                                    .WORD   L10073-.
 6002 032774                            GEDF    EM50C,ERR50     ;NO!  BAD VIA CHIP!
                                                                ;       "DEVICE FATAL" ERROR # 62
      032774  104455                                                    TRAP    C$ERDF
      032776  000076                                                    .WORD   62
      033000  016203                                                    .WORD   EM50C
      033002  010762                                                    .WORD   ERR50
 6003
 6004                       ;-------------------------------------------------------------------------
 6005
 6006 033004  004537  004310    29$:    JSR     R5,WRITE        ;RE-WRITE INTO T1C-H (ADDR 05) TO SET T1 AGAIN
 6007 033010  120005                    T1CH
 6008 033012  002453                    TMP5+1
 6009 033014  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 6010 033016                            ERROR                   ;ELSE, REPORT IT
      033016  104460                                                    TRAP    C$ERROR
 6011 033020                            ESCAPE  TST             ;       AND EXIT THIS TEST
      033020  104410                                                    TRAP    C$ESCAPE
      033022  003070                                                    .WORD   L10073-.
 6012 033024  004737  036146            JSR     PC,GETT1        ;IS "T1" SET AGAIN
 6013 033030  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 6014 033032                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
      033032  104410                                                    TRAP    C$ESCAPE
      033034  000350                                                    .WORD   L10074-.
 6015 033036  103426                    BCS     32$             ;YES, ALL'S WELL (AGAIN?)
 6016 033040  004537  004064            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 6017 033044  120006                    T1LL
 6018 033046  002454                    TMP6
 6019 033050  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 6020 033052                            ERROR                   ;ELSE, REPORT IT
      033052  104460                                                    TRAP    C$ERROR
 6021 033054                            ESCAPE  TST             ;       AND EXIT THIS TEST
      033054  104410                                                    TRAP    C$ESCAPE
      033056  003034                                                    .WORD   L10073-.
 6022 033060  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 6023 033064  120007                    T1LH
 6024 033066  002456                    TMP7
 6025 033070  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 6026 033072                            ERROR                   ;ELSE, REPORT IT
      033072  104460                                                    TRAP    C$ERROR
 6027 033074                            ESCAPE  TST             ;       AND EXIT THIS TEST
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
        033074  104410                                                  TRAP    C$ESCAPE
        033076  003014                                                  .WORD   L10073-.
   6028 033100                          GEDF    EM50L,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
                                                                ;       "DEVICE FATAL" ERROR # 63
        033100  104455                                                  TRAP    C$ERDF
        033102  000077                                                  .WORD   63
        033104  016730                                                  .WORD   EM50L
        033106  010762                                                  .WORD   ERR50
   6029 033110                          ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
        033110  104410                                                  TRAP    C$ESCAPE
        033112  000272                                                  .WORD   L10074-.
   6030
   6031                         ;-------------------------------------------------------------------------
   6032
   6033 033114  112737  000125  002455  32$:    MOVB    #125,TMP6+1     ;USING A DIFFERENT VALUE -- 55 HEX.,
   6034 033122  004537  004310                  JSR     R5,WRITE        ;RE-LOAD T1L-L (ADDR 06)
   6035 033126  120006                          T1LL
   6036 033130  002455                          TMP6+1
   6037 033132  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
   6038 033134                                  ERROR                   ;ELSE, REPORT IT
        033134  104460                                                  TRAP    C$ERROR
   6039 033136                          ESCAPE  TST             ;       AND EXIT THIS TEST
        033136  104410                                                  TRAP    C$ESCAPE
        033140  002752                                                  .WORD   L10073-.
   6040 033142  004737  036146                  JSR     PC,GETT1        ;IS "T1" STILL SET?
   6041 033146  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
   6042 033150                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        033150  104410                                                  TRAP    C$ESCAPE
        033152  000232                                                  .WORD   L10074-.
   6043 033154  103426                          BCS     33$             ;YES, ALL'S STILL OK
   6044 033156  004537  004064                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
   6045 033162  120006                          T1LL
   6046 033164  002454                          TMP6
   6047 033166  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
   6048 033170                                  ERROR                   ;ELSE, REPORT IT
        033170  104460                                                  TRAP    C$ERROR
   6049 033172                          ESCAPE  TST             ;       AND EXIT THIS TEST
        033172  104410                                                  TRAP    C$ESCAPE
        033174  002716                                                  .WORD   L10073-.
   6050 033176  004537  004064                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
   6051 033202  120007                          T1LH
   6052 033204  002456                          TMP7
   6053 033206  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
   6054 033210                                  ERROR                   ;ELSE, REPORT IT
        033210  104460                                                  TRAP    C$ERROR
   6055 033212                          ESCAPE  TST             ;       AND EXIT THIS TEST
        033212  104410                                                  TRAP    C$ESCAPE
        033214  002676                                                  .WORD   L10073-.
   6056 033216                          GEDF    EM50M,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
                                                                ;       "DEVICE FATAL" ERROR # 64
        033216  104455                                                  TRAP    C$ERDF
        033220  000100                                                  .WORD   64
        033222  017012                                                  .WORD   EM50M
        033224  010762                                                  .WORD   ERR50
   6057 033226                          ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
        033226  104410                                                  TRAP    C$ESCAPE
        033230  000154                                                  .WORD   L10074-.
```

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                                        ;------------------------------------------------------------------------------
033232 112737 000125 002453  33$:       MOVB    #125,TMP5+1     ;AND USING THE SAME VALUE AGAIN (55 HEX),
033240 004537 004310                    JSR     R5,WRITE        ;NOW LOAD T1C-H (ADDR 05)
033244 120005                           T1CH
033246 002453                           TMP5+1
033250 103003                           BCC     .+10            ;IF NO ERROR, PROCEED
033252                                  ERROR                   ;ELSE, REPORT IT
033252 104460                                                                           TRAP    C$ERROR
033254                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033254 104410                                                                           TRAP    C$ESCAPE
033256 002634                                                                           .WORD   L10073-.
033260 004737 036146                    JSR     PC,GETT1        ;"T1" SHOULD NOW BE CLEARED
033264 102002                           BVC     .+6             ;IF NO ERROR, PROCEED
033266                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
033266 104410                                                                           TRAP    C$ESCAPE
033270 000114                                                                           .WORD   L10074-.
033272 103044                           BCC     34$             ;IT WAS, ALL'S WELL THAT END'S WELL (I THINK!?)
033274 004537 004064                    JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
033300 120004                           T1CL
033302 002450                           TMP4
033304 103003                           BCC     .+10            ;IF NO ERROR, PROCEED
033306                                  ERROR                   ;ELSE, REPORT IT
033306 104460                                                                           TRAP    C$ERROR
033310                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033310 104410                                                                           TRAP    C$ESCAPE
033312 002600                                                                           .WORD   L10073-.
033314 004537 004064                    JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
033320 120005                           T1CH
033322 002452                           TMP5
033324 103003                           BCC     .+10            ;IF NO ERROR, PROCEED
033326                                  ERROR                   ;ELSE, REPORT IT
033326 104460                                                                           TRAP    C$ERROR
033330                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033330 104410                                                                           TRAP    C$ESCAPE
033332 002560                                                                           .WORD   L10073-.
033334 004537 004064                    JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
033340 120006                           T1LL
033342 002454                           TMP6
033344 103003                           BCC     .+10            ;IF NO ERROR, PROCEED
033346                                  ERROR                   ;ELSE, REPORT IT
033346 104460                                                                           TRAP    C$ERROR
033350                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033350 104410                                                                           TRAP    C$ESCAPE
033352 002540                                                                           .WORD   L10073-.
033354 004537 004064                    JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
033360 120007                           T1LH
033362 002456                           TMP7
033364 103003                           BCC     .+10            ;IF NO ERROR, PROCEED
033366                                  ERROR                   ;ELSE, REPORT IT
033366 104460                                                                           TRAP    C$ERROR
033370                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033370 104410                                                                           TRAP    C$ESCAPE
033372 002520                                                                           .WORD   L10073-.
033374                                  GEDF    EM50N,ERR50     ;IT WASN'T!  SOMETHING WENT WRONG!  REPORT IT
                                                                ;       "DEVICE FATAL" ERROR # 65
```

```
                033374  104455                                                          TRAP    C$ERDF
                033376  000101                                                          .WORD   65
                033400  017054                                                          .WORD   EMSON
                033402  010762                                                          .WORD   ERR50
 6097
 6098 033404                        34$:    ENDSUB
                033404                                                          L10074:
                033404  104403                                                          TRAP    C$ESUB
 6099           ;*****************************************************************************
 6100
 6101           ; TEST TIMER # 1 USING ONE-SHOT MODE WITH OUTPUT ON PB7 ENABLED.
 6102
 6103 033406                        BGNSUB
                033406                                                          T27.2:
                033406  104402                                                          TRAP    C$BSUB
 6104 033410  004737  003762        JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
 6105 033414  103003                BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
 6106 033416                        ERROR                   ;ELSE, REPORT ERROR
                033416  104460                                                          TRAP    C$ERROR
 6107 033420                        ESCAPE  TST             ;   & EXIT TEST
                033420  104410                                                          TRAP    C$ESCAPE
                033422  002470                                                          .WORD   L10073-.
 6108 033424  004537  004660  1$:    JSR     R5,INITT1       ;INITIALIZE TIMER # 1
 6109 033430  000000                0                       ;       0 ==> LATCHES
 6110 033432  000200                BIT7                    ;       MODE 2 & "T1" INT. ENABLE FLAG CLEARED
 6111 033434  103003                BCC     .+10            ;IF NO ERROR, PROCEED
 6112 033436                        ERROR                   ;ELSE, REPORT IT
                033436  104460                                                          TRAP    C$ERROR
 6113 033440                        ESCAPE  TST             ;       AND EXIT THIS TEST
                033440  104410                                                          TRAP    C$ESCAPE
                033442  002450                                                          .WORD   L10073-.
 6114
 6115           ; MODE 2 IS ONE-SHOT MODE WITH OUTPUT ON PB7 CONTROLED BY TIMER 1
 6116
 6117 033444  004737  036146        JSR     PC,GETT1        ;IS "T1" SET?
 6118 033450  102002                BVC     .+6             ;IF NO ERROR, PROCEED
 6119 033452                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                033452  104410                                                          TRAP    C$ESCAPE
                033454  002434                                                          .WORD   L10075-.
 6120 033456  103123                BCC     6$              ;NO, GOOD.
 6121                                                       ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
 6122 033460  004537  004064        JSR     R5,READ         ;GET ACR FOR ERROR MESSAGE
 6123 033464  120013                ACR
 6124 033466  002466                TMPB
 6125 033470  103003                BCC     .+10            ;IF NO ERROR, PROCEED
 6126 033472                        ERROR                   ;ELSE, REPORT IT
                033472  104460                                                          TRAP    C$ERROR
 6127 033474                        ESCAPE  TST             ;       AND EXIT THIS TEST
                033474  104410                                                          TRAP    C$ESCAPE
                033476  002414                                                          .WORD   L10073-.
 6128 033500  004537  004064        JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
 6129 033504  120004                T1CL
 6130 033506  002450                TMP4
 6131 033510  103003                BCC     .+10            ;IF NO ERROR, PROCEED
 6132 033512                        ERROR                   ;ELSE, REPORT IT
                033512  104460                                                          TRAP    C$ERROR
 6133 033514                        ESCAPE  TST             ;       AND EXIT THIS TEST
```

```
     033514  104410                                                                                  TRAP    C$ESCAPE
     033516  002374                                                                                  .WORD   L10073-.
     033520  004537  004064                JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
     033524  120005                        T1CH
     033526  002452                        TMP5
     033530  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
     033532                                ERROR                   ;ELSE, REPORT IT
     033532  104460                                                                                  TRAP    C$ERROR
     033534                                ESCAPE  TST             ;       AND EXIT THIS TEST
     033534  104410                                                                                  TRAP    C$ESCAPE
     033536  002354                                                                                  .WORD   L10073-.
     033540  004537  004064                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
     033544  120006                        T1LL
     033546  002454                        TMP6
     033550  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
     033552                                ERROR                   ;ELSE, REPORT IT
     033552  104460                                                                                  TRAP    C$ERROR
     033554                                ESCAPE  TST             ;       AND EXIT THIS TEST
     033554  104410                                                                                  TRAP    C$ESCAPE
     033556  002334                                                                                  .WORD   L10073-.
     033560  004537  004064                JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
     033564  120007                        T1LH
     033566  002456                        TMP7
     033570  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
     033572                                ERROR                   ;ELSE, REPORT IT
     033572  104460                                                                                  TRAP    C$ERROR
     033574                                ESCAPE  TST             ;       AND EXIT THIS TEST
     033574  104410                                                                                  TRAP    C$ESCAPE
     033576  002314                                                                                  .WORD   L10073-.
     033600                                GEDF    EM50A,ERR50     ;REPORT "T1" NOT CLEARED @ INIT.
                                                                   ;       "DEVICE FATAL" ERROR # 66
     033600  104455                                                                                  TRAP    C$ERDF
     033602  000102                                                                                  .WORD   66
     033604  016067                                                                                  .WORD   EM50A
     033606  010762                                                                                  .WORD   ERR50



                              ;--------------------------------------------------------------------------------
     033610  112737  000002  002453        MOVB    #2,TMP5+1
     033616  004537  004310                JSR     R5,WRITE        ;INIT TIMER # 1 BY WRITING INTO
     033622  120005                        T1CH                    ;T1C-H (ADDR 05)
     033624  002453                        TMP5+1
     033626  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
     033630                                ERROR                   ;ELSE, REPORT IT
     033630  104460                                                                                  TRAP    C$ERROR
     033632                                ESCAPE  TST             ;       AND EXIT THIS TEST
     033632  104410                                                                                  TRAP    C$ESCAPE
     033634  002256                                                                                  .WORD   L10073-.
     033636  004737  036146                JSR     PC,GETT1        ;IS "T1" SET?
     033642  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
     033644                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     033644  104410                                                                                  TRAP    C$ESCAPE
     033646  002242                                                                                  .WORD   L10075-.
     033650  103026                        BCC     6$              ;NO, GOOD.
                                                                   ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
     033652  004537  004064                JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
     033656  120005                        T1CH
```

```
033660  002452                          TMP5
033662  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
033664                                  ERROR                   ;ELSE, REPORT IT
033664  104460                                                                          TRAP    C$ERROR
033666                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033666  104410                                                                          TRAP    C$ESCAPE
033670  002222                                                                          .WORD   L10073-.
033672  004537  004064                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
033676  120007                          T1LH
033700  002456                          TMP7
033702  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
033704                                  ERROR                   ;ELSE, REPORT IT
033704  104460                                                                          TRAP    C$ERROR
033706                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033706  104410                                                                          TRAP    C$ESCAPE
033710  002202                                                                          .WORD   L10073-.
033712                                  GEDF    EM50B,ERR50     ;REPORT "T1" NOT CLEARED @ INIT.
                                                                ;       "DEVICE FATAL" ERROR # 67
033712  104455                                                                          TRAP    C$ERDF
033714  000103                                                                          .WORD   67
033716  016135                                                                          .WORD   EM50B
033720  010762                                                                          .WORD   ERR50
033722                                  ESCAPE  SUB             ;AND EXIT SUBTEST
033722  104410                                                                          TRAP    C$ESCAPE
033724  002164                                                                          .WORD   L10075-.


                        ;--------------------------------------------------------------------------------
033726  004737  003762          6$:     JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP AGAIN
033732  112737  000377  002445          MOVB    #377,TMP2+1     ;INITIAL VALUE FOR DDRB
033740  004537  004310                  JSR     R5,WRITE        ;LOAD IT
033744  120002                          DDRB
033746  002445                          TMP2+1
033750  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
033752                                  ERROR                   ;ELSE, REPORT IT
033752  104460                                                                          TRAP    C$ERROR
033754                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033754  104410                                                                          TRAP    C$ESCAPE
033756  002134                                                                          .WORD   L10073-.
033760  004537  004660                  JSR     R5,INITT1       ;RE-INITIALIZE THE TIMER
033764  000000                          0                       ;       FOR MAXIMUM TIMEOUT
033766  000200                          BIT7                    ;       MODE 2 & CLEARED "T1" INT. FLAG
033770  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
033772                                  ERROR                   ;ELSE, REPORT IT
033772  104460                                                                          TRAP    C$ERROR
033774                                  ESCAPE  TST             ;       AND EXIT THIS TEST
033774  104410                                                                          TRAP    C$ESCAPE
033776  002114                                                                          .WORD   L10073-.
034000  004537  004064                  JSR     R5,READ         ;GET ACR FOR FUTURE ERROR MESSAGES
034004  120013                          ACR
034006  002466                          TMPB
034010  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
034012                                  ERROR                   ;ELSE, REPORT IT
034012  104460                                                                          TRAP    C$ERROR
034014                                  ESCAPE  TST             ;       AND EXIT THIS TEST
034014  104410                                                                          TRAP    C$ESCAPE
034016  002074                                                                          .WORD   L10073-.
```

```
6205 034020  004537  036114          JSR     R5,LODT1C       ;LOAD TIMER # 1
6206 034024     252              7$:  .BYTE   252
6207 034025     252              8$:  .BYTE   252
6208
6209                             ;-------------------------------------------------------------------------------
6210
6211 034026  004737  036332          JSR     PC,GETPB7       ;GET "PB7".  IS IT CLEARED?
6212 034032  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
6213 034034                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     034034  104410                                                          TRAP    C$ESCAPE
     034036  002052                                                          .WORD   L10075-.
6214 034040  103070                  BCC     9$              ;IT IS, GOOD
6215 034042  004537  004064          JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
6216 034046  120015                  IFR
6217 034050  002472                  TMPD
6218 034052  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6219 034054                          ERROR                   ;ELSE, REPORT IT
     034054  104460                                                          TRAP    C$ERROR
6220 034056                          ESCAPE  TST             ;       AND EXIT THIS TEST
     034056  104410                                                          TRAP    C$ESCAPE
     034060  002032                                                          .WORD   L10073-.
6221 034062  004537  004064          JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
6222 034066  120004                  T1CL
6223 034070  002450                  TMP4
6224 034072  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6225 034074                          ERROR                   ;ELSE, REPORT IT
     034074  104460                                                          TRAP    C$ERROR
6226 034076                          ESCAPE  TST             ;       AND EXIT THIS TEST
     034076  104410                                                          TRAP    C$ESCAPE
     034100  002012                                                          .WORD   L10073-.
6227 034102  004537  004064          JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
6228 034106  120005                  T1CH
6229 034110  002452                  TMP5
6230 034112  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6231 034114                          ERROR                   ;ELSE, REPORT IT
     034114  104460                                                          TRAP    C$ERROR
6232 034116                          ESCAPE  TST             ;       AND EXIT THIS TEST
     034116  104410                                                          TRAP    C$ESCAPE
     034120  001772                                                          .WORD   L10073-.
6233 034122  004537  004064          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
6234 034126  120006                  T1LL
6235 034130  002454                  TMP6
6236 034132  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6237 034134                          ERROR                   ;ELSE, REPORT IT
     034134  104460                                                          TRAP    C$ERROR
6238 034136                          ESCAPE  TST             ;       AND EXIT THIS TEST
     034136  104410                                                          TRAP    C$ESCAPE
     034140  001752                                                          .WORD   L10073-.
6239 034142  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
6240 034146  120007                  T1LH
6241 034150  002456                  TMP7
6242 034152  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6243 034154                          ERROR                   ;ELSE, REPORT IT
     034154  104460                                                          TRAP    C$ERROR
6244 034156                          ESCAPE  TST             ;       AND EXIT THIS TEST
     034156  104410                                                          TRAP    C$ESCAPE
     034160  001732                                                          .WORD   L10073-.
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
6245 034162                                GEDF    EM50V,ERR50     ;NO, STILL(?) SET!
                                                                   ;       "DEVICE FATAL" ERROR # 68
     034162  104455                                                                TRAP    C$ERDF
     034164  000104                                                                .WORD   68
     034166  017240                                                                .WORD   EM50V
     034170  010762                                                                .WORD   ERR50
6246 034172  004737  036204                    JSR     PC,KICKT1       ;BECAUSE THE ERROR MESSAGE TAKES SO LONG TO
6247 034176  103003                            BCC     .+10            ;IF NO ERROR, PROCEED
6248 034200                                    ERROR                   ;ELSE, REPORT IT
     034200  104460                                                                TRAP    C$ERROR
6249 034202                                    ESCAPE  TST             ;       AND EXIT THIS TEST
     034202  104410                                                                TRAP    C$ESCAPE
     034204  001706                                                                .WORD   L10073-.
6250 034206  004737  005032                    JSR     PC,STALL        ;  PROCESS & PRINT, RE-START THE TIMER AND THEN
6251 034212  004737  005032                    JSR     PC,STALL        ;  DELAY FOR A LITTLE WHILE SO IT CAN DECREMENT
6252 034216  012703  000100          10$:      MOV     #100,R3         ;# INIT. "REPEAT" VALUE
6253 034222  004537  004064          9$:       JSR     R5,READ         ;READ THE LOW COUNTER
6254 034226  120004                            T1CL
6255 034230  002450                            TMP4
6256 034232  103003                            BCC     .+10            ;IF NO ERROR, PROCEED
6257 034234                                    ERROR                   ;ELSE, REPORT IT
     034234  104460                                                                TRAP    C$ERROR
6258 034236                                    ESCAPE  TST             ;       AND EXIT THIS TEST
     034236  104410                                                                TRAP    C$ESCAPE
     034240  001652                                                                .WORD   L10073-.
6259 034242  123737  002450  034024            CMPB    TMP4,7$         ;MAKE SURE THE COUNTER IS DECREMENTING
6260 034250  001013                            BNE     12$             ;IT IS, NOW SEE IF THE HIGH COUNTER IS TOO
6261 034252  077315                            SOB     R3,9$           ;# NO: IF NOT 64. ATTEMPTS, TRY AGAIN
6262 034254                                    GEDF    EM50D,ERR50     ;IT WASN'T -- REPORT THE ERROR
                                                                   ;       "DEVICE FATAL" ERROR # 69
     034254  104455                                                                TRAP    C$ERDF
     034256  000105                                                                .WORD   69
     034260  016251                                                                .WORD   EM50D
     034262  010762                                                                .WORD   ERR50
6263 034264  004737  036204                    JSR     PC,KICKT1       ;RESTART TIMER AGAIN IF ERROR MESSAGE PRINTED
6264 034270  103003                            BCC     12$             ;IF NO ERROR, PROCEED
6265 034272                                    ERROR                   ;ELSE, REPORT IT
     034272  104460                                                                TRAP    C$ERROR
6266 034274                                    ESCAPE  TST             ;       AND EXIT THIS TEST
     034274  104410                                                                TRAP    C$ESCAPE
     034276  001614                                                                .WORD   L10073-.
6267 034300  012703  000100          12$:      MOV     #100,R3         ;INIT. TIMEOUT VALUE
6268 034304  004537  004064          13$:      JSR     R5,READ         ;READ THE HIGH COUNTER
6269 034310  120005                            T1CH
6270 034312  002452                            TMP5
6271 034314  103003                            BCC     .+10            ;IF NO ERROR, PROCEED
6272 034316                                    ERROR                   ;ELSE, REPORT IT
     034316  104460                                                                TRAP    C$ERROR
6273 034320                                    ESCAPE  TST             ;       AND EXIT THIS TEST
     034320  104410                                                                TRAP    C$ESCAPE
     034322  001570                                                                .WORD   L10073-.
6274 034324  123737  002452  034025            CMPB    TMP5,8$         ;DID IT CHANGE FROM THE LOADED VALUE?
6275 034332  001027                            BNE     17$             ;YES, PROCEED WITH TESTING
6276 034334  077315                            SOB     R3,13$          ;NO,  IF NO TIMEOUT, TRY AGAIN
6277 034336  004537  004064                    JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
6278 034342  120006                            T1LL
6279 034344  002454                            TMP6
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
6280 034346  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6281 034350                            ERROR                   ;ELSE, REPORT IT
     034350  104460                                                    TRAP    C$ERROR
6282 034352                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034352  104410                                                    TRAP    C$ESCAPE
     034354  001536                                                    .WORD   L10073-.
6283 034356  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
6284 034362  120007                    T1LH
6285 034364  002456                    TMP7
6286 034366  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6287 034370                            ERROR                   ;ELSE, REPORT IT
     034370  104460                                                    TRAP    C$ERROR
6288 034372                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034372  104410                                                    TRAP    C$ESCAPE
     034374  001516                                                    .WORD   L10073-.
6289 034376                            GEDF    EM50E,ERR50     ;ELSE, REPORT THAT HIGH COUNTER ISN'T RUNNING
                                                               ;       "DEVICE FATAL" ERROR # 70
     034376  104455                                                    TRAP    C$ERDF
     034400  000106                                                    .WORD   70
     034402  016305                                                    .WORD   EM50E
     034404  010762                                                    .WORD   ERR50
6290 034406                            ESCAPE  SUB             ;IN THAT CASE, WE CAN'T PROCEED WITH TESTING EITHER
     034406  104410                                                    TRAP    C$ESCAPE
     034410  001500                                                    .WORD   L10075-.
6291                           ;-------------------------------------------------------------------------
6292
6293 034412  112737  000377  002445  17$:    MOVB    #377,TMP2+1     ;SETUP DDRB FOR DESIRED DIRECTION OF ORB
6294 034420  004537  004310            JSR     R5,WRITE
6295 034424  120002                    DDRB
6296 034426  002445                    TMP2+1
6297 034430  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6298 034432                            ERROR                   ;ELSE, REPORT IT
     034432  104460                                                    TRAP    C$ERROR
6299 034434                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034434  104410                                                    TRAP    C$ESCAPE
     034436  001454                                                    .WORD   L10073-.
6300 034440  004537  036114            JSR     R5,LODT1C       ;RE-LOAD TIMER # 1 WITH A VALUE WHICH WILL
6301 034444     001            18$:    .BYTE   1               ;   CAUSE AN ALMOST IMMEDIATE TIMEOUT
6302 034445     000            19$:    .BYTE   0               ; (ADDRESS OF HIGH BYTE FOR T1C-H (ADDR 05))
6303                           ;-------------------------------------------------------------------------
6304
6305 034446  004737  036146            JSR     PC,GETT1        ;WAS "T1" SET BY THE ABOVE OPERATION?
6306 034452  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
6307 034454                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     034454  104410                                                    TRAP    C$ESCAPE
     034456  001432                                                    .WORD   L10075-.
6308 034460  103446                    BCS     20$             ;YES, OK -- CONTINUE ERROR CHECKING
6309 034462  004537  004064            JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
6310 034466  120004                    T1CL
6311 034470  002450                    TMP4
6312 034472  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6313 034474                            ERROR                   ;ELSE, REPORT IT
     034474  104460                                                    TRAP    C$ERROR
6314 034476                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034476  104410                                                    TRAP    C$ESCAPE
     034500  001412                                                    .WORD   L10073-.
6315 034502  004537  004064            JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
6316 034506  120005                    T1CH
6317 034510  002452                    TMP5
6318 034512  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6319 034514                            ERROR                   ;ELSE, REPORT IT
     034514  104460                                                    TRAP    C$ERROR
6320 034516                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034516  104410                                                    TRAP    C$ESCAPE
     034520  001372                                                    .WORD   L10073-.
6321 034522  004537  004064          .     JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
6322 034526  120006                    T1LL
6323 034530  002454                    TMP6
6324 034532  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6325 034534                            ERROR                   ;ELSE, REPORT IT
     034534  104460                                                    TRAP    C$ERROR
6326 034536                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034536  104410                                                    TRAP    C$ESCAPE
     034540  001352                                                    .WORD   L10073-.
6327 034542  004537  004064          .     JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
6328 034546  120007                    T1LH
6329 034550  002456                    TMP7
6330 034552  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6331 034554                            ERROR                   ;ELSE, REPORT IT
     034554  104460                                                    TRAP    C$ERROR
6332 034556                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034556  104410                                                    TRAP    C$ESCAPE
     034560  001332                                                    .WORD   L10073-.
6333 034562                            GEDF    EM50F,ERR50     ;NO,  BAD NEWS!  REPORT THE FAILURE
                                                               ;       "DEVICE FATAL" ERROR # 71
     034562  104455                                                    TRAP    C$ERDF
     034564  000107                                                    .WORD   71
     034566  016341                                                    .WORD   EM50F
     034570   10762                                                    .WORD   ERR50
6334 034572                            ESCAPE  SUB             ;  AND GET OUT OF SUBTEST
     034572  104410                                                    TRAP    C$ESCAPE
     034574  001314                                                    .WORD   L10075-.
6335 034576  004737  036332  20$:     JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
6336 034602  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
6337 034604                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     034604  104410                                                    TRAP    C$ESCAPE
     034606  001302                                                    .WORD   L10075-.
6338 034610  103445                    BCS     41$             ;YES, CONTINUE CHECKING "T1"
6339 034612  004537  004064          .     JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
6340 034616  120004                    T1CL
6341 034620  002450                    TMP4
6342 034622  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6343 034624                            ERROR                   ;ELSE, REPORT IT
     034624  104460                                                    TRAP    C$ERROR
6344 034626                            ESCAPE  TST             ;       AND EXIT THIS TEST
     034626  104410                                                    TRAP    C$ESCAPE
     034630  001262                                                    .WORD   L10073-.
6345 034632  004537  004064          .     JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
6346 034636  120005                    T1CH
6347 034640  002452                    TMP5
6348 034642  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
6349 034644                            ERROR                   ;ELSE, REPORT IT
     034644  104460                                                    TRAP    C$ERROR
6350 034646                            ESCAPE  TST             ;       AND EXIT THIS TEST
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
        034646  104410                                                  TRAP    C$ESCAPE
        034650  001242                                                  .WORD   L10073-.
  6351  034652  004537  004064          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
  6352  034656  120006                  T1LL
  6353  034660  002454                  TMP6
  6354  034662  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
  6355  034664                          ERROR                   ;ELSE, REPORT IT
        034664  104460                                                  TRAP    C$ERROR
  6356  034666                          ESCAPE  TST             ;       AND EXIT THIS TEST
        034666  104410                                                  TRAP    C$ESCAPE
        034670  001222                                                  .WORD   L10073-.
  6357  034672  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
  6358  034676  120007                  T1LH
  6359  034700  002456                  TMP7
  6360  034702  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
  6361  034704                          ERROR                   ;ELSE, REPORT IT
        034704  104460                                                  TRAP    C$ERROR
  6362  034706                          ESCAPE  TST             ;       AND EXIT THIS TEST
        034706  104410                                                  TRAP    C$ESCAPE
        034710  001202                                                  .WORD   L10073-.
  6363  034712                        . GEDF    EM50S,ERR50     ;NO!  REPORT THAT PB7 DIDN'T GET SET!
                                                                ;       "DEVICE FATAL" ERROR # 72
        034712  104455                                                  TRAP    C$ERDF
        034714  000110                                                  .WORD   72
        034716  017122                                                  .WORD   EM50S
        034720  010762                                                  .WORD   ERR50
  6364  034722  000562                  BR      28$             ;   & EXIT THIS SECTION OF SUBTEST
  6365  034724  004537  004064  41$:    JSR     R5,READ         ;READ T1C-H (ADDR 05) TO SEE IF IT CLEARS "T1"
  6366  034730  120005                  T1CH                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
  6367  034732  002452                  TMP5                    ; ALMOST ANYTHING)
  6368  034734  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
  6369  034736                          ERROR                   ;ELSE, REPORT IT
        034736  104460                                                  TRAP    C$ERROR
  6370  034740                          ESCAPE  TST             ;       AND EXIT THIS TEST
        034740  104410                                                  TRAP    C$ESCAPE
        034742  001150                                                  .WORD   L10073-.
  6371  034744  004737  036146          JSR     PC,GETT1        ;PUT THE CURRENT "T1" VALUE INTO THE CARRY BIT
  6372  034750  102002                  BVC     11$             ;IF NO ERROR, PROCEED
  6373  034752                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        034752  104410                                                  TRAP    C$ESCAPE
        034754  001134                                                  .WORD   L10075-.
  6374  034756  103435          11$:    BCS     21$             ;IF SET, ALL'S OK
  6375                                                          ;IF CLEARED!  BAD VIA CHIP!
  6376  034760  004537  004064          JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
  6377  034764  120004                  T1CL
  6378  034766  002450                  TMP4
  6379  034770  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
  6380  034772                          ERROR                   ;ELSE, REPORT IT
        034772  104460                                                  TRAP    C$ERROR
  6381  034774                          ESCAPE  TST             ;       AND EXIT THIS TEST
        034774  104410                                                  TRAP    C$ESCAPE
        034776  001114                                                  .WORD   L10073-.
  6382  035000  004537  004064          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
  6383  035004  120006                  T1LL
  6384  035006  002454                  TMP6
  6385  035010  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
  6386  035012                          ERROR                   ;ELSE, REPORT IT
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
        035012  104460                                                          TRAP    C$ERROR
 6387   035014                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035014  104410                                                          TRAP    C$ESCAPE
        035016  001074                                                          .WORD   L10073-.
 6388   035020  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 6389   035024  120007                  T1LH
 6390   035026  002456                  TMP7
 6391   035030  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 6392   035032                          ERROR                   ;ELSE, REPORT IT
        035032  104460                                                          TRAP    C$ERROR
 6393   035034                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035034  104410                                                          TRAP    C$ESCAPE
        035036  001054                                                          .WORD   L10073-.
 6394   035040                          GEDF    EM50G,ERR50     ;REPORT BAD VIA CHIP!
                                                                ;       "DEVICE FATAL" ERROR # 73
        035040  104455                                                          TRAP    C$ERDF
        035042  000111                                                          .WORD   73
        035044  016406                                                          .WORD   EM50G
        035046  010762                                                          .WORD   ERR50
 6395   035050  000507                  BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 6396
 6397   035052  004537  004064  21$:    JSR     R5,READ         ;READ T1L-L (ADDR 06)
 6398   035056  120006                  T1LL
 6399   035060  002454                  TMP6                    ;THIS SHOULD RETURN A 001
 6400   035062  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 6401   035064                          ERROR                   ;ELSE, REPORT IT
        035064  104460                                                          TRAP    C$ERROR
 6402   035066                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035066  104410                                                          TRAP    C$ESCAPE
        035070  001022                                                          .WORD   L10073-.
 6403   035072  123737  002454  034444  CMPB    TMP6,18$        ;CHECK T1L-L (ADDR 06) AGAINST LOADED VALUE
 6404   035100  001415                  BEQ     23$             ;IF SAME, PROCEED
 6405                                                           ;ELSE, REPORT BAD LOAD OF T1L-L (ADDR 06)
 6406   035102  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 6407   035106  120007                  T1LH
 6408   035110  002456                  TMP7
 6409   035112  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 6410   035114                          ERROR                   ;ELSE, REPORT IT
        035114  104460                                                          TRAP    C$ERROR
 6411   035116                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035116  104410                                                          TRAP    C$ESCAPE
        035120  000772                                                          .WORD   L10073-.
 6412   035122                          GEDF    EM50H,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-L (ADDR 06)
                                                                ;       "DEVICE FATAL" ERROR # 74
        035122  104455                                                          TRAP    C$ERDF
        035124  000112                                                          .WORD   74
        035126  016450                                                          .WORD   EM50H
        035130  010762                                                          .WORD   ERR50
 6413   035132  000456                  BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 6414
 6415   035134  004737  036146  23$:    JSR     PC,GETT1        ;IS "T1" STILL SET?
 6416   035140  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
 6417   035142                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        035142  104410                                                          TRAP    C$ESCAPE
        035144  000744                                                          .WORD   L10075-.
 6418   035146  103415                  BCS     24$             ;YES, ALL'S OK
 6419                                                           ;NO!  BAD VIA CHIP!
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
6420 035150  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
6421 035154  120007                     T1LH
6422 035156  002456                     TMP7
6423 035160  103003                     BCC     .+10            ;IF NO ERROR, PROCEED
6424 035162                             ERROR                   ;ELSE, REPORT IT
     035162  104460                                                     TRAP    C$ERROR
6425 035164                             ESCAPE  TST             ;       AND EXIT THIS TEST
     035164  104410                                                     TRAP    C$ESCAPE
     035166  000724                                                     .WORD   L10073-.
6426 035170                             GEDF    EM50I,ERR50     ;REPORT BAD VIA CHIP!
                                                                ;       "DEVICE FATAL" ERROR # 75
     035170  104455                                                     TRAP    C$ERDF
     035172  000113                                                     .WORD   75
     035174  016536                                                     .WORD   EM50I
     035176  010762                                                     .WORD   ERR50
6427 035200  000433                     BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
6428
6429 035202  004537  004064      24$:   JSR     R5,READ         ;READ T1L-H (ADDR 07)
6430 035206  120007                     T1LH
6431 035210  002456                     TMP7                    ;THIS SHOULD RETURN A 000
6432 035212  103003                     BCC     .+10            ;IF NO ERROR, PROCEED
6433 035214                             ERROR                   ;ELSE, REPORT IT
     035214  104460                                                     TRAP    C$ERROR
6434 035216                             ESCAPE  TST             ;       AND EXIT THIS TEST
     035216  104410                                                     TRAP    C$ESCAPE
     035220  000672                                                     .WORD   L10073-.
6435 035222  123737  002456  034445     CMPB    TMP7,19$        ;CHECK T1L-H (ADDR 07) AGAINST LOADED VALUE
6436 035230  001405                     BEQ     26$             ;IF SAME, PROCEED
6437 035232                             GEDF    EM50J,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-H (ADDR 07)
                                                                ;       "DEVICE FATAL" ERROR # 76
     035232  104455                                                     TRAP    C$ERDF
     035234  000114                                                     .WORD   76
     035236  016600                                                     .WORD   EM50J
     035240  010762                                                     .WORD   ERR50
6438 035242  000412                     BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
6439
6440 035244  004737  036146      26$:   JSR     PC,GETT1        ;IS "T1" STILL SET?
6441 035250  102002                     BVC     .+6             ;IF NO ERROR, PROCEED
6442 035252                             ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     035252  104410                                                     TRAP    C$ESCAPE
     035254  000634                                                     .WORD   L10075-.
6443 035256  103404                     BCS     28$             ;YES, ALL'S OK
6444 035260                             GEDF    EM50K,ERR50     ;NO!  BAD VIA CHIP!
                                                                ;       "DEVICE FATAL" ERROR # 77
     035260  104455                                                     TRAP    C$ERDF
     035262  000115                                                     .WORD   77
     035264  016666                                                     .WORD   EM50K
     035266  010762                                                     .WORD   ERR50
6445
6446                            ;-------------------------------------------------------------------------------
6447
6448 035270  004537  004064      28$:   JSR     R5,READ         ;READ T1C-L (ADDR 04) TO CLEAR "T1"
6449 035274  120004                     T1CL                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
6450 035276  002450                     TMP4                    ; ALMOST ANYTHING)
6451 035300  103003                     BCC     .+10            ;IF NO ERROR, PROCEED
6452 035302                             ERROR                   ;ELSE, REPORT IT
     035302  104460                                                     TRAP    C$ERROR
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
6453 035304                          ESCAPE  TST             ;       AND EXIT THIS TEST
     035304  104410                                                      TRAP    C$ESCAPE
     035306  000604                                                      .WORD   L10073-.
6454 035310  004737  036146          JSR     PC,GETT1        ;IS "T1" CLEARED NOW
6455 035314  102002                  BVC     16$             ;IF NO ERROR, PROCEED
6456 035316                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     035316  104410                                                      TRAP    C$ESCAPE
     035320  000570                                                      .WORD   L10075-.
6457 035322  103004          16$:    BCC     29$             ;YES, ALL'S OK
6458 035324                          GEDF    EM50C,ERR50     ;NO!  BAD VIA CHIP!
                                                             ;       "DEVICE FATAL" ERROR # 78
     035324  104455                                                      TRAP    C$ERDF
     035326  000116                                                      .WORD   78
     035330  016203                                                      .WORD   EM50C
     035332  010762                                                      .WORD   ERR50
6459
6460                                 ;-------------------------------------------------------------------------
6461
6462 035334  105037  002445  29$:    CLRB    TMP2+1          ;CHANGE THE DIRECTION OF ORB -- IT SHOULDN'T
6463 035340  004537  004310          JSR     R5,WRITE        ;   HAVE ANY EFFECT ON "PB7"
6464 035344  120002                  DDRB
6465 035346  002445                  TMP2+1
6466 035350  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6467 035352                          ERROR                   ;ELSE, REPORT IT
     035352  104460                                                      TRAP    C$ERROR
6468 035354                          ESCAPE  TST             ;       AND EXIT THIS TEST
     035354  104410                                                      TRAP    C$ESCAPE
     035356  000534                                                      .WORD   L10073-.
6469 035360  004537  004310          JSR     R5,WRITE        ;RE-WRITE INTO T1C-H (ADDR 05) TO SET T1 AGAIN
6470 035364  120005                  T1CH
6471 035366  002453                  TMP5+1
6472 035370  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6473 035372                          ERROR                   ;ELSE, REPORT IT
     035372  104460                                                      TRAP    C$ERROR
6474 035374                          ESCAPE  TST             ;       AND EXIT THIS TEST
     035374  104410                                                      TRAP    C$ESCAPE
     035376  000514                                                      .WORD   L10073-.
6475 035400  004737  036146          JSR     PC,GETT1        ;IS "T1" SET AGAIN
6476 035404  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
6477 035406                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     035406  104410                                                      TRAP    C$ESCAPE
     035410  000500                                                      .WORD   L10075-.
6478 035412  103426                  BCS     32$             ;YES, ALL'S WELL (AGAIN?)
6479 035414  004537  004064          JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
6480 035420  120005                  T1CH
6481 035422  002452                  TMP5
6482 035424  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6483 035426                          ERROR                   ;ELSE, REPORT IT
     035426  104460                                                      TRAP    C$ERROR
6484 035430                          ESCAPE  TST             ;       AND EXIT THIS TEST
     035430  104410                                                      TRAP    C$ESCAPE
     035432  000460                                                      .WORD   L10073-.
6485 035434  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
6486 035440  120007                  T1LH
6487 035442  002456                  TMP7
6488 035444  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6489 035446                          ERROR                   ;ELSE, REPORT IT
```

TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE

```
                035446  104460                                                  TRAP    C$ERROR
6490            035450                          ESCAPE  TST             ;       AND EXIT THIS TEST
                035450  104410                                                  TRAP    C$ESCAPE
                035452  000440                                                  .WORD   L10073-.
6491            035454                          GEDF    EM50L,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
                                                                        ;       "DEVICE FATAL" ERROR # 79
                035454  104455                                                  TRAP    C$ERDF
                035456  000117                                                  .WORD   79
                035460  016730                                                  .WORD   EM50L
                035462  010762                                                  .WORD   ERR50
6492            035464                          ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
                035464  104410                                                  TRAP    C$ESCAPE
                035466  000422                                                  .WORD   L10075-.
6493
6494                                    ;-------------------------------------------------------------------------
6495
6496            035470  004737  036332  32$:    JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
6497            035474  102002          BVC     .+6             ;IF NO ERROR, PROCEED
6498            035476                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                035476  104410                                                  TRAP    C$ESCAPE
                035500  000410                                                  .WORD   L10075-.
6499            035502  103404          BCS     44$             ;YES,  GOOD.
6500            035504                  GEDF    EM50U,ERR50     ;NO,  BAD!  REPORT IT:  NOT SET AFTER TIMEOUT
                                                                        ;       "DEVICE FATAL" ERROR # 80
                035504  104455                                                  TRAP    C$ERDF
                035506  000120                                                  .WORD   80
                035510  017174                                                  .WORD   EM50U
                035512  010762                                                  .WORD   ERR50
6501            035514  112737  000125  002455  44$:    MOVB    #125,TMP6+1     ;USING A DIFFERENT VALUE -- 55 HEX.,
6502            035522  004537  004310          JSR     R5,WRITE        ;RE-LOAD T1L-L (ADDR 06)
6503            035526  120006                  T1LL
6504            035530  002455                  TMP6+1
6505            035532  103003          BCC     .+10            ;IF NO ERROR, PROCEED
6506            035534                  ERROR                   ;ELSE, REPORT IT
                035534  104460                                                  TRAP    C$ERROR
6507            035536                  ESCAPE  TST             ;       AND EXIT THIS TEST
                035536  104410                                                  TRAP    C$ESCAPE
                035540  000352                                                  .WORD   L10073-.
6508            035542  004737  036146          JSR     PC,GETT1        ;IS "T1" STILL SET?
6509            035546  102002          BVC     .+6             ;IF NO ERROR, PROCEED
6510            035550                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                035550  104410                                                  TRAP    C$ESCAPE
                035552  000336                                                  .WORD   L10075-.
6511            035554  103416          BCS     33$             ;YES, ALL'S STILL OK
6512            035556  004537  004064          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
6513            035562  120006                  T1LL
6514            035564  002454                  TMP6
6515            035566  103003          BCC     .+10            ;IF NO ERROR, PROCEED
6516            035570                  ERROR                   ;ELSE, REPORT IT
                035570  104460                                                  TRAP    C$ERROR
6517            035572                  ESCAPE  TST             ;       AND EXIT THIS TEST
                035572  104410                                                  TRAP    C$ESCAPE
                035574  000316                                                  .WORD   L10073-.
6518            035576                  GEDF    EM50M,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
                                                                        ;       "DEVICE FATAL" ERROR # 81
                035576  104455                                                  TRAP    C$ERDF
                035600  000121                                                  .WORD   81
```

```
        035602  017012                                                          .WORD   EM50M
        035604  010762                                                          .WORD   ERR50
 6519   035606                          ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
        035606  104410                                                          TRAP    C$ESCAPE
        035610  000300                                                          .WORD   L10075-.
 6520
 6521                           ;-------------------------------------------------------------------------
 6522
 6523   035612  112737  000125  002453  33$:    MOVB    #125,TMP5+1     ;AND USING THE SAME VALUE AGAIN (55 HEX),
 6524   035620  004537  004310                  JSR     R5,WRITE        ;NOW LOAD T1C-H (ADDR 05)
 6525   035624  120005                          T1CH
 6526   035626  002453                          TMP5+1
 6527   035630  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 6528   035632                                  ERROR                   ;ELSE, REPORT IT
        035632  104460                                                          TRAP    C$ERROR
 6529   035634                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035634  104410                                                          TRAP    C$ESCAPE
        035636  000254                                                          .WORD   L10073-.
 6530   035640  004737  036146                  JSR     PC,GETT1        ;"T1" SHOULD NOW BE CLEARED
 6531   035644  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
 6532   035646                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        035646  104410                                                          TRAP    C$ESCAPE
        035650  000240                                                          .WORD   L10075-.
 6533   035652  103024                          BCC     34$             ;IT WAS, ALL'S WELL THAT END'S WELL (I THINK!?)
 6534   035654  004537  004064                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 6535   035660  120006                          T1LL
 6536   035662  002454                          TMP6
 6537   035664  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 6538   035666                                  ERROR                   ;ELSE, REPORT IT
        035666  104460                                                          TRAP    C$ERROR
 6539   035670                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035670  104410                                                          TRAP    C$ESCAPE
        035672  000220                                                          .WORD   L10073-.
 6540   035674  004537  004064                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 6541   035700  120007                          T1LH
 6542   035702  002456                          TMP7
 6543   035704  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 6544   035706                                  ERROR                   ;ELSE, REPORT IT
        035706  104460                                                          TRAP    C$ERROR
 6545   035710                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035710  104410                                                          TRAP    C$ESCAPE
        035712  000200                                                          .WORD   L10073-.
 6546   035714                          GEDF    EM50N,ERR50     ;IT WASN'T!  SOMETHING WENT WRONG!  REPORT IT
                                        ;       "DEVICE FATAL" ERROR # 82
        035714  104455                                                          TRAP    C$ERDF
        035716  000122                                                          .WORD   82
        035720  017054                                                          .WORD   EM50N
        035722  010762                                                          .WORD   ERR50
 6547
 6548   035724  004537  004310  34$:    JSR     R5,WRITE        ;RE-LOAD T1C-H (ADDR 5) TO START IT AGAIN
 6549   035730  120005                          T1CH
 6550   035732  002453                          TMP5+1
 6551   035734  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 6552   035736                                  ERROR                   ;ELSE, REPORT IT
        035736  104460                                                          TRAP    C$ERROR
 6553   035740                          ESCAPE  TST             ;       AND EXIT THIS TEST
        035740  104410                                                          TRAP    C$ESCAPE
```

```
                035742  000150
6554            035744  004737  036332          JSR     PC,GETPB7       ;GET "PB7".  IS IT CLEARED?
6555            035750  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
6556            035752                  ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                035752  104410                                                  TRAP    C$ESCAPE
                035754  000134                                                  .WORD   L10075-.
6557            035756  103054                  BCC     48$             ;YES, GOOD.
6558            035760  004537  004064          JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
6559            035764  120015                  IFR
6560            035766  002472                  TMPD
6561            035770  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6562            035772                          ERROR                   ;ELSE, REPORT IT
                035772  104460                                                  TRAP    C$ERROR
6563            035774                  ESCAPE  TST                     ;       AND EXIT THIS TEST
                035774  104410                                                  TRAP    C$ESCAPE
                035776  000114                                                  .WORD   L10073-.
6564            036000  004537  004064          JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
6565            036004  120004                  T1CL
6566            036006  002450                  TMP4
6567            036010  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6568            036012                          ERROR                   ;ELSE, REPORT IT
                036012  104460                                                  TRAP    C$ERROR
6569            036014                  ESCAPE  TST                     ;       AND EXIT THIS TEST
                036014  104410                                                  TRAP    C$ESCAPE
                036016  000074                                                  .WORD   L10073-.
6570            036020  004537  004064          JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
6571            036024  120005                  T1CH
6572            036026  002452                  TMP5
6573            036030  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6574            036032                          ERROR                   ;ELSE, REPORT IT
                036032  104460                                                  TRAP    C$ERROR
6575            036034                  ESCAPE  TST                     ;       AND EXIT THIS TEST
                036034  104410                                                  TRAP    C$ESCAPE
                036036  000054                                                  .WORD   L10073-.
6576            036040  004537  004064          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
6577            036044  120006                  T1LL
6578            036046  002454                  TMP6
6579            036050  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6580            036052                          ERROR                   ;ELSE, REPORT IT
                036052  104460                                                  TRAP    C$ERROR
6581            036054                  ESCAPE  TST                     ;       AND EXIT THIS TEST
                036054  104410                                                  TRAP    C$ESCAPE
                036056  000034                                                  .WORD   L10073-.
6582            036060  004537  004064          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
6583            036064  120007                  T1LH
6584            036066  002456                  TMP7
6585            036070  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6586            036072                          ERROR                   ;ELSE, REPORT IT
                036072  104460                                                  TRAP    C$ERROR
6587            036074                  ESCAPE  TST                     ;       AND EXIT THIS TEST
                036074  104410                                                  TRAP    C$ESCAPE
                036076  000014                                                  .WORD   L10073-.
6588            036100                  GEDF    EM50V,ERR50             ;NO,  BAD!  RPT. PB7 NOT DRIVEN LOW
                                                                        ;       "DEVICE FATAL" ERROR # 83
                036100  104455                                                  TRAP    C$ERDF
                036102  000123                                                  .WORD   83
                036104  017240                                                  .WORD   EM50V
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```
                036106  010762
 6589           036110                  48$:    ENDSUB                                          .WORD   ERR50
                036110
                036110  104403                                                          L10075:
 6590           036112                          ENDTST                                          TRAP    C$ESUB
                036112
                036112  104401                                                          L10073:
 6591                                                                                            TRAP    C$ETST
 6592
 6593                                   ;-------------------------------------------------------------------------------
 6594                                   ; LODT1C -- LOAD TIMER ONE AT ADDRESSES 04 & 05
 6595                                   ;
 6596                                   ; CALLING SEQUENCE:
 6597                                   ;
 6598                                   ;       JSR     R5,LODT1C
 6599                                   ;       .BYTE   <VALUE FOR T1L-L (ADDRESS 04)>
 6600                                   ;       .BYTE   <VALUE FOR T1C-H (ADDRESS 05)>
 6601                                   ;       <NEXT SEQUENCIAL INSTRUCTION
 6602                                   ;
 6603                                   ;-------------------------------------------------------------------------------
 6604 036114    112537  002451         LODT1C: MOVB    (R5)+,TMP4+1    ;SETUP TO LOAD T1CL
 6605 036120    112537  002453                 MOVB    (R5)+,TMP5+1    ;  AND T1CH
 6606 036124    004537  004310                 JSR     R5,WRITE        ;LOAD T1C-L (ADDR 04) WITH PASSED PARAMETER
 6607 036130    120004                         T1CL
 6608 036132    002451                         TMP4+1
 6609 036134    004537  004310                 JSR     R5,WRITE        ;LOAD T1C-H (ADDR 05) WITH PASSED PARAMETER
 6610 036140    120005                         T1CH                    ;  (THIS WILL ALSO RESET "T1" & THE COUNTER)
 6611 036142    002453                         TMP5+1
 6612 036144    000205                 RTS     R5
 6613
 6614                                   ;-------------------------------------------------------------------------------
 6615                                   ; GETT1 -- GET THE "T1" FLAG FROM THE VIA'S IFR REGISTER AND PUT IT
 6616                                   ;          INTO THE "CARRY" BIT
 6617                                   ;
 6618                                   ;-------------------------------------------------------------------------------
 6619
 6620 036146    004537  004064         GETT1:  JSR     R5,READ         ;GET VIA'S IFR REG.
 6621 036152    120015                         IFR
 6622 036154    002472                         TMPD
 6623 036156    103003                 BCC     1$                      ;IF NO ERROR, PROCEED
 6624 036160                           ERROR                           ;ELSE, REPORT IT
                036160  104460                                                                  TRAP    C$ERROR
 6625 036162    000262                 SEV                             ;FLAG AN ERROR TO MAINLINE ROUTINE
 6626 036164    000207                 RTS     PC                      ;  AND TAKE AN ABNORMAL RETURN
 6627
 6628 036166    010046                 1$:     MOV     R0,-(SP)        ;PRESERVE R0
 6629 036170    113700  002472                 MOVB    TMPD,R0         ;PUT VALUE HERE TO PRESERVE TMPD
 6630 036174    106100                 ROLB    R0                      ;"IRQ" GOES INTO CARRY BIT
 6631 036176    106100                 ROLB    R0                      ;"T1" GOES INTO CARRY BIT
 6632 036200    012600                 MOV     (SP)+,R0                ;RESTORE R0
 6633 036202    000207                 RTS     PC
 6634
 6635                                   ;-------------------------------------------------------------------------------
 6636                                   ; KICKT1 -- INIT. TIMER # 1 BY THE FOLLOWING PROCEDURE:
 6637                                   ;
 6638                                   ;       READ T1L-H (ADDR 07) TO GET THE LAST VALUE LOADED INTO IT
 6639                                   ;
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6640                                    ;       WRITE THAT VALUE INTO T1C-H (ADDR 05) TO RESET THE "T1" INTERRUPT FLAG
6641                                    ;          AND CAUSE THE RE-LOADING OF BOTH COUNTERS.
6642                                    ;-------------------- ----------------------------------------------------------
6643
6644 036204  010346                    KICKT1: MOV     R3,-(SP)        ;SAVE CALLER'S REGISTER CONTENTS
6645 036206  004537  004064                    JSR     R5,READ         ;GET THE CURRENT SETTING OF THE HIGH LATCH
6646 036212  120007                            T1LH
6647 036214  002456                            TMP7
6648 036216  103443                            BCS     10$             ;IF ERROR, EXIT
6649
6650 036220  012777  120005  144134            MOV     #T1CH,@SEL4     ;SETUP ADDRESS FOR M-LOOP WRITE
6651 036226  113777  002456  144132            MOVB    TMP7,@SEL6      ;SETUP DATA FOR SAME
6652 036234  113737  002456  002453            MOVB    TMP7,TMP5+1     ;PUT HERE TOO. BECAUSE WE'RE GOING TO WRITE IT.
6653 036242  142777  000100  144110            BICB    #IFRT1,@BSEL3   ;CLEAR THE INTERRUPT BIT -- JUST IN CASE
6654 036250  112777  000002  144100            MOVB    #WRILOC,@BSEL2  ;TELL THE M-LOOP TO WRITE THE BYTE FOR US
6655 036256  012703  000074                    MOV     #60.,R3         ;SETUP TIMEOUT COUNTER
6656 036262  132777  000200  144066  5$:       BITB    #MRDY,@BSEL2    ;WAIT FOR M-READY TO BE SET
6657 036270  001016                            BNE     10$             ;AS SOON AS "MRDY" IS SET, EXIT!
6658 036272  077305                            SOB     R3,5$           ;IF NO TIMEOUT, CHECK AGAIN FOR M-READY
6659 036274                                    GTDF    EM4,ERR4        ;ELSE, "MRDY" TIMEOUT
                                                                       ;       QUEUE "DEVICE FATAL" ERROR # 84
     036274  012737  000001  002236                                                        MOV     #T.EDF,ERRTYP
     036302  012737  000124  002240                                                        MOV     #84,ERRNBR
     036310  012737  014500  002242                                                        MOV     #EM4,ERRMSG
     036316  012737  005426  002244                                                        MOV     #ERR4,ERRBLK
6660 036324  000261                            SEC                     ;INDICATE THE FAILURE & EXIT
6661
6662 036326  012603                    10$:    MOV     (SP)+,R3        ;RESTORE REGISTER
6663 036330  000207                            RTS     PC              ;IMMEDIATE RETURN
6664
6665                                    ;-------------------------------------------------------------------------------
6666                                    ; GETPB7 -- PUT THE CURRENT SETTING OF "PB7" (BIT 7 OF ORB W/IN THE VIA CHIP)
6667                                    ;           INTO THE CARRY BIT SO IT CAN BE TESTED UPON RETURN.
6668                                    ;
6669                                    ;       CALLING SEQUENCE:
6670                                    ;
6671                                    ;       JSR     PC,GETPB7
6672                                    ;       <TEST FOR PB7 SET OR CLEARED WITH "BCS" OR "BCC" INSTR'S>
6673                                    ;-------------------------------------------------------------------------------
6674
6675 036332  004537  004064            GETPB7: JSR     R5,READ         ;GET THE REGISTER THAT CONTAINS "PB7"
6676 036336  120000                            ORB
6677 036340  002440                            TMP0
6678 036342  103003                            BCC     1$              ;IF NO ERROR, PROCEED
6679 036344                                    ERROR                   ;ELSE, REPORT IT
     036344  104460                                                                TRAP    C$ERROR
6680 036346  000262                            SEV                     ;FLAG AN ERROR TO MAINLINE ROUTINE
6681 036350  000207                            RTS     PC              ;  AND TAKE AN ABNORMAL RETURN
6682
6683 036352  010046                    1$:     MOV     R0,-(SP)        ;PRESERVE THIS REGISTER FOR THE CALLER
6684 036354  113700  002440                    MOVB    TMP0,R0         ;PUT ITS CONTENTS HERE SO WE CAN MANIPULATE IT
6685 036360  106100                            ROLB    R0              ;PUT "PB7" INTO THE CARRY BIT
6686 036362  012600                            MOV     (SP)+,R0        ;RESTORE R0 FOR THE CALLER
6687 036364  000207                            RTS     PC              ;RETURN WITH "PB7" IN THE CARRY BIT
6688
```

```
   6733                                     .SBTTL TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST

                                            ;*+*********************************************************************
                                            ;*
                                            ;*       TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST
                                            ;*
                                            ;*     THIS  TEST  VERIFIES  THAT  THE  TIMER  1  COUNTER IS OPERATIONAL IN
                                            ;*     FREE-RUNNING MODE, IN EACH OF TWO SUBTESTS.
                                            ;*
                                            ;*     THE  PROGRAM  PERIODICALLY  CHECKS THE COUNTER TO VERIFY THAT:
                                            ;*
                                            ;*       IT IS DECREMENTING AND EVENTUALLY REACHES 0,
                                            ;*
                                            ;*       RELOADS FROM THE LATCHES, AND
                                            ;*
                                            ;*       CONTINUES TO DECREMENT.
                                            ;*
                                            ;*   IN THE FIRST SUBTEST, THE FOLLOWING IS PERFORMED :
                                            ;*
                                            ;*     A  MASTER CLEAR IS DONE AND THE TIMER IS PLACED IN FREE-RUNNING MODE
                                            ;*     BY  SETTING  ACR7  TO 0 & ACR6 TO 1 (MODE 1). AND THE PROGRAM CHECKS
                                            ;*     FOR THE "T1" (BIT 6 IN IFR) TO BE INITIALLY CLEARED.
                                            ;*
                                            ;*     THEN T1L-L (ADR 04) IS LOADED WITH 125 (OCTAL) AND T1C-H (ADR 05) IS
                                            ;*     LOADED WITH 125 (OCTAL) STARTING THE COUNTER.
                                            ;*
                                            ;*     THE  COUNT  IS  ALLOWED  TO  REACH 0 AGAIN, AND THE "T1" IS READ AND
                                            ;*     CHECKED TO BE SET.
                                            ;*
                                            ;*     T1C-H (ADR 05) IS READ AND "T1" IS CHECKED TO BE STILL SET.
                                            ;*
                                            ;*     THE  COUNTER  LO BYTE IS READ AND THE "T1" IS READ AND CHECKED TO BE
                                            ;*     CLEARED BY THE READ OF T1C-L.
                                            ;*
                                            ;*     THE  COUNT IS ALLOWED TO REACH 0 ONCE MORE AND "T1" IS CHECKED TO BE
                                            ;*     SET AGAIN.
                                            ;*
                                            ;*     T1L-L  IS  LOADED  WITH  252 (OCTAL) AND "T1" IS CHECKED TO BE STILL
                                            ;*     SET.
                                            ;*
                                            ;*     T1C-H  IS LOADED WITH 252 (OCTAL) AND "T1" IS READ AND CHECKED TO BE
                                            ;*     CLEARED BY THE LOADING OF T1C-H.
                                            ;*
                                            ;*   IN  THE SECOND SUBTEST, ALL OF THE ABOVE OPERATIONS ARE REPEATED, WITH
                                            ;*     ACR7  =  1,  AND ACR6 = 1 (MODE 3). ALSO, PB7 IS VERIFIED FOR PROPER
                                            ;*     STATE AT THE PROPER TIME.
                                            ;*
                                            ;*--*********************************************************************
                                            ;
                                            ;       BGNTST
        036366                                                                          T28::
   6734 036366                                      BGNSUB
        036366                                                                          T28.1:
        036366  104402                                                                          TRAP    C$BSUB
   6735 036370  004737  003762                      JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
   6736 036374  103003                              BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
   6737 036376                                      ERROR                   ;ELSE, REPORT ERROR
```

```
                036376  104460
6738            036400                          ESCAPE  TST             ;   & EXIT TEST
                                                                                TRAP    C$ERROR
                036400  104410
                036402  001514                                                    TRAP    C$ESCAPE
                                                                                .WORD   L10076-.
6739            036404  004537  004660  1$:     JSR     R5,INITT1       ;INITIALIZE TIMER # 1
6740            036410  000000                  0                       ;       0 ==> LATCHES
6741            036412  000100                  BIT6                    ;       MODE 1 & "T1" INT. ENABLE FLAG CLEARED
6742            036414  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6743            036416                          ERROR                   ;ELSE, REPORT IT
                036416  104460                                                  TRAP    C$ERROR
6744            036420                          ESCAPE  TST             ;       AND EXIT THIS TEST
                036420  104410                                                  TRAP    C$ESCAPE
                036422  001474                                                  .WORD   L10076-.
6745            036424  004737  036146          JSR     PC,GETT1        ;IS "T1" SET?
6746            036430  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
6747            036432                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                036432  104410                                                  TRAP    C$ESCAPE
                036434  000414                                                  .WORD   L10077-.
6748            036436  103006                  BCC     2$              ;NO, GOOD.
6749            036440                          GEDF    EM50A,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
                                                                        ;       "DEVICE FATAL" ERROR # 85
                036440  104455                                                  TRAP    C$ERDF
                036442  000125                                                  .WORD   85
                036444  016067                                                  .WORD   EM50A
                036446  010762                                                  .WORD   ERR50
6750            036450                          ESCAPE  SUB             ;   & EXIT TEST
                036450  104410                                                  TRAP    C$ESCAPE
                036452  000376                                                  .WORD   L10077-.
6751
6752                                    ;-------------------------------------------------------------------------------
6753
6754            036454  004537  036114  2$:     JSR     R5,LODT1C       ;RELOAD TIMER 1'S COUNTERS WITH NEW VALUES:
6755            036460      125     125         .BYTE   125,125
6756
6757
6758                                    ;-------------------------------------------------------------------------------
6759            036462  005003                  CLR     R3              ;INITIALIZE TIMEOUT COUNTER
6760            036464  004737  036146  3$:     JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
6761            036470  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
6762            036472                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                036472  104410                                                  TRAP    C$ESCAPE
                036474  000354                                                  .WORD   L10077-.
6763            036476  103407                  BCS     4$              ;YES, GOOD.
6764            036500  077307                  SOB     R3,3$           ;NO,  IF NO TIMEOUT, LOOK AGAIN
6765            036502                          GEDF    EM50F,ERR50     ;ELSE, SAY IT WASN'T SET BY T1 TIMEOUT
                                                                        ;       "DEVICE FATAL" ERROR # 86
                036502  104455                                                  TRAP    C$ERDF
                036504  000126                                                  .WORD   86
                036506  016341                                                  .WORD   EM50F
                036510  010762                                                  .WORD   ERR50
6766            036512                          ESCAPE  SUB             ;IF ERROR, THE REST OF THIS TEST IS UN-DOABLE!
                036512  104410                                                  TRAP    C$ESCAPE
                036514  000334                                                  .WORD   L10077-.
6767
6768            036516  004537  004064  4$:     JSR     R5,READ         ;READING T1CH SHOULDN'T CLEAR "T1"
6769            036522  120005                  T1CH
6770            036524  002452                  TMP5                    ; (WE DON'T CARE WHAT THIS IS)
```

TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST

```
6771 036526  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
6772 036530                                ERROR                   ;ELSE, REPORT IT
     036530  104460                                                        TRAP    C$ERROR
6773 036532                                ESCAPE  TST             ;       AND EXIT THIS TEST
     036532  104410                                                        TRAP    C$ESCAPE
     036534  001362                                                        .WORD   L10076-.
6774 036536  004737  036146                JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD STILL BE SET
6775 036542  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
6776 036544                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     036544  104410                                                        TRAP    C$ESCAPE
     036546  000302                                                        .WORD   L10077-.
6777 036550  103404                        BCS     6$              ;IT IS, GOOD.
6778 036552                                GEDF    EM50G,ERR50     ;CLEARED BY READING T1CH!!
                                                                   ;       "DEVICE FATAL" ERROR # 87
     036552  104455                                                        TRAP    C$ERDF
     036554  000127                                                        .WORD   87
     036556  016406                                                        .WORD   EM50G
     036560  010762                                                        .WORD   ERR50
6779 036562  004737  036204          6$:   JSR     PC,KICKT1       ;KICK IT OFF AGAIN SO WE CAN PRESERVE TIMING
6780 036566  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
6781 036570                                ERROR                   ;ELSE, REPORT IT
     036570  104460                                                        TRAP    C$ERROR
6782 036572                                ESCAPE  TST             ;       AND EXIT THIS TEST
     036572  104410                                                        TRAP    C$ESCAPE
     036574  001322                                                        .WORD   L10076-.
6783
6784                                                       ;WAIT FOR IT TO FINISH:
6785 036576  005003                        CLR     R3              ;INITIALIZE TIMEOUT COUNTER
6786 036600  004737  036146          7$:   JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
6787 036604  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
6788 036606                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     036606  104410                                                        TRAP    C$ESCAPE
     036610  000240                                                        .WORD   L10077-.
6789 036612  103402                        BCS     8$              ;YES, GOOD.
6790 036614  077307                        SOB     R3,7$           ;NO.  IF NO TIMEOUT, LOOK AGAIN
6791 036616  000422                        BR      10$             ;IF TIMEOUT, BYPASS NEXT CHECK (THIS DONE ABOVE)
6792 036620  004537  004064          8$:   JSR     R5,READ         ;READING T1CL SHOULD CLEAR "T1"
6793 036624  120004                        T1CL
6794 036626  002450                        TMP4                    ; (WE DON'T CARE WHAT THIS IS EITHER)
6795 036630  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
6796 036632                                ERROR                   ;ELSE, REPORT IT
     036632  104460                                                        TRAP    C$ERROR
6797 036634                                ESCAPE  TST             ;       AND EXIT THIS TEST
     036634  104410                                                        TRAP    C$ESCAPE
     036636  001260                                                        .WORD   L10076-.
6798 036640  004737  036146                JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD BE CLEARED NOW
6799 036644  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
6800 036646                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     036646  104410                                                        TRAP    C$ESCAPE
     036650  000200                                                        .WORD   L10077-.
6801 036652  103004                        BCC     10$             ;IT IS, GOOD.
6802 036654                                GEDF    EM50C,ERR50     ;NOT CLEARED!  REPORT IT.
                                                                   ;       "DEVICE FATAL" ERROR # 88
     036654  104455                                                        TRAP    C$ERDF
     036656  000130                                                        .WORD   88
     036660  016203                                                        .WORD   EM50C
     036662  010762                                                        .WORD   ERR50
```

```
                                        10$:    CLR     R3                      ;RE-INITIALIZE THE TIMEOUT COUNTER
                                        12$:    JSR     PC,GETT1                ;WAIT FOR "T1" TO GET SET AGAIN
                                                BVC     .+6                     ;IF NO ERROR, PROCEED
                                                ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10077-.
                                                BCS     14$                     ;GOT IT -- GOOD.
                                                SOB     R3,12$                  ;NOT YET.  IF NO TIMEOUT, TRY AGAIN.
                                                GEDF    EM50X,ERR50             ;ELSE, REPORT "T1" NOT RESET
                                                                                ;       "DEVICE FATAL" ERROR # 89
                                                                                        TRAP    C$ERDF
                                                                                        .WORD   89
                                                                                        .WORD   EM50X
                                                                                        .WORD   ERR50
                                                ESCAPE  SUB                     ;IF ERROR, CAN'T CONTINUE THIS TEST
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10077-.
                                        14$:    MOVB    #252,TMP6+1             ;SETUP FOR AND
                                                JSR     R5,WRITE                ;  LOAD T1LL (ADDR 6)
                                                T1LL
                                                TMP6+1                          ;  WITH 252 OCTAL
                                                BCC     .+10                    ;IF NO ERROR, PROCEED
                                                ERROR                           ;ELSE, REPORT IT
                                                                                        TRAP    C$ERROR
                                                ESCAPE  TST                     ;       AND EXIT THIS TEST
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10076-.
                                                JSR     PC,GETT1                ;THIS SHOULDN'T CLEAR "T1"
                                                BVC     .+6                     ;IF NO ERROR, PROCEED
                                                ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10077-.
                                                BCS     16$                     ;IT DIDN'T -- GOOD.
                                                GEDF    EM50M,ERR50             ;WOOPS, IT DID!!  REPORT FAILURE
                                                                                ;       "DEVICE FATAL" ERROR # 90
                                                                                        TRAP    C$ERDF
                                                                                        .WORD   90
                                                                                        .WORD   EM50M
                                                                                        .WORD   ERR50
                                                ESCAPE  SUB                     ;       THE REST OF THIS TEST IS INVALID TOO!
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10077-.
                                        16$:    MOVB    #252,TMP7+1             ;SETUP FOR AND
                                                JSR     R5,WRITE                ;  LOAD T1LH (ADDR 7)
                                                T1LH
                                                TMP7+1                          ;  WITH 252 OCTAL
                                                BCC     .+10                    ;IF NO ERROR, PROCEED
                                                ERROR                           ;ELSE, REPORT IT
                                                                                        TRAP    C$ERROR
                                                ESCAPE  TST                     ;       AND EXIT THIS TEST
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10076-.
                                                JSR     PC,GETT1                ;THIS SHOULD CLEAR "T1"
                                                BVC     .+6                     ;IF NO ERROR, PROCEED
                                                ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
                                                                                        TRAP    C$ESCAPE
                                                                                        .WORD   L10077-.
```

TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST

```
6834 037036  103004                        BCC     18$             ;IT DID -- GOOD.
6835 037040                                GEDF    EM50A,ERR50     ;NOP!  REPORT:  "T1" NOT CLEARED BY LOADING T1LH
                                                                   ;       "DEVICE FATAL" ERROR # 91
     037040  104455                                                                TRAP    C$ERDF
     037042  000133                                                               .WORD   91
     037044  016067                                                               .WORD   EM50A
     037046  010762                                                               .WORD   ERR50
6836 037050                         18$:    ;THAT'S ALL FOLKS!
6837 037050                                 ENDSUB
     037050                                                            L10077:
     037050  104403                                                               TRAP    C$ESUB
6838                                ;=============================================================================
6839 037052                                 BGNSUB
     037052                                                            T28.2:
     037052  104402                                                               TRAP    C$BSUB
6840 037054  004737  003762                 JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
6841 037060  103003                        BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
6842 037062                                ERROR                   ;ELSE, REPORT ERROR
     037062  104460                                                                TRAP    C$ERROR
6843 037064                                ESCAPE  TST             ;   & EXIT TEST
     037064  104410                                                                TRAP    C$ESCAPE
     037066  001030                                                               .WORD   L10076-.
6844 037070  112737  000377  002445  1$:    MOVB    #377,TMP2+1     ;SETUP DDRB SUCH THAT ORB IS AN INPUT/OUTPUT REG
6845 037076  004537  004310                JSR     R5,WRITE
6846 037102  120002                        DDRB
6847 037104  002445                        TMP2+1
6848 037106  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
6849 037110                                ERROR                   ;ELSE, REPORT IT
     037110  104460                                                                TRAP    C$ERROR
6850 037112                                ESCAPE  TST             ;       AND EXIT THIS TEST
     037112  104410                                                                TRAP    C$ESCAPE
     037114  001002                                                               .WORD   L10076-.
6851 037116  112737  000030  002441        MOVB    #30,TMP0+1      ;CLEAR ALL BITS IN ORB EXCEPT DTR L & RTS L
6852 037124  004537  004310                JSR     R5,WRITE        ;  BY DOING THIS, WE SHOULD EXPECT PB7 TO BE
6853 037130  120000                        ORB                     ;  CLEARED IF MODE 3 DOESN'T WORK PROPERLY.
6854 037132  002441                        TMP0+1
6855 037134  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
6856 037136                                ERROR                   ;ELSE, REPORT IT
     037136  104460                                                                TRAP    C$ERROR
6857 037140                                ESCAPE  TST             ;       AND EXIT THIS TEST
     037140  104410                                                                TRAP    C$ESCAPE
     037142  000754                                                               .WORD   L10076-.
6858 037144  004537  004660                JSR     R5,INITT1       ;INITIALIZE TIMER # 1
6859 037150  000000                        0                       ;       0 ==> LATCHES
6860 037152  000300                        BIT7+BIT6               ;       MODE 3 & "T1" INT. ENABLE FLAG CLEARED
6861 037154  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
6862 037156                                ERROR                   ;ELSE, REPORT IT
     037156  104460                                                                TRAP    C$ERROR
6863 037160                                ESCAPE  TST             ;       AND EXIT THIS TEST
     037160  104410                                                                TRAP    C$ESCAPE
     037162  000734                                                               .WORD   L10076-.
6864 037164  004737  036146                JSR     PC,GETT1        ;IS "T1" SET?
6865 037170  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
6866 037172                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
     037172  104410                                                                TRAP    C$ESCAPE
     037174  000720                                                               .WORD   L10100-.
6867 037176  103006                        BCC     2$              ;NO, GOOD.
```

```
 6868 037200                            GEDF    EM50A,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
                                                                ;       "DEVICE FATAL" ERROR # 92
      037200  104455                                                           TRAP    C$ERDF
      037202  000134                                                           .WORD   92
      037204  016067                                                           .WORD   EM50A
      037206  010762                                                           .WORD   ERR50
 6869 037210                            ESCAPE  SUB             ;   & EXIT TEST
      037210  104410                                                           TRAP    C$ESCAPE
      037212  000702                                                           .WORD   L10100-.
 6870
 6871                           ;-------------------------------------------------------------------------
 6872
 6873 037214  004537  036114    2$:     JSR     R5,LODT1C       ;RELOAD TIMER 1'S COUNTERS WITH NEW VALUES:
 6874 037220     125     125            .BYTE   125,125
 6875
 6876                           ;-------------------------------------------------------------------------
 6877
 6878 037222  005003                    CLR     R3              ;INITIALIZE TIMEOUT COUNTER
 6879 037224  004737  036146    4$:     JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
 6880 037230  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 6881 037232                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
      037232  104410                                                           TRAP    C$ESCAPE
      037234  000660                                                           .WORD   L10100-.
 6882 037236  103407                    BCS     5$              ;YES, GOOD.
 6883 037240  077307                    SOB     R3,4$           ;NO,  IF NO TIMEOUT, LOOK AGAIN
 6884 037242                            GEDF    EM50F,ERR50     ;ELSE, SAY IT WASN'T SET BY T1 TIMEOUT
                                                                ;       "DEVICE FATAL" ERROR # 93
      037242  104455                                                           TRAP    C$ERDF
      037244  000135                                                           .WORD   93
      037246  016341                                                           .WORD   EM50F
      037250  010762                                                           .WORD   ERR50
 6885 037252                            ESCAPE  SUB             ;IF ERROR, THE REST OF THIS TEST IS UN-DOABLE!
      037252  104410                                                           TRAP    C$ESCAPE
      037254  000640                                                           .WORD   L10100-.
 6886
 6887                           ;-------------------------------------------------------------------------
 6888
 6889 037256                    5$:
 6890 037256  004737  036332            JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
 6891 037262  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 6892 037264                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
      037264  104410                                                           TRAP    C$ESCAPE
      037266  000626                                                           .WORD   L10100-.
 6893 037270  103406                    BCS     36$             ;YES, GOOD.
 6894 037272                            GEDF    EM50U,ERR50     ;NO,  REPORT IT NOT SET.
                                                                ;       "DEVICE FATAL" ERROR # 94
      037272  104455                                                           TRAP    C$ERDF
      037274  000136                                                           .WORD   94
      037276  017174                                                           .WORD   EM50U
      037300  010762                                                           .WORD   ERR50
 6895 037302                            ESCAPE  SUB             ;       & ALLOW RESTART OF THIS SUBTEST
      037302  104410                                                           TRAP    C$ESCAPE
      037304  000610                                                           .WORD   L10100-.
 6896
 6897                           ;-------------------------------------------------------------------------
 6898
 6899 037306  004537  004064    36$:    JSR     R5,READ         ;READING T1CH SHOULDN'T CLEAR "T1"
```

```
037312  120005                   T1CH
037314  002452                   TMP5                        ; (WE DON'T CARE WHAT THIS IS)
037316  103003                   BCC     .+10                ;IF NO ERROR, PROCEED
037320                           ERROR                       ;ELSE, REPORT IT
037320  104460                                                                      TRAP    C$ERROR
037322                           ESCAPE  TST                 ;       AND EXIT THIS TEST
037322  104410                                                                      TRAP    C$ESCAPE
037324  000572                                                                      .WORD   L10076-.
037326  004737  036146           JSR     PC,GETT1            ;CHECK "T1" -- IT SHOULD STILL BE SET
037332  102002                   BVC     .+6                 ;IF NO ERROR, PROCEED
037334                           ESCAPE  SUB                 ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
037334  104410                                                                      TRAP    C$ESCAPE
037336  000556                                                                      .WORD   L10100-.
037340  103406                   BCS     37$                 ;IT IS, GOOD.
037342                           GEDF    EM50G,ERR50         ;CLEARED BY READING T1CH!!
                                                             ;       "DEVICE FATAL" ERROR # 95
037342  104455                                                                      TRAP    C$ERDF
037344  000137                                                                      .WORD   95
037346  016406                                                                      .WORD   EM50G
037350  010762                                                                      .WORD   ERR50
037352                           ESCAPE  SUB                 ;       ALLOW RESTART OF THIS SUBTEST
037352  104410                                                                      TRAP    C$ESCAPE
037354  000540                                                                      .WORD   L10100-.


                         ;--------------------------------------------------------------------------------

037356  005003           37$:    CLR     R3                  ;INITIALIZE TIMEOUT COUNTER AGAIN
037360  004737  036146   38$:    JSR     PC,GETT1            ;WAIT FOR "T1" TO BE SET AGAIN
037364  102002                   BVC     .+6                 ;IF NO ERROR, PROCEED
037366                           ESCAPE  SUB                 ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
037366  104410                                                                      TRAP    C$ESCAPE
037370  000524                                                                      .WORD   L10100-.
037372  103407                   BCS     39$                 ;GOT IT -- NO CHECK PB7
037374  077307                   SOB     R3,38$              ;NOT YET.  IF NO TIMEOUT, LOOK AGAIN.
037376                           GEDF    EM50L,ERR50         ;ELSE, TIMER NOT REALLY WORKING RIGHT!
                                                             ;       "DEVICE FATAL" ERROR # 96
037376  104455                                                                      TRAP    C$ERDF
037400  000140                                                                      .WORD   96
037402  016730                                                                      .WORD   EM50L
037404  010762                                                                      .WORD   ERR50
037406                           ESCAPE  SUB
037406  104410                                                                      TRAP    C$ESCAPE
037410  000504                                                                      .WORD   L10100-.


                         ;--------------------------------------------------------------------------------

037412                   39$:
037412  004737  036332           JSR     PC,GETPB7           ;GET "PB7".  IS IT SET?
037416  102002                   BVC     .+6                 ;IF NO ERROR, PROCEED
037420                           ESCAPE  SUB                 ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
037420  104410                                                                      TRAP    C$ESCAPE
037422  000472                                                                      .WORD   L10100-.
037424  103404                   BCS     6$                  ;YES, GOOD.
037426                           GEDF    EM50Z,ERR50         ;NO,  REPORT "PB7" NOT SET AFTER SECOND CYCLE
                                                             ;       "DEVICE FATAL" ERROR # 97
037426  104455                                                                      TRAP    C$ERDF
037430  000141                                                                      .WORD   97
```

TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST

```
        037432  017471                                                  .WORD   EM50Z
        037434  010762                                                  .WORD   ERR50
  6931
  6932                          ;-------------------------------------------------------------------------
  6933
  6934 037436  004737  036204   6$:     JSR     PC,KICKT1       ;KICK IT OFF AGAIN SO WE CAN PRESERVE TIMING
  6935 037442  103003           BCC     .+10            ;IF NO ERROR, PROCEED
  6936 037444                   ERROR                   ;ELSE, REPORT IT
        037444  104460                                                  TRAP    C$ERROR
  6937 037446                   ESCAPE  TST             ;       AND EXIT THIS TEST
        037446  104410                                                  TRAP    C$ESCAPE
        037450  000446                                                  .WORD   L10076-.
  6938
  6939                                          ;WAIT FOR IT TO FINISH:
  6940 037452  005003           CLR     R3              ;INITIALIZE TIMEOUT COUNTER
  6941 037454  004737  036146   7$:     JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
  6942 037460  102002           BVC     .+6             ;IF NO ERROR, PROCEED
  6943 037462                   ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        037462  104410                                                  TRAP    C$ESCAPE
        037464  000430                                                  .WORD   L10100-.
  6944 037466  103402           BCS     8$              ;YES, GOOD.
  6945 037470  077307           SOB     R3,7$           ;NO.  IF NO TIMEOUT, LOOK AGAIN
  6946 037472  000442           BR      14$             ;IF TIMEOUT, BYPASS NEXT CHECK (THIS DONE ABOVE)
  6947 037474  004537  004064   8$:     JSR     R5,READ         ;READING T1CL SHOULD CLEAR "T1"
  6948 037500  120004           T1CL
  6949 037502  002450           TMP4                    ; (WE DON'T CARE WHAT THIS IS EITHER)
  6950 037504  103003           BCC     .+10            ;IF NO ERROR, PROCEED
  6951 037506                   ERROR                   ;ELSE, REPORT IT
        037506  104460                                                  TRAP    C$ERROR
  6952 037510                   ESCAPE  TST             ;       AND EXIT THIS TEST
        037510  104410                                                  TRAP    C$ESCAPE
        037512  000404                                                  .WORD   L10076-.
  6953 037514  004737  036146           JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD BE CLEARED NOW
  6954 037520  102002           BVC     .+6             ;IF NO ERROR, PROCEED
  6955 037522                   ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        037522  104410                                                  TRAP    C$ESCAPE
        037524  000370                                                  .WORD   L10100-.
  6956 037526  103006           BCC     9$              ;IT IS, GOOD.
  6957 037530                   GEDF    EM50C,ERR50     ;NOT CLEARED!  REPORT IT.
                                                        ;       "DEVICE FATAL" ERROR # 98
        037530  104455                                                  TRAP    C$ERDF
        037532  000142                                                  .WORD   98
        037534  016203                                                  .WORD   EM50C
        037536  010762                                                  .WORD   ERR50   .
  6958 037540                   ESCAPE  SUB             ;IF THIS ERROR OCCURED, EXIT SUBTEST
        037540  104410                                                  TRAP    C$ESCAPE
        037542  000352                                                  .WORD   L10100-.
  6959 037544  005003   9$:     CLR     R3              ;RE-INITIALIZE THE TIMEOUT COUNTER
  6960 037546  004737  036146   12$:    JSR     PC,GETT1        ;WAIT FOR "T1" TO GET SET AGAIN
  6961 037552  102002           BVC     .+6             ;IF NO ERROR, PROCEED
  6962 037554                   ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        037554  104410                                                  TRAP    C$ESCAPE
        037556  000336                                                  .WORD   L10100-.
  6963 037560  103407           BCS     14$             ;GOT IT -- GOOD.
  6964 037562  077307           SOB     R3,12$          ;NOT YET.  IF NO TIMEOUT, TRY AGAIN.
  6965 037564                   GEDF    EM50X,ERR50     ;ELSE, REPORT "T1" NOT RESET
                                                        ;       "DEVICE FATAL" ERROR # 99
```

TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST

```
        037564  104455                                                          TRAP    C$ERDF
        037566  000143                                                          .WORD   99
        037570  017354                                                          .WORD   EM50X
        037572  010762                                                          .WORD   ERR50
  6966  037574                          ESCAPE  SUB             ;IF ERROR, CAN'T CONTINUE THIS TEST
        037574  104410                                                          TRAP    C$ESCAPE
        037576  000316                                                          .WORD   L10100-.
  6967  037600  112737  000252  002455  14$:    MOVB    #252,TMP6+1     ;SETUP FOR AND
  6968  037606  004537  004310                  JSR     R5,WRITE        ;  LOAD T1LL (ADDR 6)
  6969  037612  120006                          T1LL
  6970  037614  002455                          TMP6+1                  ;  WITH 252 OCTAL
  6971  037616  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
  6972  037620                                  ERROR                   ;ELSE, REPORT IT
        037620  104460                                                          TRAP    C$ERROR
  6973  037622                          ESCAPE  TST             ;       AND EXIT THIS TEST
        037622  104410                                                          TRAP    C$ESCAPE
        037624  000272                                                          .WORD   L10076-.
  6974  037626  004737  036146                  JSR     PC,GETT1        ;THIS SHOULDN'T CLEAR "T1"
  6975  037632  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
  6976  037634                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        037634  104410                                                          TRAP    C$ESCAPE
        037636  000256                                                          .WORD   L10100-.
  6977  037640  103406                          BCS     16$             ;IT DIDN'T -- GOOD.
  6978  037642                          GEDF    EM50M,ERR50     ;WOOPS, IT DID!!  REPORT FAILURE
                                                                  ;       "DEVICE FATAL" ERROR # 100
        037642  104455                                                          TRAP    C$ERDF
        037644  000144                                                          .WORD   100
        037646  017012                                                          .WORD   EM50M
        037650  010762                                                          .WORD   ERR50
  6979  037652                          ESCAPE  SUB             ;       THE REST OF THIS TEST IS INVALID TOO!
        037652  104410                                                          TRAP    C$ESCAPE
        037654  000240                                                          .WORD   L10100-.
  6980  037656  004737  036332  16$:    JSR     PC,GETPB7       ;"PB7" SHOULD BE LOW HERE
  6981  037662  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
  6982  037664                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
        037664  104410                                                          TRAP    C$ESCAPE
        037666  000226                                                          .WORD   L10100-.
  6983  037670  103054                          BCC     17$             ;IT WASN'T, GOOD.
  6984  037672  004537  004064                  JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
  6985  037676  120015                          IFR
  6986  037700  002472                          TMPD
  6987  037702  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
  6988  037704                                  ERROR                   ;ELSE, REPORT IT
        037704  104460                                                          TRAP    C$ERROR
  6989  037706                          ESCAPE  TST             ;       AND EXIT THIS TEST
        037706  104410                                                          TRAP    C$ESCAPE
        037710  000206                                                          .WORD   L10076-.
  6990  037712  004537  004064                  JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
  6991  037716  120004                          T1CL
  6992  037720  002450                          TMP4
  6993  037722  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
  6994  037724                                  ERROR                   ;ELSE, REPORT IT
        037724  104460                                                          TRAP    C$ERROR
  6995  037726                          ESCAPE  TST             ;       AND EXIT THIS TEST
        037726  104410                                                          TRAP    C$ESCAPE
        037730  000166                                                          .WORD   L10076-.
  6996  037732  004537  004064                  JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
```

```
 6997 037736  120005                    T1CH
 6998 037740  002452                    TMP5
 6999 037742  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7000 037744                            ERROR                   ;ELSE, REPORT IT
      037744  104460                                                    TRAP    C$ERROR
 7001 037746                            ESCAPE  TST             ;       AND EXIT THIS TEST
      037746  104410                                                    TRAP    C$ESCAPE
      037750  000146                                                    .WORD   L10076-.
 7002 037752  004537  004064            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 7003 037756  120006                    T1LL
 7004 037760  002454                    TMP6
 7005 037762  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7006 037764                            ERROR                   ;ELSE, REPORT IT
      037764  104460                                                    TRAP    C$ERROR
 7007 037766                            ESCAPE  TST             ;       AND EXIT THIS TEST
      037766  104410                                                    TRAP    C$ESCAPE
      037770  000126                                                    .WORD   L10076-.
 7008 037772  004537  004064            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 7009 037776  120007                    T1LH
 7010 040000  002456                    TMP7
 7011 040002  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7012 040004                            ERROR                   ;ELSE, REPORT IT
      040004  104460                                                    TRAP    C$ERROR
 7013 040006                            ESCAPE  TST             ;       AND EXIT THIS TEST
      040006  104410                                                    TRAP    C$ESCAPE
      040010  000106                                                    .WORD   L10076-.
 7014 040012                            GEDF    EM50Y,ERR50     ;IT WAS!  REPORT IT BEING RESET BY WRITTING T1LL
                                        ;       "DEVICE FATAL" ERROR # 101
      040012  104455                                                    TRAP    C$ERDF
      040014  000145                                                    .WORD   101
      040016  017417                                                    .WORD   EM50Y
      040020  010762                                                    .WORD   ERR50
 7015
 7016                           ; AT THE ABOVE "PB7" TEST, IT SHOULD BE LOW.  NOT BECAUSE OF ANY READ/WRITE
 7017                           ; OPERATION, BUT BECAUSE OF WHERE WE ARE IN THE CYCLING OF TIMER # 1.  "PB7"
 7018                           ; SHOULD BE LOW HERE UNTIL T1 TIMES OUT.
 7019
 7020 040022  112737  000252  002457  17$:   MOVB    #252,TMP7+1     ;SETUP FOR AND
 7021 040030  004537  004310            JSR     R5,WRITE        ;  LOAD T1LH (ADDR 7)
 7022 040034  120007                    T1LH
 7023 040036  002457                    TMP7+1                  ;  WITH 252 OCTAL
 7024 040040  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7025 040042                            ERROR                   ;ELSE, REPORT IT
      040042  104460                                                    TRAP    C$ERROR
 7026 040044                            ESCAPE  TST             ;       AND EXIT THIS TEST
      040044  104410                                                    TRAP    C$ESCAPE
      040046  000050                                                    .WORD   L10076-.
 7027 040050  004737  036146            JSR     PC,GETT1        ;THIS SHOULD CLEAR "T1"
 7028 040054  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 7029 040056                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
      040056  104410                                                    TRAP    C$ESCAPE
      040060  000034                                                    .WORD   L10100-.
 7030 040062  103006                    BCC     18$             ;IT DID -- GOOD.
 7031 040064                            GEDF    EM50A,ERR50     ;NOP!  REPORT:  "T1" NOT CLEARED BY LOADING T1LH
                                        ;       "DEVICE FATAL" ERROR # 102
      040064  104455                                                    TRAP    C$ERDF
      040066  000146                                                    .WORD   102
```

TEST 28 -- VIA TIMER 1 FREE-RUNNING MODE TEST SEQ 0196

```
        040070  016067                                                          .WORD   EM50A
        040072  010762                                                          .WORD   ERR50
7032    040074                          ESCAPE  SUB
        040074  104410                                                          TRAP    C$ESCAPE
        040076  000016                                                          .WORD   L10100-.
7033    040100  004537  004660    18$:  JSR     R5,INITT1       ;RE-INITIALIZE IT TO STOP ITS FUNCTIONING
7034    040104  000001                  1
7035    040106  000000                  0
7036    040110  103001                  BCC     .+4             ;IF NO ERROR, EXIT
7037    040112                          ERROR                   ;ELSE, REPORT IT
        040112  104460                                                          TRAP    C$ERROR
7038                                    ;THAT'S ALL FOLKS!
7039    040114                          ENDSUB
        040114                                                  L10100:
        040114  104403                                                          TRAP    C$ESUB
7040    040116                          ENDTST
        040116                                                  L10076:
        040116  104401                                                          TRAP    C$ETST
7041
7042
7043
```

HARDWARE PARAMETER CODING SECTION

```
                                .SBTTL HARDWARE PARAMETER CODING SECTION


                                ;//////////////////////////////////////////////////////////////////////////////
                                ;/ THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ;/ THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ;/ MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ;/ INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ;/ MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ;/ WITH THE OPERATOR.
                                ;//////////////////////////////////////////////////////////////////////////////

040120                                  BGNHRD
040120  000015                                                        .WORD L10101-L$HARD/2
040122                                                          L$HARD::
040122                                  GPRMA   ADDRES,0,0,160020,177776,YES
040122  000031                                                        .WORD   T$CODE
040124  040154                                                        .WORD   ADDRES
040126  160020                                                        .WORD   T$LOLIM
040130  177776                                                        .WORD   T$HILIM
040132                                  GPRMA   VECTOR,2,0,0,674,YES
040132  001031                                                        .WORD   T$CODE
040134  040202                                                        .WORD   VECTOR
040136  000000                                                        .WORD   T$LOLIM
040140  000674                                                        .WORD   T$HILIM
040142                                  GPRMD   PRIRTY,4,0,7000,0,7,YES
040142  002032                                                        .WORD   T$CODE
040144  040233                                                        .WORD   PRIRTY
040146  007000                                                        .WORD   7000
040150  000000                                                        .WORD   T$LOLIM
040152  000007                                                        .WORD   T$HILIM

040154                                  ENDHRD
                                                                .EVEN
040154                                                          L10101:

                                .NLIST  BEX
040154  104     105     126     ADDRES: .ASCIZ  /DEVICE CSR ADDRESS : /
040202  104     105     126     VECTOR: .ASCIZ  /DEVICE VECTOR ADDRESS : /
040233  104     105     126     PRIRTY: .ASCIZ  /DEVICE PRIORITY LEVEL : /
                                .LIST   BEX
                                .EVEN
```

```
                        .SBTTL SOFTWARE PARAMETER CODING SECTION


                        ;////////////////////////////////////////////////////////////////////////
                        ;/  THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                        ;/  THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                        ;/  MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                        ;/  INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                        ;/  MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                        ;/  WITH THE OPERATOR.
                        ;////////////////////////////////////////////////////////////////////////

040264                          BGNSFT
040264  000000                                                    .WORD L10102-L$SOFT/2
040266                                                          L$SOFT::
                                ENDSFT
040266                                                                  .EVEN
040266                                                          L10102:
```

PATCH AREA FOR DEBUG

```
                                .SBTTL PATCH AREA FOR DEBUG
040266                          PATCH:
        040366                          .=.+100
040366  000240                          NOP
040370  000240                          NOP
040372  000240                          NOP

                                ;*****************************************

                                .SBTTL "ENDMOD" & "LASTAD"
040374                                  ENDMOD
040374                                  LASTAD

                                                                .EVEN
040374  000000                                                  .WORD   0
040376  000000                                                  .WORD   0
040400                          L$LAST::
        000001                  .END
```

SYMBOL TABLE

```
ACR    = 120013          BSLT5 = 000025          C$GPRI= 000040          EM50A  016067          FMT06A  012571
ADDRES  040154           BSLT6 = 000026          C$INIT= 000011          EM50B  016135          FMT06B  012637
ADR    = 000020 G        BSLT7 = 000027          C$INLP= 000020          EM50C  016203          FMT07   012530
AD.HIT  020350           BSR0    002246          C$MANI= 000050          EM50D  016251          FMT10   012654
AD.OK   020344           BSR1    002250          C$MEM = 000031          EM50E  016305          FMT11   012730
ASSEMB= 000010           BSR10   002264          C$MSG = 000023          EM50F  016341          FMT4    012245
BDATA   002312           BSR11   002270          C$OPEN= 000034          EM50G  016406          FMT4A   012305
BIT0   = 000001 G        BSR12   002272          C$PNTB= 000014          EM50H  016450          FMT4B   012340
BIT00  = 000001 G        BSR13   002274          C$PNTF= 000017          EM50I  016536          FMT4C   012345
BIT01  = 000002 G        BSR14   002276          C$PNTS= 000016          EM50J  016600          FMT47A  007232
BIT02  = 000004 G        BSR15   002300          C$PNTX= 000015          EM50K  016666          FMT47B  007263
BIT03  = 000010 G        BSR16   002302          C$QIO = 000377          EM50L  016730          FMT47C  007322
BIT04  = 000020 G        BSR17   002304          C$RDBU= 000007          EM50M  017012          FMT47E  007350
BIT05  = 000040 G        BSR2    002252          C$REFG= 000047          EM50N  017054          FMT47G  007407
BIT06  = 000100 G        BSR3    002254          C$RESE= 000033          EM50S  017122          FMT48A  010300
BIT07  = 000200 G        BSR4    002256          C$REVI= 000003          EM50U  017174          FMT48B  010347
BIT08  = 000400 G        BSR5    002260          C$RFLA= 000021          EM50V  017240          FMT48C  010402
BIT09  = 001000 G        BSR6    002262          C$RPT = 000025          EM50W  017305          FMT48E  010437
BIT1   = 000002 G        BSR7    002264          C$SEFG= 000046          EM50X  017354          FMT48F  010506
BIT10  = 002000 G        BT1    = 003122         C$SPRI= 000041          EM50Y  017417          FMT48G  010551
BIT11  = 004000 G        BT2    = 003206         C$SVEC= 000037          EM50Z  017471          FMT48H  010611
BIT12  = 010000 G        BUFARE  003122          C$TPRI= 000013          EM6    014540          FMT48I  010644
BIT13  = 020000 G        CONSOL  002346          DDRA   = 120003         EM7    014564          FMT5    012400
BIT14  = 040000 G        CONTIN  020122          DDRB   = 120002         EM8    014611          FMT5A   012443
BIT15  = 100000 G        CONTST  020222          DELAY1  002316          EM9    014634          FMT50A  012747
BIT2   = 000004 G        CSREGS= 000020          DELAY2  002320          ENDEMB 012114          FMT50B  013021
BIT3   = 000010 G        C$AU   = 000052         DEVMAP  002342          ENDT7  022642          FMT50C  013102
BIT4   = 000020 G        C$AUTO= 000061          DEVPTR  002344          ERRBLK 002244 G        FMT50D  013142
BIT5   = 000040 G        C$BRK  = 000022         DFPTBL  002216 G        ERRFLG 002332          FMT50E  013157
BIT6   = 000100 G        C$BSEG= 000004          DIAGMC= 000000          ERRMSG 002242 G        FMT50M  013174
BIT7   = 000200 G        C$BSUB= 000002          DMVDAI= 000001          ERRNBR 002240 G        FRSPAS  002340
BIT8   = 000400 G        C$CEFG= 000045          DMVPU  = 000004         ERRTYP 002236 G        FRSTIM  002336
BIT9   = 001000 G        C$CLCK= 000062          EF.CON= 000036 G        ERR1   005276 G        F$AU   = 000015
BOE    = 000400 G        C$CLEA= 000012          EF.NEW= 000035 G        ERR2   005304 G        F$AUTO= 000020
BSEL    002352           C$CLOS= 000035          EF.PWR= 000034 G        ERR3   005414 G        F$BGN  = 000040
BSELRS  003042           C$CLP1= 000006          EF.RES= 000037 G        ERR4   005426 G        F$CLEA= 000007
BSEL0   002352           C$CVEC= 000036          EF.STA= 000040 G        ERR4$  011322          F$DU   = 000016
BSEL1   002354           C$DCLN= 000044          EM14    014667          ERR47  006724 G        F$END  = 000041
BSEL10  002372           C$DODU= 000051          EM15    014733          ERR47. 007110          F$HARD= 000004
BSEL11  002374           C$DRPT= 000024          EM16    015013          ERR48  007632 G        F$HW   = 000013
BSEL12  002376           C$DU   = 000053         EM17    015110          ERR48. 010030          F$INIT= 000006
BSEL13  002400           C$EDIT= 000003          EM17A   015170          ERR5   005552 G        F$JMP  = 000050
BSEL14  002402           C$ERDF= 000055          EM20    015243          ERR5$  011710          F$MOD  = 000000
BSEL15  002404           C$ERHR= 000056          EM20A   015275          ERR50  010762 G        F$MSG  = 000011
BSEL16  002406           C$ERRO= 000060          EM20B   015355          ERR6   005650 G        F$PROT= 000021
BSEL17  002410           C$ERSF= 000054          EM21    015442          ERR7   006612 G        F$PWR  = 000017
BSEL2   002356           C$ERSO= 000057          EM22    015477          ER47CT 007104          F$RPT  = 000012
BSEL3   002360           C$ESCA= 000010          EM22A   015532          ER47MX 007106          F$SEG  = 000003
BSEL4   002362           C$ESEG= 000005          EM25    015565          ER48CT 010024          F$SOFT= 000005
BSEL5   002364           C$ESUB= 000003          EM3     014454          ER48MX 010026          F$SRV  = 000010
BSEL6   002366           C$ETST= 000001          EM34    015613          EVL    = 000004 G      F$SUB  = 000002
BSEL7   002370           C$EXIT= 000032          EM34B   015644          EXECUT= 000005         F$SW   = 000014
BSLT0  = 000020          C$GETB= 000026          EM4     014500          E$END  = 002100        F$TEST= 000001
BSLT1  = 000021          C$GETW= 000027          EM47A   015675          E$LOAD= 000035         GDATA   002310
BSLT2  = 000022          C$GMAN= 000043          EM47B   015735          FMT02  012124          GETBSR  004434
BSLT3  = 000023          C$GPHR= 000042          EM48A   016016          FMT02A 012161          GETPB7  036332
BSLT4  = 000024          C$GPLO= 000030          EM5     014515          FMT06  012562          GETPRM  020012
```

SYMBOL TABLE

```
GETT1   036146          I$PTAB= 000041          L$PRIO  002042 G        L10054  027356          ORA    = 120001
GETWSR  004576          I$PWR  = 000041         L$PROT  017614 G        L10055  027352          ORAM   = 120017
G$CNTO= 000200          I$RPT  = 000041         L$PRT   002112 G        L10056  027440          ORB    = 120000
G$DELM= 000372          I$SEG  = 000041         L$REPP  002062 G        L10057  027434          O$APTS= 000000
G$DISP= 000003          I$SETU= 000041          L$REV   002010 G        L10060  027524          O$AU   = 000001
G$EXCP= 000400          I$SFT  = 000041         L$SOFT  040266 G        L10061  027520          O$BGNR= 000000
G$HILI= 000002          I$SRV  = 000041         L$SPC   002056 G        L10062  027612          O$BGNS= 000000
G$LOLI= 000001          I$SUB  = 000041         L$SPCP  002020 G        L10063  027606          O$DU   = 000001
G$NO   = 000000         I$TST  = 000041         L$SPTP  002024 G        L10064  030100          O$ERRT= 000001
G$OFFS= 000400          J$JMP  = 000167         L$STA   002030 G        L10065  030230          O$GNSW= 000000
G$OFSI= 000376          KICKT1  036204          L$SW    002236 G        L10066  030360          O$POIN= 000001
G$PRMA= 000001          LODT1C  036114          L$TEST  002114 G        L10067  030514          O$SETU= 000000
G$PRMD= 000002          LOE    = 040000 G       L$TIML  002014 G        L10070  030644          PATA    002504
G$PRML= 000000          LOGDEV  002322          L$UNIT  002012 G        L10071  030774          PATB    002526
G$RADA= 000140          LOT    = 000010 G       L10000  002234         L10072  031132          PATC    002556
G$RADB= 000000          LSIDCL= 000002          L10001  002236         L10073  036112          PATCH   040266
G$RADD= 000040          LSIHLT= 000020          L10002  005220         L10074  033404          PATCM   002624
G$RADL= 000120          LU1MOD  002000 G        L10003  005272         L10075  036110          PATCR   002604
G$RADO= 000020          L$ACP   002110 G        L10004  005302         L10076  040116          PATD    002644
G$XFER= 000004          L$APT   002036 G        L10005  005412         L10077  037050          PATE    002674
G$YES  = 000010         L$AU    020400 G        L10006  005424         L10100  040114          PATF    002724
HELP   = 000000         L$AUT   002070 G        L10007  005550         L10101  040154          PATG    003040
HOE    = 100000 G       L$AUTO  020232 G        L10010  005646         L10102  040266          PATGEN  023776
IBE    = 010000 G       L$CCP   002106 G        L10011  006610         MASCLR  003614          PCR    = 120014
IDU    = 000040 G       L$CLEA  020356 G        L10012  006722         MCLR   = 000100         PFLAG   002350
IENBA  = 000001         L$CO    002032 G        L10013  007102         MLWRI   004332          PNT    = 001000 G
IENBB  = 000020         L$DEPO  002011 G        L10014  010022         MPCSR   002352          PRI    = 002000 G
IENR   = 120016         L$DESC  003542 G        L10015  011274         MPIHAN  005152 G        PRIRTY  040233
IER    = 020000 G       L$DESP  002076 G        L10017  020220         MPIVEC  002412          PRI00  = 000000 G
IFR    = 120015         L$DEVP  002060 G        L10020  020346         MPOHAN  005224 G        PRI01  = 000040 G
IFRCA1= 000002          L$DISP  002124 G        L10021  020372         MPOVEC  002414          PRI02  = 000100 G
IFRCA2= 000001          L$DLY   002116 G        L10022  020376         MPRIOR  002416          PRI03  = 000140 G
IFRCB1= 000020          L$DTP   002040 G        L10023  020400         MRDY   = 000200         PRI04  = 000200 G
IFRCB2= 000010          L$DTYP  002034 G        L10024  020536         MREQ   = 000001         PRI05  = 000240 G
IFRIRQ= 000200          L$DU    020374 G        L10025  020666         MSTCLR  003762          PRI06  = 000300 G
IFRSR  = 000004         L$DUT   002072 G        L10026  021254         NEWLIN  012121          PRI07  = 000340 G
IFRT1  = 000100         L$DVTY  003522 G        L10027  021446         NEWPC   002500          PSTACK  002324
IFRT2  = 000040         L$EF    002052 G        L10030  021610         NEWST   017772          PU24   = 000001
IHILNK  005222          L$ENVI  002044 G        L10031  021732         NPRABT= 000200          RCRAM   023616
IHOLNK  005274          L$ERRT  002236 G        L10032  022134         NPRAIH= 000075          READ    004064
INITT1  004660          L$ETP   002102 G        L10033  022644         NPRAIL= 000074          READI   004176
INTFLG  002326          L$EXP1  002046 G        L10034  022354         NPRAIX= 000076          REDLOC= 000001
INTWCH  002330          L$EXP4  002064 G        L10035  022642         NPRAOH= 000071          REDPAG= 000003
IRQA   = 000004         L$EXP5  002066 G        L10036  023212         NPRAOL= 000070          REGNUM  002334
IRQB   = 000002         L$HARD  040122 G        L10037  023400         NPRAOX= 000072          REG0    002420
IRQREG= 123005          L$HIME  002120 G        L10040  025140         NPRBS7= 000010          REG1    002422
ISR    = 000100 G       L$HPCP  002016 G        L10041  025762         NPRBYT= 000010          REG2    002424
IXE    = 004000 G       L$HPTP  002022 G        L10042  026044         NPRCTL= 123004          REG3    002426
I$AU   = 000041         L$HW    002216 G        L10043  026040         NPRDL  = 000044         REG4    002430
I$AUTO= 000041          L$ICP   002104 G        L10044  026126         NPRDLB= 000054          REG5    002432
I$CLN  = 000041         L$INIT  017622 G        L10045  026122         NPRDRH= 123001          REG6    002434
I$DU   = 000041         L$LADP  002026 G        L10046  026230         NPRDRL= 123000          REG7    002436
I$HRD  = 000041         L$LAST  040400 G        L10047  026224         NPRGO  = 000100         RESFMC  003040
I$INIT= 000041          L$LOAD  002100 G        L10050  027274         NPRIO  = 000040         RESFT3  003062
I$MOD  = 000041         L$LUN   002074 G        L10051  026736         NPRLD  = 000004         RESTRT  017766
I$MSG  = 000041         L$MREV  002050 G        L10052  027114         NULERR  012072          RUN    = 000200
I$PROT= 000040          L$NAME  002000 G        L10053  027272         OLDSP   002502          SEL0    002352
```

SYMBOL TABLE

```
SEL10   002372          TXTVRB  014430          T$LOLI= 000000          T1.2    021001          T4      021450 G
SEL12   002376          TXTVRC  014434          T$LSYM= 010000          T1.3    021034          T5      021612 G
SEL14   002402          TXTVRD  014440          T$LTNO= 000034          T1.4    021106          T6      021734 G
SEL16   002406          TXTVRE  014444          T$NEST= 177777          T10     024162 G        T7      022136 G
SEL2    002356          TXTVRF  014450          T$NS0 = 000000          T11     025142 G        T7.1    022136
SEL4    002362          TXTVRT  017554          T$NS1 = 000005          T12     025764 G        T7.2    022356
SEL6    002366          TXTVR0  014345          T$NS2 = 000002          T12.LP  026006          T8      022646 G
SFPTBL  002236 G        TXTVR1  014351          T$NS3 = 000003          T12.1   026006          T9      023214 G
SLT0    = 000020        TXTVR2  014355          T$PTNU= 000000          T13     026046 G        T9.RST  023402
SLT2    = 000022        TXTVR3  014362          T$SAVL= 177777          T13.LP  026070          UAM     = 000200 G
SLT4    = 000024        TXTVR4  014367          T$SEGL= 177777          T13.1   026070          VECTOR  040202
SLT6    = 000026        TXTVR5  014374          T$SEKO= 010000          T14     026130 G        WA      = 003346
SR      = 120012        TXTVR6  014401          T$SUBN= 000002          T14.LP  026172          WB      = 003350
STALL   005032          TXTVR7  014406          T$TAGL= 177777          T14.1   026172          WC      = 003352
STARST  017722          TXTVR8  014413          T$TAGN= 010103          T15     026232 G        WD      = 003354
STREG   005034          TXTVR9  014420          T$TEMP= 000000          T15.1   026266          WE      = 003356
SVCGBL= 000000          TXT1    013253          T$TEST= 000034          T15.2   026740          WF      = 003360
SVCINS= 000001          TXT2    013311          T$TSTM= 177777          T15.3   027116          WRCRAM  023420
SVCSUB= 000001          TXT2A   013353          T$TSTS= 000001          T16     027276 G        WRILOC= 000002
SVCTAG= 000001          TXT2B   013412          T$$AU = 010023          T16.LP  026276          WRIPAG= 000004
SVCTST= 000001          TXT3    013454          T$$AUT= 010020          T16.L1  026750          WRITE   004310
SWPBOT= 121000          TXT4    013504          T$$CLE= 010021          T16.L2  027126          WRITEI  004322
SWPDDC= 121400          TXT4A   013544          T$$DU = 010022          T16.1   027320          WSR0    002246
S$LSYM= 010000          TXT47C  007442          T$$HAR= 010101          T17     027360 G        WSR10   002256
TDATA   002306          TXT47D  007453          T$$HW = 010000          T17.1   027402          WSR12   002260
TMPA    002464          TXT47E  007466          T$$INI= 010017          T18     027442 G        WSR14   002262
TMPB    002466          TXT47F  007510          T$$MSG= 010025          T18.LP  027320          WSR16   002264
TMPC    002470          TXT47G  007533          T$$PRO= 010016          T18.1   027466          WSR2    002250
TMPD    002472          TXT47H  007556          T$$SEG= 010000          T19     027526 G        WSR4    002252
TMPE    002474          TXT47P  007614          T$$SOF= 010102          T19.LP  027402          WSR6    002254
TMPF    002476          TXT48A  010736          T$$SRV= 010003          T19.1   027554          W0      = 003322
TMP0    002440          TXT48B  010743          T$$SUB= 010100          T2      021146 G        W1      = 003324
TMP1    002442          TXT48C  010750          T$$SW = 010001          T2CH    = 120011        W2      = 003326
TMP2    002444          TXT48D  010755          T$$TES= 010076          T2CL    = 120010        W3      = 003330
TMP3    002446          TXT5    013605          T.EDF = 000001          T2LL    = 120010        W4      = 003332
TMP4    002450          TXT6    013607          T.EHRD= 000002          T20     027614 G        W5      = 003334
TMP5    002452          TXT7    013632          T.ESF = 000000          T20.LP  027466          W6      = 003336
TMP6    002454          TXT7A   013717          T.ESFT= 000003          T21     030102 G        W7      = 003340
TMP7    002456          TXT8A   014004          T1      020402 G        T21.LP  027554          W8      = 003342
TMP8    002460          TXT8B   014021          T1CH    = 120005        T22     030232 G        W9      = 003344
TMP9    002462          TXT8C   014036          T1CL    = 120004        T23     030362 G        XDATA   002314
TXTMLT  017532          TXT8D   014053          T1LH    = 120007        T24     030516 G        XORGB   011276
TXTML0  014105          TXT8E   014070          T1LHGO= 120005          T25     030646 G        X$ALWA= 000000
TXTML1  014111          T$ARGC= 000001          T1LL    = 120006        T26     030776 G        X$FALS= 000040
TXTML2  014125          T$CODE= 002032          T1.EHD  020670          T27     031134 G        X$OFFS= 000400
TXTML3  014142          T$ERRN= 000146          T1.EM1  020552 G        T27.1   031134          X$TRUE= 000020
TXTML4  014164          T$EXCP= 000000          T1.HIT  020540          T27.2   033406          $E      = 000146
TXTML5  014205          T$FLAG= 000040          T1.HSB  020550          T28     036366 G        $LSTIN= 000001
TXTML6  014235          T$GMAN= 000000          T1.HSW  020546          T28.1   036366          $LSTTA= 000001
TXTML7  014247          T$HILI= 000007          T1.OK   020536          T28.2   037052          $MPCSR= 160000 G
TXTVR   014327          T$LAST= 000001          T1.1    020717          T3      021256 G        $T      = 000034
TXTVRA  014425

. ABS.  040400      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  31952 WORDS  ( 125 PAGES)
```

SYMBOL TABLE

DYNAMIC MEMORY: 19748 WORDS (75 PAGES)
ELAPSED TIME: 00:08:46
CNDMAA.BIC,CNDMAA.SEQ/CR/-SP=SVC34.MLB/ML,CNDMAA.P11

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