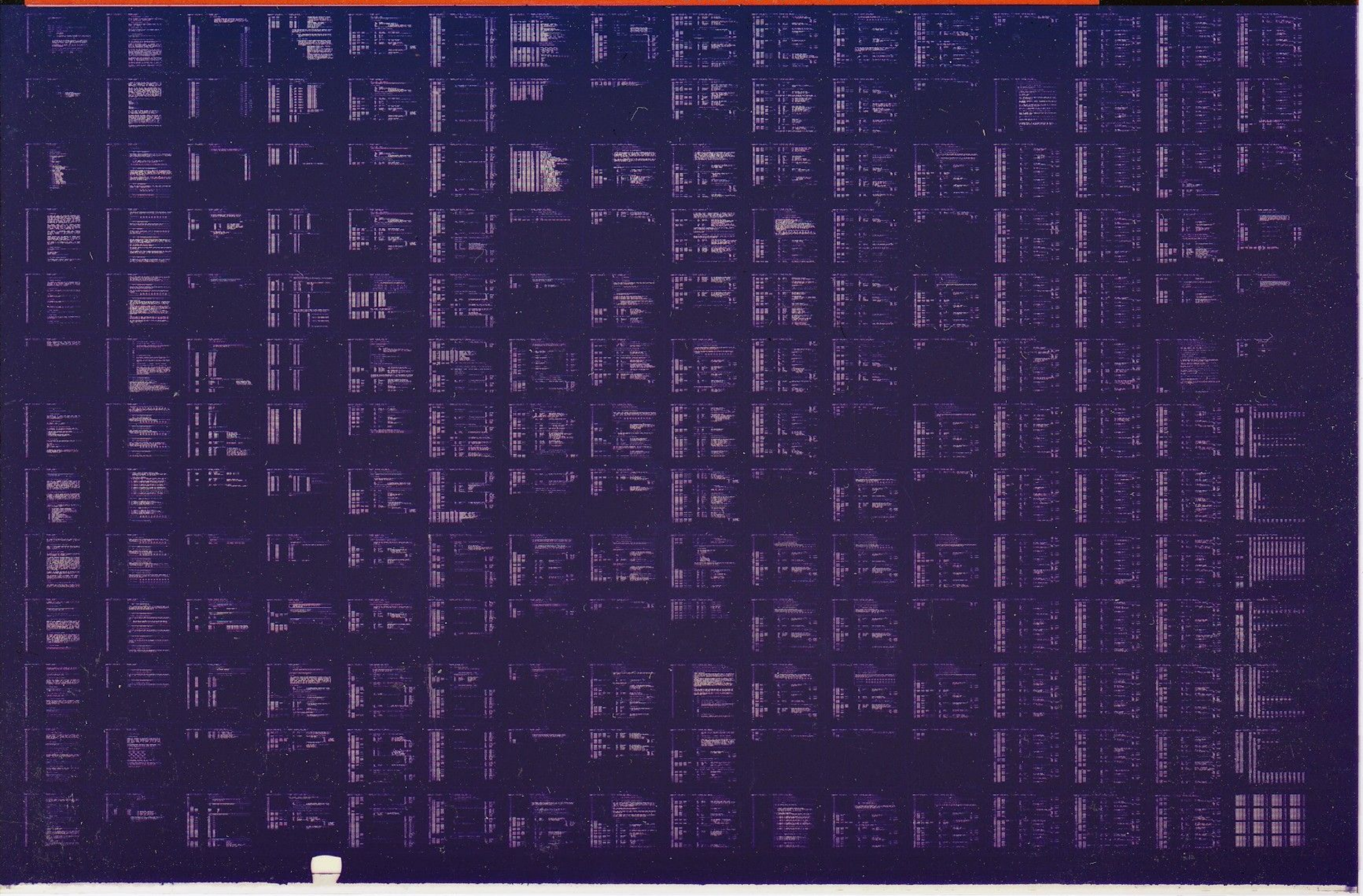
DMV11 DMV11 MCRCTRLR STC P1
CVDMACO

AH-FZ62C-MC
FICHE 01 OF 02

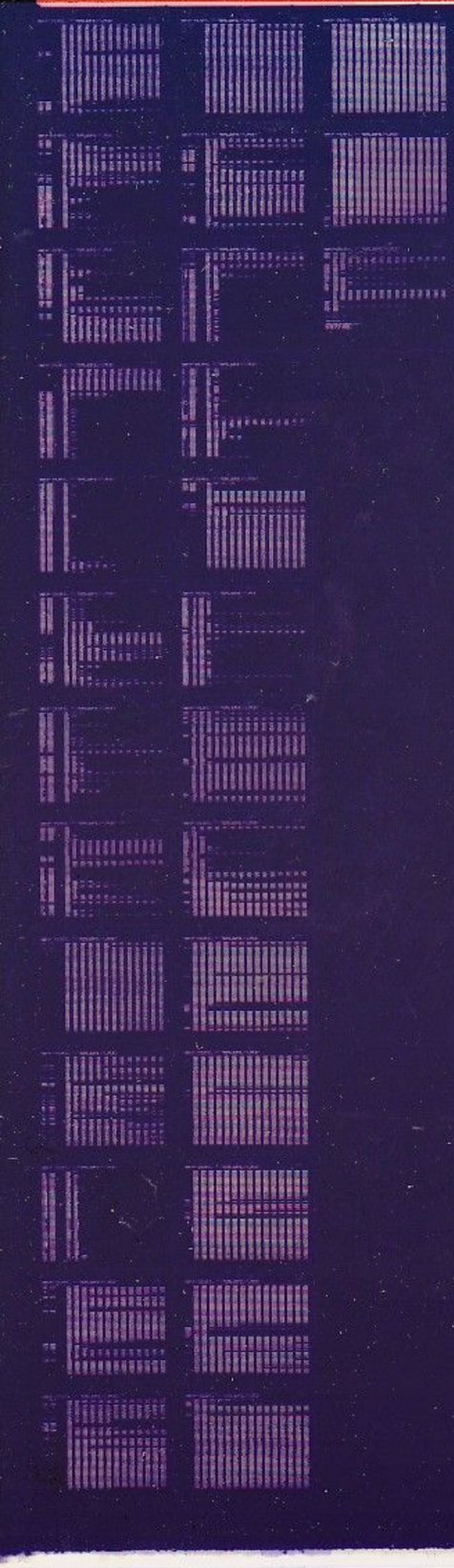
FEB 1985
digital
Made In USA



DMV11 DMV11 MCRCTRLR STC P1
CVDMACO

AH-FZ62C-MC
FICHE 02 OF 02

FEB 1985
digital
Made In USA



```
2196
2197                            .TITLE CVDMACO DMV11 MCTRL DIAG #1
2198                            .SBTTL PROGRAM DOCUMENT
2199                            .REM *
2200
2201
2202
2203                                        I D E N T I F I C A T I O N
2204                                        ---------------------------
2205
2206                            PRODUCT CODE:   AC-F261C-MC
2207
2208                            PRODUCT NAME:   CVDMACO DMV-11 MICRO-CONTROLLER STATIC DIAGNOSTIC PART 1
2209
2210                            PRODUCT DATE:   JULY 1983
2211
2212                            MAINTAINER:     DIAGNOSTICS MERRIMACK  CC:38P
2213
2214                            AUTHORS:        CHRIS BRIENEN
2215                                            RAY MARSHALL
2216
2217                            PURPOSE:        THIS DIAGNOSTIC IS DESIGNED TO PERFORM STATIC LOGIC TESTS FOR
2218                                            THE M8053 OR M8064 (HEREAFTER REFERRED TO AS THE DMV OR DMV-11)
2219
2220
2221
2222                                    THE INFORMATION IN THIS DOCUMENT IS  SUBJECT  TO  CHANGE WITHOUT
2223                                    NOTICE  AND  SHOULD  NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL
2224                                    EQUIPMENT CORPORATION.  DIGITAL EQUIPMENT CORPORATION ASSUMES NO
2225                                    RESPONSIBILITY FOR ANY ERRORS THAT MAY APPEAR IN THIS DOCUMENT.
2226
2227                                    NO RESPONSIBILITY IS ASSUMED  FOR  THE  USE  OR  RELIABILITY  OF
2228                                    SOFTWARE ON EQUIPMENT THAT IS NOT  SUPPLIED  BY  DIGITAL  OR ITS
2229                                    AFFILIATED COMPANIES.
2230
2231                                    COPYRIGHT (C) 1981,1984 BY DIGITAL EQUIPMENT CORPORATION
2232
2233                            THE FOLLOWING ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION:
2234
2235                                    DIGITAL         PDP             UNIBUS          MASSBUS
2236                                    DEC             DECUS           DECTAPE
```

```
2238
2239
2240
2241
2242
2243                                    HISTORY
2244                                    -------
2245
2246
2247                        REV           DATE          REASON
2248                        ---           ----          ------
2249
2250                         A            14-JAN-81     INITIAL RELEASE
2251                         B            11-JUL-83     INSTALLED OUTSTANDING PATCHES
2252                         C            29-JUL-84     INCREASED TIMING PARAMETERS
2253                                                    TO ALLOW PROGRAM TO RUN ON
2254                                                    A J-11 PROCESSOR (ORION).
2255                                                    (NICK MCCAMY)
2256
```

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:

PDP-11/03 OR PDP-11/23
16K WORDS OF MEMORY
CONSOLE TERMINAL
M8053 OR M8064 COMMUNICATIONS INTERFACE

3.0 PRELIMINARY PROGRAM REQUIREMENTS

THIS PROGRAM (CVDMA) 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.

```
2363
2364                            4.0 GENERAL PROGRAM CONSIDERATIONS
2365
2366
2367                            4.1 DIAGNOSTIC SUPERVISOR
2368
2369                            THIS  PROGRAM  IS  COMPATIBLE WITH THE STANDALONE DIAGNOSTIC
2370                            SUPERVISOR, AND MUST BE LOADED TO BE  CO-RESIDENT  WITH  THE
2371                            SUPERVISOR,  OR  BE  PREVIOUSLY COMBINED WITH THE SUPERVISOR
2372                            AND LOADED AS A SINGLE FILE.  IN EITHER CASE,  THE  COMBINED
2373                            PROGRAM WILL NOT EXCEED 16K OF MEMORY.
2374
2375
2376                            4.2 EXECUTION TIME
2377
2378                            THE  MAXIMUM  TIME REQUIRED TO RUN THIS PROGRAM PER PASS FOR
2379                            EACH UNIT IS AS FOLLOWS: 11/03 = 100 SEC, 11/23 = 50 SECONDS.
2380
2381
2382                            4.3 XXDP+
2383
2384                            THIS PROGRAM MAY BE LOADED UNDER XXDP+, AND  MAY BE RUN  IN
2385                            DUMP MODE OR CHAIN MODE.
2386
2387
2388                            4.4 ACT/SLIDE
2389
2390                            THIS PROGRAM MAY BE LOADED UNDER ACT OR SLIDE AND MAY BE RUN
2391                            IN DUMP MODE OR CHAIN MODE.
2392
2393
2394                            4.5 APT
2395
2396                            THIS PROGRAM MAY BE LOADED  BY  THE  APT  SYSTEM  (INCLUDING
2397                            APT-RD) AND RUN IN PROGRAM MODE OR SCRIPT MODE.
2398
2399
2400                            4.6 MEMORY MANAGEMENT
2401
2402                            MEMORY MANAGEMENT IS NOT UTILIZED IN THIS PROGRAM.
2403
2404
2405                            4.7 ERROR LOGGING
2406
2407                            AT THE END OF EACH PASS ON ALL UNITS, THE PROGRAM PRINTS OUT
2408                            THE CUMULATIVE TOTAL NUMBER OF ERRORS SINCE THE LAST START OR
2409                            RESTART COMMAND.
2410
2411
2412                            5.0 PROGRAM LOAD MEDIA
2413
2414                            THIS PROGRAM  CAN  BE  LOADED  FROM  PAPER  TAPE  USING  THE
```

```
2415                    ABSOLUTE  LOADER OR FROM ACT, SLIDE, OR APT SYSTEMS, OR FROM
2416                    ANY MEDIA SUPPORTED BY XXDP+.  WHEN  USING  THE  PAPER  TAPE
2417                    ABSOLUTE   LOADER,  THE  PROGRAM  SHOULD  BE  LOADED  FIRST,
2418                    FOLLOWED BY THE DIAGNOSTIC SUPERVISOR.  WHEN USING XXDP+, THE
2419                    DIAGNOSTIC  SUPERVISOR  SHOULD  BE LOADED FIRST, FOLLOWED BY
2420                    THE DIAGNOSTIC PROGRAM.
```

6.0 OPERATING INSTRUCTIONS

6.1 LOADING AND STARTING PROCEDURES

6.1.1 LOADING PROCEDURES

THIS PROGRAM MAY BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER. IT MAY ALSO BE LOADED FROM ANY XXDP+ LOAD MEDIA. WHEN LOADED UNDER XXDP+, THE DIAGNOSTIC SUPERVISOR WILL BE LOADED AUTOMATICALLY.

6.1.2 STARTING PROCEDURES

THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES TO START THE PROGRAM.

6.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION

THE DIAGNOSTIC CAN BE EXECUTED STANDALONE UNDER XXDP+, WITHOUT READING THE REMAINDER OF THIS DOCUMENT, AS FOLLOWS:

A) LOAD AND START DIAGNOSTIC USING RUN COMMAND
B) RECEIVE DIAGNOSTIC SUPERVISOR IDENTIFICATION AND PROMPT (DRS-C>)
C) ENTER STA<CR>
D) ANSWER HARDWARE AND SOFTWARE QUESTIONS
E) GET END OF PASS MESSAGES OR ERROR MESSAGES
F) TO END EXECUTION, ENTER CONTROL/C

6.2 INITIAL DIALOGUE

AFTER THE PROGRAM AND THE SUPERVISOR ARE LOADED AND THE PROGRAM IS STARTED, THE FOLLOWING IDENTIFICATION IS TYPED :

```
DRS LOADED
DIAG. RUN-TIME SERVICES
CVDMA-C-0
DMV-11 U-CONTRL LOGIC DIAG - PART 1 OF 2
UNIT IS M8053 OR M8064
DR>
```

THE OPERATOR THEN PROCEEDS BY TYPING ONE OR MORE OF THE COMMANDS DESCRIBED IN THE FOLLOWING SECTION 6.3. (FOR MORE DETAILED INFORMATION, REFER TO THE DIAGNOSTIC SUPERVISOR FUNCTIONAL SPECIFICATION).

6.3 PROGRAM OPTIONS

6.3.1 START COMMAND

```
**********************************************************************
STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
   <FLAG-LIST>/EOP:<INCR>
**********************************************************************
```

6.3.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>)

<TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS. ON THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.2 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DEFAULT IS NON-ENDING EXECUTION. IN THIS CASE EXIT FROM THE PROGRAM IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY OCCURANCE OF AN ERROR WITH THE HALT ON ERROR FLAG BEING SET. THE EXIT IS A RETURN TO COMMAND MODE. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE	HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED
LOE	LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAINING THE ERROR
IER	INHIBIT ERROR REPORTING
IBE	INHIBIT BASIC ERROR REPORTS
IXE	INHIBIT EXTENDED ERROR REPORTS
PRI	DIRECT ALL MESSAGES TO A LINE PRINTER
PNT	PRINT NUMBER OF TEST BEING EXECUTED
BOE	BELL ON ERROR
UAM	RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TESTS
ISR	INHIBIT STATISTICAL REPORTS
IDU	INHIBIT DROPPING OF UNITS BY DIAGNOSTIC

LOT LOOP ON TEST

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.

6.3.2 RESTART COMMAND

```
**********************************************************************
RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
   <FLAG-LIST>/UNITS:<UNIT-LIST>
**********************************************************************
```

6.3.2.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND.

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

<UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (0,1 ETC.) OR RANGES OF DECIMAL NUMBERS (0-5, 8-10 ETC.) THAT SPECIFY THE UNITS TO BE TESTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS MAY RANGE FROM 0 THRU N-1 (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND). THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIAGLOGUE. THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND. SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW. DEFAULT IS TO TEST ALL. UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND.

6.3.2.3 EFFECT OF RESTART COMMAND

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT. THE UNITS SWITCH GIVES THE ABILITY TO SELECT A SUBSET OF THESE. THE SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED (OPERATOR WILL BE ASKED). THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS: A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C) A CONTROL/C WAS ENTERED BY THE OPERATOR.

6.3.3 CONTINUE COMMAND

```
**********************************************************************
CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>
**********************************************************************
```

6.3.3.1 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS SAME AS IN START COMMAND, BUT THE DEFAULT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART. IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION.

6.3.3.2 FLAG SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS SAME AS IN START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

6.3.3.3 EFFECT OF CONTINUE COMMAND

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

6.3.4 PROCEED COMMAND

****
PRO(CEED)/FLAGS:<FLAG-LIST>
****

6.3.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

6.3.4.2 EFFECT OF PROCEED COMMAND

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE. COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

6.3.5 ADD COMMAND

****
ADD/UNITS:<UNIT-LIST>
****

6.3.5.1 UNITS SWITCH (/UNITS:<UNIT-LIST>

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

```
2702
2703                            6.3.5.2 EFFECT OF ADD COMMAND
2704
2705                            THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE.  EACH
2706                            UNIT MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER
2707                            HARDWARE DIALOGUE.  THIS COMMAND MUST BE FOLLOWED BY A
2708                            RESTART OR CONTINUE.  THE UNITS SWITCH MUST BE SPECIFIED.
2709                            THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS THAT WERE
2710                            PREVIOUSLY DROPPED.
2711
2712
2713                            6.3.6 DROP COMMAND
2714
2715                            ********************************************************************
2716                            DRO(P)/UNITS:<UNIT-LIST>
2717                            ********************************************************************
2718
2719
2720                            6.3.6.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)
2721
2722                            <UNIT-LIST> IS AS IN THE RESTART COMMAND.
2723
2724
2725                            6.3.6.2 EFFECT OF DROP COMMAND
2726
2727                            THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING.  THE UNITS
2728                            WILL BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START
2729                            COMMAND.  THE UNITS SWITCH MUST BE ENTERED.  THIS COMMAND
2730                            MUST BE FOLLOWED BY A RESTART OR A CONTINUE COMMAND.
2731
2732
2733                            6.3.7 PRINT COMMAND
2734
2735                            ********************************************************************
2736                            PRI(NT)
2737                            ********************************************************************
2738
2739
2740                            6.3.7.1 EFFECT OF PRINT COMMAND
2741
2742                            THE TOTAL NUMBER OF ERRORS FOR EACH UNIT SINCE THE LAST
2743                            START OR RESTART COMMAND ARE PRINTED.  THE ISR (INHIBIT
2744                            STATISTICAL REPORTING) FLAG IS CLEARED.
2745
2746
2747                            6.3.8 DISPLAY COMMAND
2748
2749                            ********************************************************************
2750                            DIS(PLAY)/UNITS:<UNIT-LIST>
2751                            ********************************************************************
2752
2753
2754                            6.3.8.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)
2755
2756                            <UNIT-LIST> IS AS IN THE RESTART COMMAND.
2757
```

```
2758
2759                    6.3.8.2 EFFECT OF DISPLAY COMMAND
2760
2761                    THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED
2762                    OUT IN THE FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS
2763                    THAT WERE DROPPED BY THE OPERATOR "DROP" COMMAND ARE SO
2764                    DESIGNATED.
2765
2766
2767                    6.3.9 FLAGS COMMAND
2768
2769                    ********************************************************************
2770                    FLA(GS)
2771                    ********************************************************************
2772
2773
2774                    6.3.9.1 EFFECT OF FLAGS COMMAND
2775
2776                    THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.
2777
2778
2779                    6.3.10 ZFLAGS COMMAND
2780
2781                    ********************************************************************
2782                    ZFL(AGS)
2783                    ********************************************************************
2784
2785
2786                    6.3.10.1 EFFECT OF ZFLAGS COMMAND
2787
2788                    ALL FLAGS ARE CLEARED.
2789
2790
2791                    6.3.11  CONTROL  CHARACTERS
2792
2793                    A CONTROL C (C) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES
2794                    A  RETURN  TO  COMMAND MODE.
2795
2796                    A  CONTROL  Z  (Z)  ENTERED DURING ONE OF THE THREE OPERATOR
2797                    DIALOGUES- HARD CORE QUESTIONS (SEE  6.2),HARDWARE  DIALOGUE
2798                    (SEE 6.3.1.5), OR SOFTWARE DIALOGUE (SEE 6.3.1.5) CAUSES THE
2799                    DEFAULTS TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.
2800
2801                    A CONTROL O (O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC
2802                    CAUSES  ALL  TELETYPE  OUTPUT  TO  BE  SURPRESSED  FOR  THE
2803                    REMAINDER OF THE DIAGNOSTIC OR UNTIL  ANOTHER  O  IS  TYPED,
2804                    WHICH RESTORES NORMAL TELETYPE OUTPUT.
2805
2806
2807                    6.3.12 HARDWARE PARAMETERS
2808
2809                    THE  FOLLOWING 3 QUESTIONS WILL BE ASKED ON A START COMMAND.
2810                    THE VALUE LOCATED TO THE LEFT OF THE QUESTION  MARK  IS  THE
2811                    DEFAULT  VALUE  THAT  WILL  BE  TAKEN  ON  A CARRIAGE RETURN
2812                    RESPONSE.
2813
```

1. DEVICE CSR ADDRESS : (0) 160020?

THIS IS THE ADDRESS AT WHICH THE CSR REGISTERS (SEL0) RESIDE ON THE LSI-BUS. THE ALLOWABLE RANGE IS 160020-177760 (OCTAL), AND THE DEFAULT VALUE IS 160020.

2. DEVICE VECTOR ADDRESS : (0) 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 : (0) 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).

```
2924
2925
2926                            7.0 TEST DESCRIPTIONS
2927
2928
2929                            ;*****************************************************************************
2930                            ;*      TEST 1  <DMV-11 AVAILABILITY>
2931                            ;*
2932                            ;* EACH NORMALLY USED CSR IS ACCESSED WITH A "TST" OR "TSTB" INSTRUCTION AND IF
2933                            ;* A BUS TIMEOUT OCCURS (INTERRUPT @ VECTOR ADDR 4) A FLAG WILL BE SET SHOWING
2934                            ;* WHICH CSR ADDR AND INSTRUCTION FAILED. "T1.HSW" REFLECTS "TST" INSTRUCTIONS
2935                            ;* AND "T1.HSB" REFLECTS "TSTB" INSTRUCTIONS.
2936                            ;*
2937                            ;*      EXAMPLES:
2938                            ;*
2939                            ;*      IF "TSTB  @BSEL1"  FAILS,  BIT # 1 OF "T1.HSB" WILL BE SET.
2940                            ;*      IF "TST  @SEL4" FAILS, BIT # 4 OF "T1.HSW" WILL BE SET
2941                            ;*      (NOTE: ONLY EVEN BITS IN "T1.HSW" CAN BE SET).
2942                            ;*
2943                            ;*  THE FLAG WORDS ARE OUTPUT IN BINARY AS "EXTENDED ERROR INFORMATION".
2944                            ;*****************************************************************************
2945
2946
2947                            ;*****************************************************************************
2948                            ;*      TEST 2  <MASTER CLEAR, RUN MICRODIAGNOSTICS>
2949                            ;*
2950                            ;* A MASTER CLEAR IS ISSUED TO THE DMV-11, AND THE PR[illegible]RAM ALLOWS SUFFICIENT
2951                            ;* TIME FOR THE MICRODIAGNOSTICS TO BE PERFORMED. THESE MICRODIAGNOSTICS RESIDE
2952                            ;* IN 6502 PROGRAM  MEMORY,  AND  THOROUGHLY VERIFY THE OPERATION OF THE 6502
2953                            ;* MICROPROCESSOR CHIP. THEN, THEY CHECK OUT THE DATA RAM, THE 6502'S ACCESS TO
2954                            ;* THE CSR'S,  AND  PERFORM  A  SIMPLE MESSAGE TEST USING THE 6522 CHIP AND THE
2955                            ;* USYRT, WITH INTERNAL LOOPBACK.
2956                            ;*
2957                            ;* NEXT, THE LSI-11 PROGRAM READS THE THE CSR'S (SEL0-SEL6) AND CHECKS THEM FOR
2958                            ;* THEIR EXPECTED INITIALIZED  STATES.  IF AN ERROR HAS OCCURRED IN THE MICRO-
2959                            ;* DIAGNOSTICS THE NUMBER OF THE FAILING TEST WILL BE FOUND IN SEL4, AND RUN
2960                            ;* (BIT 7) WILL NOT BE SET IN BSEL1.
2961                            ;*****************************************************************************
2962
2963
2964                            ;*****************************************************************************
2965                            ;*      TEST 3  <CSR ADDRESSING>
2966                            ;*
2967                            ;* FIRST, HALT THE 6502 UP BY CLEARING ALL CSRS. THEN, WRITE A DIFFERENT WORD
2968                            ;* OF DATA  PATTERN  A INTO EACH OF BSEL0-17, AND AFTER EACH WRITE, READ AND
2969                            ;* COMPARE ALL REGS TO EXPECTED VALUES.
2970                            ;*
2971                            ;* DATA PATTERN A = 001, 002, 004, 010, 020, 040, 100, 200, 052, 300, 140,
2972                            ;*                  060, 030, 014, 006, 003
2973                            ;*****************************************************************************
2974
2975
2976                            ;*****************************************************************************
2977                            ;*      TEST 4  <CSR REGISTERS DATA READ/WRITE>
2978                            ;*
2979                            ;* WRITE, READ, AND COMPARE EACH BYTE OF DATA PATTERN B INTO REGISTER BSEL0.
```

```
2980                    ;* THEN, REPEAT THIS USING EACH OF THE REMAINING CSR'S, BSEL1-BSEL17.  WHEN BSEL1
2981                    ;* IS BEING TESTED, THE PROGRAM ALWAYS SETS BIT 7 IN THE DATA PATTERN SO THAT
2982                    ;* RUN WILL NOT BE CLEARED, AND IT ALWAYS CLEARS BIT6 SO THAT MCLR WILL NOT BE
2983                    ;* SET.
2984                    ;*
2985                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
2986                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
2987                    ;*****************************************************************************
2988
2989
2990                    ;*****************************************************************************
2991                    ;*      TEST 5  <BASIC MASTER CLEAR>
2992                    ;*
2993                    ;* PERFORM AN INITIAL MASTER CLEAR. WRITE 356 INTO BSEL0 AND READ AND CHECK IT.
2994                    ;* THEN, ISSUE A MASTER CLEAR AND READ AND CHECK BSEL0 FOR 000.
2995                    ;*****************************************************************************
2996
2997
2998                    ;*****************************************************************************
2999                    ;*      TEST 6  <BUS RESET>
3000                    ;*
3001                    ;* PERFORM AN INITIAL MASTER CLEAR.  WRITE 377 INTO BSEL0 AND READ AND CHECK
3002                    ;* IT. THEN, ISSUE A RESET INSTRUCTION, STALL FOR COMPLETION, AND READ AND
3003                    ;* CHECK BSEL0 FOR 000.
3004                    ;*****************************************************************************
3005
3006
3007                    ;*****************************************************************************
3008                    ;*      TEST 7  <CSR, MAINTENANCE MICROCODE INTERACTION>
3009                    ;*
3010                    ;* THIS TEST INVOKES THE MAINTENANCE REQUEST MECHANISM THROUGH WHICH THE LSI-11
3011                    ;* AND 6502 CAN COMMUNICATE.    FIRST, A MASTER CLEAR IS DONE WITH ONLY BIT 0
3012                    ;* (MREQ) SET IN BSEL1. THE PROGRAM THEN CHECKS FOR THE SETTING OF BSEL2 BIT 7
3013                    ;* (MRDY) BY THE MAINTENANCE MICROCODE WITHIN ABOUT 50 MICRO-SEC., AND IF MRDY
3014                    ;* DOES NOT GET SET, AN ERROR IS REPORTED.
3015                    ;*
3016                    ;* NEXT, THE PROGRAM LOADS SEL4 WITH 000010 AND BSEL6 WITH 125. THEN, ALL CSR'S
3017                    ;* ARE READ AND CHECKED FOR EXPECTED CONTENTS.
3018                    ;*
3019                    ;* BSEL2 IS THEN LOADED WITH A WRITE COMMAND, WHICH SHOULD CAUSE THE MICROCODE
3020                    ;* TO  TRANSFER  THE  125  INTO  BSEL0. ALL CSR'S ARE THEN READ AND CHECKED FOR
3021                    ;* EXPECTED CONTENTS.
3022                    ;*
3023                    ;* THEN, THE PROGRAM LOADS 252 INTO BSEL0 AND READS AND CHECKS ALL CSR'S. BSEL2
3024                    ;* IS THEN LOADED  WITH  A  READ  COMMAND, WHICH SHOULD CAUSE THE MICROCODE TO
3025                    ;* TRANSFER THE 252 INTO BSEL6.  ALL CSR'S ARE READ AND CHECKED.
3026                    ;*****************************************************************************
3027
3028
3029                    ;*****************************************************************************
3030                    ;*      TEST 8  <RUN FLIP-FLOP>
3031                    ;*
3032                    ;* THE PROGRAM PUTS THE MICROCODE INTO THE MAINTENANCE LOOP. A 125 CHARACTER
3033                    ;* IS LOADED INTO BSEL6 AND A REQUEST IS MADE TO WRITE THE CONTENTS OF BSEL6
3034                    ;* INTO BSEL0. THE PROGRAM THEN READS AND CHECKS BSEL0 TO CONTAIN 125.
3035                    ;* NEXT, THE RUN FLIP-FLOP IS CLEARED BY LOADING A 0 INTO RUN (BSEL1 BIT 7).
```

```
3036                    ;* BSEL0 IS THEN CLEARED AND THE REQUEST IS MADE AGAIN TO WRITE THE CONTENTS
3037                    ;* OF BSEL6 INTO BSEL0. THE PROGRAM STALLS FOR 50 MICRO-SEC. AND CHECKS FOR
3038                    ;* MRDY (BSEL2 BIT 7) NOT SET, AND BSEL0 STILL CLEARED.
3039                    ;* THEN, THE PROGRAM SETS THE RUN FLIP-FLOP AGAIN BY LOADING A 1 INTO RUN,
3040                    ;* AND CHECKS FOR MRDY SET WITHIN 50 MICRO-SEC. AND BSEL0 = 125.
3041                    ;*****************************************************************************
3042
3043
3044                    ;*****************************************************************************
3045                    ;*      TEST 9  <LOW RAM (00-0F) SCRATCHPAD>
3046                    ;*
3047                    ;* THIS TEST FIRST PERFORMS AN ADDRESSING TEST OF RAM LOCATIONS (00-0F), BY
3048                    ;* WRITING THE ADRS INTO EACH LOCATION AND AFTER EACH WRITE, ALL THE LOCATIONS
3049                    ;* ARE READ AND CHECKED FOR EXPECTED CONTENTS.
3050                    ;*
3051                    ;* THEN, THE TEST PERFORMS READ/WRITE DATA TESTING OF RAM LOCATIONS 00-0F,
3052                    ;* BY WRITING, READING, AND COMPARING ALL BYTES OF DATA PATTERN B IN EACH
3053                    ;* LOCATION.
3054                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3055                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3056                    ;*****************************************************************************
3057
3058
3059                    ;*****************************************************************************
3060                    ;*      TEST 10 <DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)>
3061                    ;*
3062                    ;* GENERAL DESCRIPTION:
3063                    ;*  FIRST, THE 2K BYTE LOCATIONS IN RAM ARE LOADED WITH 0'S (SEE NOTE BELOW).
3064                    ;* THEN, THE FIRST LOCATION IS READ AND CHECKED, A SINGLE 1 IS WRITTEN INTO
3065                    ;* THE LOW BIT POSITION, AND THIS IS READ AND CHECKED. THIS IS DONE FOR ALL
3066                    ;* BYTES IN THE RAM, BY INCREMENTING THE ADDRESS TO POINT TO THE NEXT RAM
3067                    ;* LOCATION.
3068                    ;*  THEN, THE NEXT BIT POSITION IS CHOSEN TO INSERT A 1, AND ALL LOCATIONS
3069                    ;* ARE READ, WRITTEN, AND READ AS BEFORE. THIS IS CONTINUED FOR ALL BIT
3070                    ;* POSITIONS UNTIL THE ENTIRE RAM IS WRITTEN TO ALL 1'S. THE ABOVE OPERATIONS
3071                    ;* ARE PERFORMED A SECOND TIME, WITH 0'S INSERTED INTO THE RAM INSTEAD OF 1'S.
3072                    ;* THIS RESULTS IN THE ENTIRE RAM BEING WRITTEN TO ALL 0'S.
3073                    ;*  THIS TEST CONSTITUTES A THOROUGH TEST OF THE RAM. IT IS CAPABLE OF
3074                    ;* DETECTING THE FOLLOWING FAULTS :  STUCK ADDRESS BITS, UNI- AND BI-DIRECT-
3075                    ;* IONAL COUPLING BETWEEN ADDRESS BITS, STUCK MEMORY BITS, AND UNI- AND
3076                    ;* BI-DIRECTIONAL COUPLING BETWEEN MEMORY BITS IN BOTH ROWS AND COLUMNS OF THE
3077                    ;* MEMORY MATRIX.
3078                    ;*
3079                    ;* NOTE:
3080                    ;*  THIS TEST DOES NOT CHECK LOCATIONS 0010-001F, SO THAT THE PRIMARY CSR'S
3081                    ;* ARE NOT WRITTEN. IT DOES TEST LOCATIONS 0000-000F (SCRATCHPAD RAM) AND
3082                    ;* LOCATIONS 0020-002F (SECONDARY CSR'S), AS WELL AS 0030-0800 (BASIC RAM).
3083                    ;*
3084                    ;* THE "TMP#" REGISTERS ARE USED HERE TO CONTAIN THE VARIOUS CONSTANTS &
3085                    ;* VARIABLES USED THROUGHOUT THIS TEST.  A LIST OF THEIR ASSIGNMENTS SEEMS
3086                    ;* USEFUL SO HERE IT IS:
3087                    ;*
3088                    ;*      TMP0    POINTS TO THE FIRST LOCATION AFTER THE SELECT REGISTERS.
3089                    ;*
3090                    ;*      TMP1    ----
3091                    ;*
```

```
3092                            ;*      TMP2    TEST PATTERN ID CODE -- UNUSED BY THIS TEST.
3093                            ;*
3094                            ;*      TMP3    TEST DATA PATTERN INDEX -- UNUSED BY THIS TEST.
3095                            ;*
3096                            ;*      TMP4    TEST DATA PATTERN.  THE HIGH BYTE IS THE PATTERN BEING WRITTEN
3097                            ;*              ON ANY GIVEN PASS AND THE LOW BYTE IS THE PATTERN THAT WAS
3098                            ;*              WRITTEN BY THE PREVIOUS PASS THROUGH THE RAM.
3099                            ;*
3100                            ;*      TMP5    DATA READ FROM THE RAM.  ONLY THE LOW BYTE IS USED.
3101                            ;*
3102                            ;*      TMP6    ----
3103                            ;*      TMP7    ----
3104                            ;*      TMP8    ----
3105                            ;*      TMP9    ----
3106                            ;*
3107                            ;*      TMPA    RAM ADDRESS BEING TESTED.
3108                            ;*
3109                            ;*      TMPB    BIT POINTER.  NUMBER OF THE BIT WITHIN THE DATA FIELD WHICH IS
3110                            ;*              BEING SWITCHED ON EACH WRITE WITHIN THE CURRENT PASS.
3111                            ;*
3112                            ;*      TMPC    DATA FLAG.  BIT 0 OF THIS WORD IS THE VALUE TO WHICH THE BIT
3113                            ;*              IDENTIFIED IN TMPB IS BEING SET ON EACH WRITE IN THE CURRENT
3114                            ;*              PASS.
3115                            ;*
3116                            ;*      TMPD    DIRECTION SWITCH.  0 = FORWARD    NON-ZERO = BACKWARD
3117                            ;*
3118                            ;*      TMPE    LAST VALID ADDRESS TO BE TESTED.  (I.E. THE END OF RAM)
3119                            ;*
3120                            ;*      TMPF    ERROR FLAGS.  BIT 1 SET = THE LAST DETECTED ERROR WAS THE READ
3121                            ;*              OF THE PREVIOUS DATA BEFORE WRITING THE NEW DATA.  IF BIT2 IS
3122                            ;*              SET, THE READ AFTER WRITE FAILED.  IF EITHER IS SET WHEN AN
3123                            ;*              ERROR IS DETECTED, THE SUPERVISOR IS NOT CALL'D AND THEREFOR
3124                            ;*              IT'S ERROR COUNTER WILL NOT REFLECT THE ERROR -- INSTEAD, THE
3125                            ;*              DATA LINE IS PRINTED.  (UNLESS THE ERROR HANDLER'S DATA LINE
3126                            ;*              PRINT COUNT HAS EXCEDED ITS LIMIT -- IN WHICH CASE ITS
3127                            ;*              INVOCATION IS IGNORED.)
3128                            ;*********************************************************************************
3129
3130
3131                            ;*********************************************************************************
3132                            ;*      TEST 11 <VIA REGISTER ADRESSING>
3133                            ;*
3134                            ;*      VIA == "6522 VERSATILE INTERFACE ADAPTER"
3135                            ;*
3136                            ;* A MASTER CLEAR IS PERFORMED, NEXT, TIMER 1 LATCHES
3137                            ;* ARE CLEARED BY WRITING 000 INTO VIA REGS 6 & 7
3138                            ;* THEN, 377 IS LOADED INTO DATA DIRECTION REGISTERS A, B (DDRA,DDRB) TO
3139                            ;* SET THE PORT PINS FOR OUTPUT MODE.
3140                            ;* THEN, A DIFFERENT BYTE OF DATA PATTERN C IS WRITTEN INTO EACH VIA
3141                            ;* LOCATION, (EXCEPT THE TIMER REGS 4,5,10,11 OCT) AND AFTER EACH IS WRITTEN,
3142                            ;* ALL VIA REGS (EXCEPT 4,5,10,11) ARE READ AND COMPARED TO EXPECTED
3143                            ;* CONTENTS. NOTE THAT SOME VIA REGS ARE ALTERED BY THE LOADING OF OTHERS,
3144                            ;* AND THE PROGRAM TAKES THIS INTO ACCOUNT, IN THE SETTING OF EXPECTED REG
3145                            ;* VALUES. THE DATA PATTERN IS CHOSEN TO AVOID ACTIVATING THE VIA CHIP (SUCH
3146                            ;* AS GENERATING OUTPUTS ON CA1, CA2, CB1, CB2, OR CAUSING 6502
3147                            ;* INTERRUPT REQUESTS).
```

```
3148                    ;*  DATA PATTERN C (WITH VIA REGS AND THEIR DATA SHOWN IN OCTAL) :
3149                    ;*   REGISTER = 00   01   02   03   06   07   12   13   14   15   16   17
3150                    ;*        DATA = 100, 101, 377, 377, 106, 107, 112, 040, 042, 000, 200, 117
3151                    ;* NEXT, 000 IS LOADED INTO DDRA, AND DDRB IS READ AND COMPARED TO 377. THEN,
3152                    ;* THE 377 IS LOADED BACK INTO DDRA, AND DDRB IS LOADED WITH 000 AND DDRA IS
3153                    ;* READ AND COMPARED TO 377.
3154                    ;*****************************************************************************
3155
3156
3157                    ;*****************************************************************************
3158                    ;*      TEST 12 <VIA'S DDRB DATA READ/WRITE>
3159                    ;*
3160                    ;*      DDRB == "DATA DIRECTION REGISTER B"
3161                    ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
3162                    ;* READ/WRITE BITS 0-7 OF VIA DATA DIRECTION REGISTER B ARE TESTED BY WRITING,
3163                    ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
3164                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3165                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3166                    ;*****************************************************************************
3167
3168
3169                    ;*****************************************************************************
3170                    ;*      TEST 13 <VIA'S DDRA DATA READ/WRITE>
3171                    ;*
3172                    ;*      DDRA == "DATA DIRECTION REGISTER A"
3173                    ;*
3174                    ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
3175                    ;* READ/WRITE BITS 0-7 OF VIA DATA DIRECTION REGISTER A ARE TESTED BY WRITING,
3176                    ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
3177                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3178                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3179                    ;*****************************************************************************
3180
3181
3182                    ;*****************************************************************************
3183                    ;*      TEST 14 <VIA'S ORB DATA READ/WRITE>
3184                    ;*
3185                    ;*      ORB == "OUTPUT REGISTER PORT B"
3186                    ;*
3187                    ;* FIRST, A MASTER CLEAR IS PERFORMED. NEXT, 377 IS LOADED INTO DATA
3188                    ;* DIR. REG. B (DDRB) TO SET ALL B PORT PINS FOR OUTPUT MODE. THEN ,
3189                    ;* READ/WRITE BITS 0-7 OF VIA OUTPUT REG. PORT B ARE TESTED BY WRITING,
3190                    ;* READING, AND COMPARING EACH BYTE OF DATA PATTERN B.
3191                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3192                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3193                    ;*****************************************************************************
3194
3195
3196                    ;*****************************************************************************
3197                    ;*      TEST 15 <VIA'S T1 DATA READ/WRITE>
3198                    ;*
3199                    ;*      T1 == "TIMER #1"
3200                    ;*
3201                    ;* THIS TEST WRITES, READS, AND CHECKS THE T1 LATCHES AND COUNTER REGISTERS
3202                    ;* WITH DATA PATTERNS IN EACH OF 3 SUBTESTS.
3203                    ;*
```

```
3204                            ;*
3205                            ;* FIRST SUBTEST:  CHECKS FOR PROPER LOADING OF LATCHES
3206                            ;*      IT ALSO CHECKS TO BE SURE THAT THE COUNTER APPEARS TO BE DOING
3207                            ;*      SOMETHING TO THE COUNTERS.  AS LONG AS THEY HAVE CHANGED FROM THE
3208                            ;*      VALUE LOADED INTO THEM, WE WILL BE SATISFIED.
3209                            ;*
3210                            ;* A. A MASTER CLEAR IS PERFORMED.
3211                            ;* B. ALL LATCHES ARE LOADED TO ZEROES (JUST IN CASE), ACR6 & ACR7 ARE SET
3212                            ;*    TO ZERO (MODE 00), AND "T1" INTERRUPT ENABLE FLAG IS CLEARED.
3213                            ;*
3214                            ;* C. T1L-L(ADR 04) IS LOADED WITH THE CURRENT BYTE OF DATA PATTERN B.
3215                            ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
3216                            ;* E. T1C-L(ADR 04) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
3217                            ;*
3218                            ;* F. T1L-L(ADR 06) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
3219                            ;* G. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
3220                            ;*
3221                            ;* H. T1L-L(ADR 06) IS RE-LOADED WITH 0 TO MAKE T1C-H DECREMENT FAST.
3222                            ;*    T1L-H(ADR 05) IS LOADED WITH THE ORIGINAL TEST DATA PATTERN BYTE.
3223                            ;* I. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE LOADED INTO T1L-H.
3224                            ;*
3225                            ;* J. T1C-H(ADR 05) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
3226                            ;*
3227                            ;* K. T1L-H(ADR 07) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
3228                            ;* L. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE JUST LOADED.
3229                            ;*
3230                            ;* M. STEPS C-L ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
3231                            ;*
3232                            ;*
3233                            ;* SECOND SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
3234                            ;*                  FROM T1L-L TO T1L-H
3235                            ;*
3236                            ;* A. T1L-H(ADR 07) IS LOADED WITH 000 TO CLEAR IT.
3237                            ;* B. T1L-L(ADR 06) IS LOADED WITH A BYTE OF DATA PATTERN B.
3238                            ;* C. T1L-L(ADR 06) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
3239                            ;* D. T1L-H(ADR 07) IS READ AND COMPARED TO 000.
3240                            ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
3241                            ;*
3242                            ;*
3243                            ;* THIRD SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
3244                            ;*                  FROM T1L-H TO T1L-L
3245                            ;*
3246                            ;* A. T1L-L(ADR 04) IS LOADED WITH 000 TO CLEAR IT
3247                            ;* B. T1L-H(ADR 07) IS LOADED WITH A BYTE OF DATA PATTERN B.
3248                            ;* C. T1L-H(ADR 07) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
3249                            ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO 000.
3250                            ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
3251                            ;*
3252                            ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3253                            ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3254                            ;*********************************************************************************
3255
3256
3257                            ;*********************************************************************************
3258                            ;*      TEST 16 <VIA'S SR DATA READ/WRITE>
3259                            ;*
```

```
3260                    ;*      SR == "SHIFT REGISTER"
3261                    ;*
3262                    ;* FIRST, A MASTER CLEAR IS PERFORMED AND THE ACR IS SET TO 000. THEN :
3263                    ;* READ/WRITE BITS 0-7 OF VIA SHIFT REGISTER ARE TESTED BY WRITING, READING,
3264                    ;* AND COMPARING EACH BYTE OF DATA PATTERN B.
3265                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3266                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3267                    ;*****************************************************************************
3268
3269
3270                    ;*****************************************************************************
3271                    ;*      TEST 17 <VIA'S ACR DATA READ/WRITE>
3272                    ;*
3273                    ;*      ACR == "AUXILIARY CONTROL REGISTER"
3274                    ;*
3275                    ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
3276                    ;* READ/WRITE BITS 0-7 OF THE ACR ARE TESTED BY WRITING, READING,
3277                    ;* AND COMPARING EACH BYTE OF DATA PATTERN B.
3278                    ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
3279                    ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
3280                    ;*****************************************************************************
3281
3282
3283                    ;*****************************************************************************
3284                    ;*      TEST 18 <VIA'S PCR DATA READ/WRITE>
3285                    ;*
3286                    ;*      PCR == "PERIPHERAL CONTROL REGISTER"
3287                    ;*
3288                    ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
3289                    ;* READ/WRITE BITS 0-7 OF THE PCR REGISTER ARE TESTED BY WRITING, READING,
3290                    ;* AND COMPARING EACH BYTE OF A SUBSET OF DATA PATTERN B.
3291                    ;*   DATA PATTERN B (SUBSET) =  125, 252, 000, 377, 001, 002, 004, 010, 020,
3292                    ;*                              040, 100, 200.
3293                    ;*****************************************************************************
3294
3295
3296                    ;*****************************************************************************
3297                    ;*      TEST 19 <VIA'S IER DATA READ/WRITE>
3298                    ;*
3299                    ;*      IER == "INTERRUPT ENABLE REGISTER"
3300                    ;*
3301                    ;* BITS 0-6 OF THE IER CAN BE SET OR CLEARED ON A WRITE, UNDER CONTROL OF THE
3302                    ;* SET/CLEAR CONTROL BIT 7. TO TEST THIS , EACH BYTE OF DATA PATTERN D IS
3303                    ;* WRITTEN INTO IER, AND THE REGISTER IS READ AND COMPARED TO THE CORRESPOND-
3304                    ;* ING BYTE OF DATA PATTERN E.
3305                    ;*
3306                    ;*   DATA PATTERN D = 200, 201, 202, 204, 210, 220, 240, 300, 200, 000, 001,
3307                    ;*                    002, 004, 010, 020, 040, 100, 000, 325, 125, 252, 052
3308                    ;*
3309                    ;*   DATA PATTERN E = 000, 001, 003, 007, 017, 037, 077, 177, 177, 177, 176,
3310                    ;*                    174, 170, 160, 140, 100, 000, 000, 125, 000, 052, 000
3311                    ;*
3312                    ;*****************************************************************************
3313
3314
3315                    ;*****************************************************************************
```

```
3316                            ;*      TEST 20 <VIA'S ORB/DDRB MASTER CLEAR TEST>
3317                            ;*
3318                            ;*      ORB == "OUTPUT REGISTER PORT B"
3319                            ;*      DDRB == "DATA DIRECTION REGISTER B"
3320                            ;*
3321                            ;* FIRST, A MASTER CLEAR IS PERFORMED. NEXT, 377 IS LOADED INTO DDRB TO SET
3322                            ;* ALL 8 PORT PINS FOR OUTPUT MODE. THEN, A 000 BYTE IS WRITTEN INTO ORB AND
3323                            ;* THE REGISTER IS READ BACK AND CHECKED FOR 000. THEN, A MASTER CLEAR IS
3324                            ;* PERFORMED AND ORB IS READ AND CHECKED FOR 377.
3325                            ;*****************************************************************************
3326
3327
3328                            ;*****************************************************************************
3329                            ;*      TEST 21 <VIA'S DDRB MASTER CLEAR TEST>
3330                            ;*
3331                            ;*      DDRB == "DATA DIRECTION REGISTER B"
3332                            ;*
3333                            ;* A 377 BYTE IS WRITTEN INTO DDRB AND THE REGISTER IS READ BACK AND CHECKED
3334                            ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND DDRB IS READ AND CHECKED FOR
3335                            ;* 000.
3336                            ;*
3337                            ;* NOTE:  THIS TESTING IS ALSO DONE IN TEST 23.  IT IS INCLUDED HERE ONLY TO
3338                            ;*        PROVIDE TIGHTER LOOPING ON JUST THE DDRB MASTER CLEAR CHECKING.
3339                            ;*****************************************************************************
3340
3341
3342                            ;*****************************************************************************
3343                            ;*      TEST 22 <VIA'S DDRA MASTER CLEAR TEST>
3344                            ;*
3345                            ;*      DDRA == "DATA DIRECTION REGISTER A"
3346                            ;*
3347                            ;* A 377 BYTE IS WRITTEN INTO DDRA AND THE REGISTER IS READ BACK AND CHECKED
3348                            ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND DDRA IS READ AND CHECKED FOR
3349                            ;* 000.
3350                            ;*****************************************************************************
3351
3352
3353                            ;*****************************************************************************
3354                            ;*      TEST 23 <VIA'S SR MASTER CLEAR TEST>
3355                            ;*
3356                            ;*      SR == "SHIFT REGISTER"
3357                            ;*
3358                            ;* A 123 BYTE IS WRITTEN INTO SR AND THE REGISTER IS READ BACK AND CHECKED
3359                            ;* FOR 123. THEN, A MASTER CLEAR IS PERFORMED AND SR IS READ AND CHECKED FOR
3360                            ;* NO CHANGE.
3361                            ;*****************************************************************************
3362
3363
3364                            ;*****************************************************************************
3365                            ;*      TEST 24 <VIA'S ACR MASTER CLEAR TEST>
3366                            ;*
3367                            ;*      ACR == "AUXILIARY CONTROL REGISTER"
3368                            ;*
3369                            ;* A 252 BYTE IS WRITTEN INTO ACR AND THE REGISTER IS READ BACK AND CHECKED
3370                            ;* FOR 252. THEN, A MASTER CLEAR IS PERFORMED AND ACR IS READ AND CHECKED FOR
3371                            ;* 000, TO VERIFY THAT IT IS CLEARED BY MASTER CLEAR.
```

```
3372                    ;*****************************************************************************
3373
3374
3375                    ;*****************************************************************************
3376                    ;*      TEST 25 <VIA'S PCR MASTER CLEAR TEST>
3377                    ;*
3378                    ;*      PCR == "PERIPHERAL CONTROL REGISTER"
3379                    ;*
3380                    ;* A 377 BYTE IS WRITTEN INTO PCR AND THE REGISTER IS READ BACK AND CHECKED
3381                    ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND PCR IS READ AND CHECKED FOR
3382                    ;* 000.
3383                    ;*****************************************************************************
3384
3385
3386                    ;*****************************************************************************
3387                    ;*      TEST 26 <VIA'S IER MASTER CLEAR TEST>
3388                    ;*
3389                    ;*      IER == "INTERRUPT ENABLE REGISTER"
3390                    ;*
3391                    ;* A 377 BYTE IS WRITTEN INTO IER AND THE REGISTER IS READ BACK AND CHECKED
3392                    ;* FOR 377. THEN, A MASTER CLEAR IS PERFORMED AND IER IS READ AND CHECKED FOR
3393                    ;* 200.
3394                    ;*****************************************************************************
3395
```

```
3397
3398
3399                            8.0 ERROR INFORMATION
3400
3401
3402                            8.1 ERROR REPORTING
3403
3404                            ERRORS  ARE  REPORTED  BY  THE PROGRAM AS THEY OCCUR (IF NOT
3405                            INHIBITED). THE REPORT CONFORMS TO THE DIAGNOSTIC SUPERVISOR
3406                            ERROR  REPORT  FORMAT,  AND CONSISTS OF A DESCRIPTION OF THE
3407                            ERROR, THE TEST NUMBER, SUBTEST  NUMBER,  PC  OF  THE  ERROR
3408                            CALL,  DEVICE  ADDRESS,  AND  BASIC  AND  EXTENDED  ERROR
3409                            INFORMATION.
3410
3411                            THE FOLLOWING EXAMPLE PROVIDES A TYPICAL ERROR REPORT, WHICH
3412                            DESCRIBES A "MASTER CLEAR FAILURE" ERROR, AND PROVIDES THE PC
3413                            OF THE ERROR CALL AND THE DEVICE REGISTER CONTENTS :
3414
3415                              CVDMA DVC FTL ERR 00001 ON UNIT 00 TST 002 SUB 000 PC: 021122
3416                              MASTER CLEAR FAILURE
3417
3418                                THE CONTENTS OF ALL BYTE SELECT REG'S ARE:
3419                              BSEL0   BSEL1   BSEL2   BSEL3
3420                               000     000     000     000
3421                                 BSEL4   BSEL5   BSEL6   BSEL7
3422                                  000     000     121     000
3423                              BSEL10  BSEL11  BSEL12  BSEL13
3424                               000     000     000     000
3425                                 BSEL14  BSEL15  BSEL16  BSEL17
3426                                  000     000     000     000
3427
3428                            FOR OTHER ERRORS, THE REPORT  MAY  BE  MORE  EXTENSIVE,  AND
3429                            REQUIRE ADDITIONAL DATA TO BE REPORTED.
3430
3431                            IF  EXTENDED  ERROR INFORMATION HAD BEEN INHIBITED USING THE
3432                            IXE FLAG PRIOR TO RUNNING THE TEST, THE  ABOVE  ERROR  WOULD
3433                            HAVE BEEN REPORTED IN THE FOLLOWING SHORTENED FORM :
3434
3435                              CVDMA DVC FTL ERR 00001 ON UNIT 00 TST 002 SUB 000 PC: 021122
3436                              MASTER CLEAR FAILURE
3437
3438                            .
```

```
                        .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.
                        ;--

002000                          HEADER CVDMA,C,0,110.,,0
(4) 002000                                                      L$NAME::
(4) 002000  103                                                         .ASCII /C/
(4) 002001  126                                                         .ASCII /V/
(4) 002002  104                                                         .ASCII /D/
(4) 002003  115                                                         .ASCII /M/
(4) 002004  101                                                         .ASCII /A/
(6) 002005  000                                                         .BYTE   0
(6) 002006  000                                                         .BYTE   0
(5) 002007  000                                                         .BYTE   0
(5) 002010                                                      L$REV::
(4) 002010  103                                                         .ASCII  /C/
(5) 002011                                                      L$DEPO::
(4) 002011  060                                                         .ASCII  /0/
(5) 002012                                                      L$UNIT::
(4) 002012  000000                                                      .WORD   0
(5) 002014                                                      L$TIML::
(4) 002014  000156                                                      .WORD   110.
(5) 002016                                                      L$HPCP::
(4) 002016  040116                                                      .WORD   L$HARD
(5) 002020                                                      L$SPCP::
(4) 002020  000000                                                      .WORD   0
(5) 002022                                                      L$HPTP::
(4) 002022  002216                                                      .WORD   L$HW
(5) 002024                                                      L$SPTP::
(4) 002024  000000                                                      .WORD   0
(5) 002026                                                      L$LADP::
(4) 002026  040374                                                      .WORD   L$LAST
(5) 002030                                                      L$STA::
(4) 002030  000000                                                      .WORD   0
(5) 002032                                                      L$CO::
(4) 002032  000000                                                      .WORD   0
(5) 002034                                                      L$DTYP::
(4) 002034  000000                                                      .WORD   0
(5) 002036                                                      L$APT::
(4) 002036  000000                                                      .WORD   0
(5) 002040                                                      L$DTP::
(4) 002040  002124                                                      .WORD   L$DISPATCH
(5) 002042                                                      L$PRIO::
(4) 002042  000000                                                      .WORD   0
(5) 002044                                                      L$ENVI::
(4) 002044  000000                                                      .WORD   0
(5) 002046                                                      L$EXP1::
(4) 002046  000000                                                      .WORD   0
(5) 002050                                                      L$MREV::
(4) 002050      003                                                     .BYTE   C$REVISION
(3) 002051      003                                                     .BYTE   C$EDIT
```

```
(5)  002052
(4)  002052  000000
(5)  002054  000000
(5)  002056
(4)  002056  000000
(5)  002060
(4)  002060  003522
(5)  002062
(4)  002062  000000
(5)  002064
(4)  002064  000000
(5)  002066
(4)  002066  000000
(5)  002070
(4)  002070  020364
(5)  002072
(4)  002072  020360
(5)  002074
(4)  002074  000000
(5)  002076
(4)  002076  003542
(5)  002100
(4)  002100  104035
(5)  002102
(4)  002102  002236
(5)  002104
(4)  002104  017634
(5)  002106
(4)  002106  020342
(5)  002110
(4)  002110  020216
(5)  002112
(4)  002112  017626
(5)  002114
(4)  002114  000000
(5)  002116
(4)  002116  000000
(5)  002120
(4)  002120  000000
3492
3498                            .EVEN

L$EF::
                .WORD   0
                .WORD   0
L$SPC::
                .WORD   0
L$DEVP::
                .WORD   L$DVTYP
L$REPP::
                .WORD   0
L$EXP4::
                .WORD   0
L$EXP5::
                .WORD   0
L$AUT::
                .WORD   L$AU
L$DUT::
                .WORD   L$DU
L$LUN::
                .WORD   0
L$DESP::
                .WORD   L$DESC
L$LOAD::
                EMT     E$LOAD
L$ETP::
                .WORD   L$ERRTBL
L$ICP::
                .WORD   L$INIT
L$CCP::
                .WORD   L$CLEAN
L$ACP::
                .WORD   L$AUTO
L$PRT::
                .WORD   L$PROT
L$TEST::
                .WORD   0
L$DLY::
                .WORD   0
L$HIME::
                .WORD   0
```

```
3500                                    .SBTTL DISPATCH TABLE
3501
3502                                    ;////////////////////////////////////////////////////////////////////////////////
3503                                    ;/ THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
3504                                    ;/ IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
3505                                    ;////////////////////////////////////////////////////////////////////////////////
3506
3507  002122                                    DISPATCH        28.
 (4)  002122  000034                                                        .WORD   28
 (3)  002124                                                        L$DISPATCH::
 (6)  002124  020366                                                        .WORD   T1
 (6)  002126  021132                                                        .WORD   T2
 (6)  002130  021242                                                        .WORD   T3
 (6)  002132  021434                                                        .WORD   T4
 (6)  002134  021576                                                        .WORD   T5
 (6)  002136  021720                                                        .WORD   T6
 (6)  002140  022132                                                        .WORD   T7
 (6)  002142  022642                                                        .WORD   T8
 (6)  002144  023210                                                        .WORD   T9
 (6)  002146  024156                                                        .WORD   T10
 (6)  002150  025136                                                        .WORD   T11
 (6)  002152  025760                                                        .WORD   T12
 (6)  002154  026042                                                        .WORD   T13
 (6)  002156  026124                                                        .WORD   T14
 (6)  002160  026226                                                        .WORD   T15
 (6)  002162  027272                                                        .WORD   T16
 (6)  002164  027354                                                        .WORD   T17
 (6)  002166  027436                                                        .WORD   T18
 (6)  002170  027522                                                        .WORD   T19
 (6)  002172  027610                                                        .WORD   T20
 (6)  002174  030076                                                        .WORD   T21
 (6)  002176  030226                                                        .WORD   T22
 (6)  002200  030356                                                        .WORD   T23
 (6)  002202  030512                                                        .WORD   T24
 (6)  002204  030642                                                        .WORD   T25
 (6)  002206  030772                                                        .WORD   T26
 (6)  002210  031130                                                        .WORD   T27
 (6)  002212  036362                                                        .WORD   T28
3508
```

```
                        .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
(3) 002214  000007                                                      .WORD   L10000-L$HW/2
(3) 002216                                                          L$HW::
(3) 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
(3) 002234                                                          L10000:
```

```
                        .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
(3)  002234  000000                                             .WORD   L10001-L$SW/2
(3)  002236                                                     L$SW::
(3)  002236                                                     SFPTBL::
002236                          ENDSW
(3)  002236                                                     L10001:
```

```
                                .SBTTL GLOBAL EQUATES SECTION


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

002236                                  EQUALS
(1)                             ;
(1)                             ; BIT DIFINITIONS
(1)                             ;
(1)             100000          BIT15== 100000
(1)             040000          BIT14== 40000
(1)             020000          BIT13== 20000
(1)             010000          BIT12== 10000
(1)             004000          BIT11== 4000
(1)             002000          BIT10== 2000
(1)             001000          BIT09== 1000
(1)             000400          BIT08== 400
(1)             000200          BIT07== 200
(1)             000100          BIT06== 100
(1)             000040          BIT05== 40
(1)             000020          BIT04== 20
(1)             000010          BIT03== 10
(1)             000004          BIT02== 4
(1)             000002          BIT01== 2
(1)             000001          BIT00== 1
(1)                             ;
(1)             001000          BIT9==  BIT09
(1)             000400          BIT8==  BIT08
(1)             000200          BIT7==  BIT07
(1)             000100          BIT6==  BIT06
(1)             000040          BIT5==  BIT05
(1)             000020          BIT4==  BIT04
(1)             000010          BIT3==  BIT03
(1)             000004          BIT2==  BIT02
(1)             000002          BIT1==  BIT01
(1)             000001          BIT0==  BIT00
(1)                             ;
(1)                             ; EVENT FLAG DEFINITIONS
(1)                             ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
(1)                             ;
(1)             000040          EF.START==      32.                     ; START COMMAND WAS ISSUED
(1)             000037          EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
(1)             000036          EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
(1)             000035          EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
(1)             000034          EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
(1)                             ;
(1)                             ;
(1)                             ; PRIORITY LEVEL DEFINITIONS
(1)                             ;
(1)             000340          PRI07== 340
(1)             000300          PRI06== 300
(1)             000240          PRI05== 240
(1)             000200          PRI04== 200
```

```
(1)          000140                  PRI03== 140
(1)          000100                  PRI02== 100
(1)          000040                  PRI01== 40
(1)          000000                  PRI00== 0
(1)                                  ;
(1)                                  ;OPERATOR FLAG BITS
(1)                                  ;
(1)          000004                  EVL==        4
(1)          000010                  LOT==       10
(1)          000020                  ADR==       20
(1)          000040                  IDU==       40
(1)          000100                  ISR==      100
(1)          000200                  UAM==      200
(1)          000400                  BOE==      400
(1)          001000                  PNT==     1000
(1)          002000                  PRI==     2000
(1)          004000                  IXE==     4000
(1)          010000                  IBE==    10000
(1)          020000                  IER==    20000
(1)          040000                  LOE==    40000
(1)          100000                  HOE==   100000
3564
3565                                 .SBTTL  DEFINE THE NUMBER OF CSR'S
3566         000020                  CSREGS  = 16.
3567
3568                                 ;-------------------------------------------------------------------------------
3569
3570                                 .SBTTL  NPR ADDRESS REGISTER EQUATES
3571         000070                  NPRAOL  = 70                    ;OUT NPR ADRS LO REG
3572         000071                  NPRAOH  = NPRAOL+1              ;OUT NPR ADRS HI REG
3573         000072                  NPRAOX  = NPRAOL+2              ;OUT NPR EXTENDED ADRS REG
3574         000074                  NPRAIL  = NPRAOL+4              ;IN NPR ADRS LO REG
3575         000075                  NPRAIH  = NPRAOL+5              ;IN NPR ADRS HI REG
3576         000076                  NPRAIX  = NPRAOL+6              ;IN NPR EXTENDED ADRS REG
3577         000010                  NPRBS7  = BIT3                  ;"BANK SELECT 7" BIT -- W/IN EXTENDED ADRS. REG.
3578
3579
3580
3581                                 .SBTTL  NPR DATA REG EQUATES
3582         123000                  NPRDRL  = 123000                ;NPR DATA REGISTER -- LOW BYTE
3583         123001                  NPRDRH  = NPRDRL+1              ;NPR DATA REGISTER -- HIGH BYTE
3584
3585
3586
3587                                 .SBTTL  NPR CONTROL REG EQUATES
3588         123004                  NPRCTL  = NPRDRL+4              ;NPR CONTROL REGISTER
3589         000200                  NPRABT  = BIT7                  ;=1 IF BUS TIME-OUT ON NPR
3590         000100                  NPRGO   = BIT6                  ;SET FOR NOP, CLEAR TO "GO" / 0=DONE, 1=BUSY
3591         000040                  NPRIO   = BIT5                  ;0 = (LSI ==> DMV);  1 = (DMV ==> LSI)
3592         000020                  LSIHLT  = BIT4                  ;SETTING THIS WILL "HALT" THE LSI-11 !!
3593         000010                  NPRBYT  = BIT3                  ;SET TO 1 TO WRITE BYTE ONLY TO LSI-11
3594         000004                  DMVPU   = BIT2                  ;SET BY MICRO-DIAG.  MUST REMAIN SET!!!
3595         000002                  LSIDCL  = BIT1                  ;IF SET, WILL CAUSE POWER DOWN CONDITION IN LSI!
3596         000001                  DMVDAI  = BIT0                  ;"DISABLE INIT" FROM EFFECTING DMV-11
3597
3598
```

```
                        NPR REQUEST FUNCTIONS

3599                    .SBTTL  NPR REQUEST FUNCTIONS
3600    000004          NPRLD   = DMVPU                 ;WORD XFER:  LSI ==> DMV
3601    000044          NPRDL   = DMVPU!NPRIO           ;WORD XFER:  DMV ==> LSI
3602    000054          NPRDLB  = DMVPU!NPRIO!NPRBYT    ;BYTE XFER:  DMV ==> LSI
3603
3604                    ;-------------------------------------------------------------------------------
3605
3606                    .SBTTL  INTERRUPT REG EQUATES
3607    123005          IRQREG  = 123005                ;INTERRUPT REQUEST REG
3608    000004          IRQA    = BIT2                  ;REQUEST BIT FOR XX0 INTERRUPT -- "A"
3609    000002          IRQB    = BIT1                  ;REQUEST BIT FOR XX4 INTERRUPT -- "B"
3610
3611                    ;-------------------------------------------------------------------------------
3612
3613                    .SBTTL  CONTROL FLAGS FROM P-TABLE ENTRIES
3614    000001          PU24    = BIT0                  ;POWER-FAIL VECTORING MODE.  1 = MODE 0
3615                                                    ;  (I.E. JUMPERS W5 & W6 BOTH REMOVED)
```

J3


```
                        .SBTTL  SWITCH PACKS

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

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

```
                        .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
```

```
3708            000200                  IFRIRQ  =BIT7   ;"IRQ" HAS BEEN ISSUED -- LOGICAL "OR" OF BITS 0 --> 6
3709            000100                  IFRT1   =BIT6   ;"T1" -- TIMER # 1 TIMED-OUT
3710            000040                  IFRT2   =BIT5   ;"T2" -- TIMER # 1 TIMED-OUT
3711            000020                  IFRCB1  =BIT4   ;"CB1" EDGE DETECTED ("K2 LINE UNIT STEP" O/P SIGNAL FROM SR)
3712            000010                  IFRCB2  =BIT3   ;"CB2" EDGE DETECTED (UNUSED!)
3713            000004                  IFRSR   =BIT2   ;"SR" REGISTER COMPLETED SHIFT OPERATION
3714            000002                  IFRCA1  =BIT1   ;"CA1" EDGE DETECTED ("K6 MOD RDY H")
3715            000001                  IFRCA2  =BIT0   ;"CA2" EDGE DETECTED ("K2 CTS H")
3716
3717
```

```
                        .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
                        ;--*************************************************************************

002236                          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  001000          DELAY2: .WORD   1000            ;DELAY TIME FOR M-LOOP FUNCTION, 100 USEC.APPROX.
002322  000000          LOGDEV: .WORD   0               ;LOGICAL DEVICE NUMBER
```

```
4019  002324  000000                  PSTACK: .WORD   0               ;CONTAINS BASE LEVEL PROGRAM STACK POINTER
4020  002326  000000                  INTFLG: .WORD   0               ;INTERRUPT RECEIVED FLAG BYTES.  ALLOCATION:
4021                                                                  ;  LOW BYTE FOR "A" & HIGH BYTE FOR "B"
4022  002330  000000                  INTWCH: .WORD   0               ;BYTE IS SET NON-ZERO WHEN HANDLER SHOULD BE
4023                                                                  ;  WATCHING FOR INT'S.  ALLOCATION: SEE INTFLG
4024  002332  000000                  ERRFLG: .WORD   0               ;ERROR FLAG
4025  002334  000000                  REGNUM: .WORD   0               ;REGISTER NUMBER -- FOR PASSING ARG. TO "ERR@"
4026  002336  000000                  FRSTIM: .WORD   0               ;FLAG=0 IF PROGRAM JUST LOADED
4027  002340  000000                  FRSPAS: .WORD   0               ;FLAG=0 IF FIRST PASS AFTER LOAD
4028  002342  000000                  DEVMAP: .WORD   0               ;BIT MAP OF ACTIVE DEVICES
4029  002344  000000                  DEVPTR: .WORD   0               ;DEVICE MAP BIT POINTER
4030  002346  000000                  CONSOL: .WORD   0               ;CONSOLE DEVICE FLAG -- NON-ZERO = NONE PRESENT
4031  002350  000000                  PFLAG:  .WORD   0               ;MISC. PROGRAM FLAGS
4032                                    ;
4033                                    ; THE ABOVE WORD CONTAINS MISC. FLAGS WHICH CAN ONLY BE ACCESSED BY PATCHING.
4034                                    ; IT IS NOT INTENDED THAT THEY BE SET OR CLEARED EXCEPT UNDER VERY UNUSUAL
4035                                    ; CIRCUMSTANCES.  THEREFORE, THEY WILL NOT BE DOCUMENTED ANY OTHER PLACE
4036                                    ; EXCEPT RIGHT HERE.
4037                                    ;
4038                                    ; BIT 0 -- WHEN SET, THOSE TESTS WHICH DO A BUS RESET WILL NOT BE EXECUTED.
4039                                    ;          THIS WAS IMPLEMENTED TO SAVE WEAR & TEAR ON THE RX01 IN THE
4040                                    ;          DEVELOPMENT SYSTEM WHILE DOING LONG TERM TESTING OF ALL OTHER
4041                                    ;          TESTS.
4042                                    ;
4043                                    ; BIT 1 -- CPU TYPE. (NOT USED)
4044                                    ;
4045                                    ; BIT 2 -- CONTROLS PRINTING OF EXTENDED ERROR INFORMATION DURING "MOVING
4046                                    ;          INVERSIONS TEST" OF RAM.  NORMALLY ONLY ADDRESS, GOOD & BAD
4047                                    ;          DATA, AND XOR WILL BE PRINTED.  IF THIS BIT IS SET HOWEVER,
4048                                    ;          INFORMATION IDENTIFYING WHERE WITHIN THE ALGORITHM THE ERROR
4049                                    ;          WAS DETECTED IS REPORTED.  THE FOLLOWING ABBREVIATIONS ARE USED
4050                                    ;          IN THE HEADING:
4051                                    ;               BIT ---  IDENTIFIES THE INNERMOST LOOP.  WHICH BIT IS
4052                                    ;                        BEING INVERTED AT EACH LOCATION.  BITS ARE
4053                                    ;                        IDENTIFIED AS 0 THROUGH 7.
4054                                    ;               DATA --  IDENTIFIES THE VALUE TO WHICH THE ABOVE BIT IS
4055                                    ;                        BEING SET (I.E. 0 OR 1).  IT IS FIRST READ AND
4056                                    ;                        CHECKED FOR EXPECTED CONTENTS; THEN THE BIT IS
4057                                    ;                        INVERTED TO THIS STATE (DATA) AND RE-WRITTEN;
4058                                    ;                        THEN IT IS AGAIN READ & CHECKED FOR THE NEW
4059                                    ;                        VALUE.
4060                                    ;               SEQ ---  INDICATES THE DIRECTION (FWD OR BKWD) THE TEST
4061                                    ;                        WAS SCANNING THROUGH RAM WHEN THE ERROR OCCURED.
4062                                    ;               LSB ---  THIS IS THE LOGICAL LEAST SIGNIFICANT BIT OF THE
4063                                    ;                        RAM ADDRESS AS WE SCAN THROUGH MEMORY.  BY
4064                                    ;                        VARYING THIS, THE ALGORITHM GENERATS NON-SEQUEN-
4065                                    ;                        TIAL ADDRESSING OF RAM AND EFFECTS A MUCH MORE
4066                                    ;                        THOROUGH TEST OF MEMORY.
4067                                    ;
4068
4069
```

```
                                .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
```

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

                                .EVEN                                   ;USAGE:
002504  000020          PATA:   .WORD   PATB-PATA-2                     ;# OF BYTES IN PATTERN
002506     001                  .BYTE   001                             ;BSEL0
002507     002                  .BYTE   002                             ;BSEL1
002510     004                  .BYTE   004                             ;BSEL2
002511     010                  .BYTE   010                             ;BSEL3
002512     020                  .BYTE   020                             ;BSEL4
002513     040                  .BYTE   040                             ;BSEL5
002514     100                  .BYTE   100                             ;BSEL6
002515     200                  .BYTE   200                             ;BSEL7
002516     052                  .BYTE   052                             ;BSEL10
002517     300                  .BYTE   300                             ;BSEL11
002520     140                  .BYTE   140                             ;BSEL12
002521     060                  .BYTE   060                             ;BSEL13
002522     030                  .BYTE   030                             ;BSEL14
002523     014                  .BYTE   014                             ;BSEL15
002524     006                  .BYTE   006                             ;BSEL16
002525     003                  .BYTE   003                             ;BSEL17

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

                                .EVEN                                   ;USAGE:
002526  000026          PATB:   .WORD   PATC-PATB-2                     ;# OF BYTES IN PATTERN
002530     125                  .BYTE   125
002531     252                  .BYTE   252
002532     000                  .BYTE   000
002533     377                  .BYTE   377
002534     001                  .BYTE   001
002535     002                  .BYTE   002
002536     004                  .BYTE   004
002537     010                  .BYTE   010
002540     020                  .BYTE   020
002541     040                  .BYTE   040
002542     100                  .BYTE   100
002543     200                  .BYTE   200
002544     376                  .BYTE   376
002545     375                  .BYTE   375
002546     373                  .BYTE   373
002547     367                  .BYTE   367
002550     357                  .BYTE   357
002551     337                  .BYTE   337
002552     277                  .BYTE   277
002553     177                  .BYTE   177
002554     000                  .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

                        002556  .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
```

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

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

                        .EVEN
                        PATF:   .WORD   <PATG-PATF-2>/2
4304  002724  000045             .WORD   125252
4305  002726  125252             .WORD   052525
4306  002730  052525             .WORD   000000
4307  002732  000000             .WORD   177777
4308  002734  177777             .WORD   000001
4309  002736  000001             .WORD   000002
4310  002740  000002             .WORD   000004
4311  002742  000004             .WORD   000010
4312  002744  000010             .WORD   000020
4313  002746  000020             .WORD   000040
4314  002750  000040             .WORD   000100
4315  002752  000100             .WORD   000200
4316  002754  000200             .WORD   000400
4317  002756  000400             .WORD   001000
4318  002760  001000             .WORD   002000
4319  002762  002000             .WORD   004000
4320  002764  004000             .WORD   010000
4321  002766  010000             .WORD   020000
4322  002770  020000             .WORD   040000
4323  002772  040000             .WORD   100000
4324  002774  100000             .WORD   177776
4325  002776  177776             .WORD   177775
4326  003000  177775             .WORD   177773
4327  003002  177773             .WORD   177767
4328  003004  177767             .WORD   177757
4329  003006  177757             .WORD   177737
4330  003010  177737             .WORD   177677
4331  003012  177677             .WORD   177577
4332  003014  177577             .WORD   177377
4333  003016  177377             .WORD   176777
4334  003020  176777             .WORD   175777
4335  003022  175777             .WORD   173777
4336  003024  173777             .WORD   167777
4337  003026  167777             .WORD   157777
4338  003030  157777             .WORD   137777
4339  003032  137777             .WORD   077777
4340  003034  077777             .WORD   000000
4341  003036  000000
```

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

  4343  003040                PATG:
  4344
  4345                        .SBTTL  ***** DATA PATTERN RESULTS TABLE FOR MASTER CLEAR (RESFMC) *****
  4346
  4347                        .EVEN
  4348  003040  000020   RESFMC: .WORD   RESFT3-RESFMC-2
  4349  003042     000   BSELRS: .BYTE   000             ;BSEL0
  4350  003043     200           .BYTE   200             ;BSEL1 -- "RUN" BIT SET
  4351  003044     000           .BYTE   000             ;BSEL2
  4352  003045     000           .BYTE   000             ;BSEL3
  4353  003046     033           .BYTE   033             ;BSEL4 -- CODE FOR THE DMV-11
  4354  003047     000           .BYTE   000             ;BSEL5
  4355  003050     305           .BYTE   305             ;BSEL6 -- INDICATING VALID COMPLETION OF U-DIAG.
  4356  003051     000           .BYTE   000             ;BSEL7
  4357  003052     000           .BYTE   000             ;BSEL10
  4358  003053     000           .BYTE   000             ;BSEL11
  4359  003054     000           .BYTE   000             ;BSEL12
  4360  003055     000           .BYTE   000             ;BSEL13
  4361  003056     000           .BYTE   000             ;BSEL14
  4362  003057     000           .BYTE   000             ;BSEL15
  4363  003060     000           .BYTE   000             ;BSEL16
  4364  003061     000           .BYTE   000             ;BSEL17
  4365
  4366                        .SBTTL  ***** DATA PATTERN RESULTS FOR TEST 3 (RESFT3) *****
  4367
  4368  003062  000020   RESFT3: .BLKW   16.
  4369                        .EVEN
```

```
                        .SBTTL  DATA BUFFER AREAS

003122  000400          BUFAREA:        .BLKB   256.


                        ;  THIS BUFFER HAS SOME ALTERNATE USES TOO.  THE FOLLOWING LABELS ARE PROVIDED
                        ;  FOR THOSE USAGES.

        003322          W0 = BUFAREA+128.       ;THIS WORD TABLE STARTS IN THE MIDDLE OF "BUFAREA"
        003324          W1 = W0+2               ;AND IS USED BY "ERR6" FOR PRINTING BYTES
        003326          W2 = W1+2
        003330          W3 = W2+2
        003332          W4 = W3+2
        003334          W5 = W4+2
        003336          W6 = W5+2
        003340          W7 = W6+2
        003342          W8 = W7+2
        003344          W9 = W8+2
        003346          WA = W9+2
        003350          WB = WA+2
        003352          WC = WB+2
        003354          WD = WC+2
        003356          WE = WD+2
        003360          WF = WE+2

        003122          BT1 = BUFAREA           ;BYTE TABLE # 1
        003206          BT2 = BUFAREA+64        ;BYTE TABLE # 2
```

```
                                          .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
                                          ;--**********************************************************************
      003522                                      DEVTYP  <M8053 OR M8064>
 (4)  003522                                                                     L$DVTYP::
 (3)  003522  034115  032460  020063                                                     .ASCIZ  /M8053 OR M8064/
 (3)  003530  051117  046440  030070
 (3)  003536  032066     000
 (2)          003542                                                                     .EVEN

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

              000012                      .RADIX  10.
      003542                                      DESCRIPT   <DMV-11 U-CONTRL LOGIC DIAG - PART 1 OF 2>
 (4)  003542                                                                     L$DESC::
 (3)  003542  046504  026526  030461                                                     .ASCIZ  /DMV-11 U-CONTRL
 (3)  003550  052440  041455  047117
 (3)  003556  051124  020114  047514
 (3)  003564  044507  020103  044504
 (3)  003572  043501  026440  050040
 (3)  003600  051101  020124  020061
 (3)  003606  043117  031040     000
 (2)          003614                                                                     .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  010246                  MOV     R2,-(SP)        ; SAVE REGISTER 2
003626  012702  000010          MOV     #10,R2
003632  013701  002316  2$:     MOV     DELAY1,R1       ;INITIALIZE THE LOOP COUNTER FOR DELAY LOOP
003636  005301          10$:    DEC     R1              ;  ELSE, DECREMENT THE LOOP COUNTER AND
003640  001376                  BNE     10$             ;  CONTINUE TO LOOP.
003642  005302                  DEC     R2
003644  001372                  BNE     2$
003646                  1$:                             ; TIME-UP!
003646  132777  000200  176500          BITB    #RUN,@BSEL1     ;CHECK THE RUN BIT --
003654  001410                  BEQ     3$              ;IF NOT SET, GO REPORT THE ERROR

                        ;IF THE RUN BIT IS SET, MICRODIAGNOSTICS ARE COMPLETE.
                        ;CHECK IF ALL MICRODIAGNOSTICS PASSED.

003656  127737  176504  003050  4$:     CMPB    @BSEL6,BSELRS+6 ;THIS CHECKS THE BYTE IN B-SELECT 6 FOR THE
                                                        ;VALID MICRODIAGNOSTIC COMPLETION CODE.
003664  001004                  BNE     3$              ;IF BAD, GO REPORT ERROR
```

```
 4483  003666  127737  176470  003046          CMPB    @BSEL4,BSELRS+4 ;ELSE, CHECK FOR THE VALID CODE FOR A DMV-11
 4484  003674  001420                          BEQ     6$              ;IF THIS TOO IS CORRECT THEN NO ERROR EXISTS
 4485                                                                  ;ELSE, FALL INTO THE ERROR REPORTING CODE
 4486
 4487  003676  004737  004446          3$:     JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 4488  003702                          GTDF    20$,ERR3                ;MASTER CLEAR ERROR
  (2)                                                                  ;       QUEUE "DEVICE FATAL" ERROR # 1
  (5)  003702  012737  000001  002236                                                    MOV     #T.EDF,ERRTYP
  (5)  003710  012737  000001  002240                                                    MOV     #1,ERRNBR
  (5)  003716  012737  003746  002242                                                    MOV     #20$,ERRMSG
  (5)  003724  012737  005426  002244                                                    MOV     #ERR3,ERRBLK
 4489  003732  000261                          SEC                     ;INDICATE TO THE CALLING ROUTINE THAT
 4490  003734  000401                          BR      7$              ;   AN ERROR WAS DETECTED
 4491
 4492  003736  000241          6$:     CLC                             ;CLEAR THE CARRY BIT TO INDICATE NO ERROR
 4493  003740  012602          7$:     MOV     (SP)+,R2                ;RESTORE REGISTER 2
 4494  003742  012601                  MOV     (SP)+,R1                ;RESTORE REGISTER 1
 4495  003744  000207                  RTS     PC                      ; RETURN TO THE CALLER
 4496                          .NLIST  BEX
 4497  003746  040515  052123  051105  20$:     .ASCIZ  /MASTER CLEAR FAILURE/
 4498                          .LIST   BEX
 4499          003774          .EVEN
```

```
                                .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>
                                ;
                                ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

003774  012777  140400  176350  MSTCLR: MOV     #<RUN!MCLR!MREQ>*256.,@SEL0  ;INITIATE M-LOOP

004002  010346                          MOV     R3,-(SP)
004004  012703  001000                  MOV     #512.,R3        ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004010  077301                  1$:     SOB     R3,1$
004012  012603                          MOV     (SP)+,R3

004014  132777  000200  176334          BITB    #MRDY,@#SEL2    ;DID THE M-LOOP FINISH
004022  001023                          BNE     5$              ;YES.  GOOD.  RETURN
004024  004737  004610                  JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004030  012737  000301  002310          MOV     #RUN!MCLR!MREQ,GDATA    ;IDENTIFY REQUESTED FUNCTION
004036                                  GTDF    EM3,ERR4        ;"MRDY" TIMEOUT
 (2)                                                            ;       QUEUE "DEVICE FATAL" ERROR # 2
 (5)    004036  012737  000001  002236                                          MOV     #T.EDF,ERRTYP
 (5)    004044  012737  000002  002240                                          MOV     #2,ERRNBR
 (5)    004052  012737  014466  002242                                          MOV     #EM3,ERRMSG
 (5)    004060  012737  005440  002244                                          MOV     #ERR4,ERRBLK
004066  000261                          SEC                     ;SET CARRY TO INDICATE ERROR
004070  000401                          BR      9$              ;EXIT WITH THE "ERROR" FLAG (CARRY BIT) SET
004072  000241                  5$:     CLC                     ;CLEAR C BIT FOR NO ERRORS
004074  000207                  9$:     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>
                        ;       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>
                        ;
                        ;--**************************************************************************

004076  012577  176260  READ:   MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004102  112777  000001  176246          MOVB    #REDLOC,@BSEL2  ;TELL M-LOOP TO GIVE US THE REQUESTED DATA

004110  010346                  MOV     R3,-(SP)
004112  012703  000032          MOV     #26.,R3         ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004116  077301          1$:     SOB     R3,1$
004120  012603                  MOV     (SP)+,R3

004122  132777  000200  176226          BITB    #RDY,@BSEL2     ;DID THE M-LOOP FINISH
004130  001023                  BNE     5$              ;YES,  GOOD.  RETURN

004132  004737  004610          JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004136  012737  000001  002310          MOV     #REDLOC,GDATA   ;IDENTIFY REQUESTED FUNCTION
004144                          GTDF    EM4,ERR4        ;"RDY" TIMEOUT
  (2)                                                   ;       QUEUE "DEVICE FATAL" ERROR # 3
  (5) 004144  012737  000001  002236                                            MOV     #T.EDF,ERRTYP
  (5) 004152  012737  000003  002240                                            MOV     #3,ERRNBR
  (5) 004160  012737  014512  002242                                            MOV     #EM4,ERRMSG
  (5) 004166  012737  005440  002244                                            MOV     #ERR4,ERRBLK
004174  000261                  SEC                     ;INDICATE AN ERROR HAS BEEN STACKED
004176  000401                  BR      6$              ;RETURN WITH THAT INDICATION

004200  000241          5$:     CLC                     ;INDICATE "NO ERROR"
004202  117735  176160  6$:     MOVB    @BSEL6,@(R5)+   ;PUT DATA WHERE CALLER WANTS IT
004206  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>
                                ;
                                ;--**************************************************************************

004210                          READI:
004210  012577  176146                  MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004214  112777  000001  176134          MOVB    @REDLOC,@BSEL2  ;TELL M-LOOP TO GIVE US THE REQUESTED DATA

004222  010346                          MOV     R3,-(SP)
004224  012703  001000                  MOV     #512.,R3                ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004230  077301                  1$:     SOB     R3,1$
004232  012603                          MOV     (SP)+,R3

004234  132777  000200  176114          BITB    @#RDY,@BSEL2    ;DID THE M-LOOP FINISH
004242  001023                          BNE     5$              ;YES,  GOOD.  RETURN

004244  004737  004610                  JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004250  012737  000001  002310          MOV     @REDLOC,GDATA   ;IDENTIFY REQUESTED FUNCTION
004256                                  GTDF    EM4,ERR4        ;"#RDY" TIMEOUT
  (2)                                   ;       QUEUE "DEVICE FATAL" ERROR # 4
  (5)   004256  012737  000001  002236                                  MOV     @T.EDF,ERRTYP
  (5)   004264  012737  000004  002240                                  MOV     #4,ERRNBR
  (5)   004272  012737  014512  002242                                  MOV     @EM4,ERRMSG
  (5)   004300  012737  005440  002244                                  MOV     @ERR4,ERRBLK
004306  000261                          SEC                     ;INDICATE AN ERROR HAS BEEN STACKED
004310  000401                          BR      6$              ;RETURN WITH THAT INDICATION

004312  000241                  5$:     CLC                     ;INDICATE "NO ERROR"
004314  017725  176046          6$:     MOV     @SEL6,(R5)+     ;PUT DATA WHERE CALLER WANTS IT
004320  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>
                        ;
                        ;--**************************************************************************

004322  012577  176034  WRITE:  MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004326  113577  176034          MOVB    @(R5)+,@SEL6    ;MAKE DATA AVAILABLE TO M-LOOP
004332  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>
                        ;
                        ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

004334                  WRITEI:
004334  012577  176022          MOV     (R5)+,@SEL4     ;SETUP SOURCE POINTER
004340  012577  176022          MOV     (R5)+,@SEL6     ;MAKE DATA AVAILABLE TO M-LOOP
004344  112777  000002  176004 MLWRI:  MOVB    #WRILOC,@SEL2   ;TELL M-LOOP TO WRITE THE DATA

004352  010346          MOV     R3,-(SP)
004354  012703  000050          MOV     #40.,R3         ;WAIT FOR THE M-LOOP TO FINISH THE OPERATION
004360  077301          1$:     SOB     R3,1$
004362  012603          MOV     (SP)+,R3

004364  132777  000200  175764        BITB    #RDY,@SEL2      ;DID THE M-LOOP FINISH
004372  001023          BNE     5$              ;YES.  GOOD.  RETURN
004374  004737  004610          JSR     PC,GETWSR       ;GET BYTE SELECT REGISTERS
004400  012737  000002  002310        MOV     #WRILOC,GDATA   ;IDENTIFY REQUESTED FUNCTION
004406                  GTDF    EM4,ERR4        ;"RDY" TIMEOUT
  (2)                           ;       QUEUE "DEVICE FATAL" ERROR # 5
  (5)   004406  012737  000001  002236                                  MOV     #T.EDF,ERRTYP
  (5)   004414  012737  000005  002240                                  MOV     #5,ERRNBR
  (5)   004422  012737  014512  002242                                  MOV     #EM4,ERRMSG
  (5)   004430  012737  005440  002244                                  MOV     #ERR4,ERRBLK
004436  000261          SEC                     ;INDICATE AN ERROR HAS BEEN STACKED
004440  000401          BR      6$              ;RETURN WITH THAT INDICATION

004442  000241          5$:     CLC             ;INDICATE "NO ERROR"
004444  000205          6$:     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
                        ;
                        ;--*************************************************************************

004446  117737  175700  002246  GETBSR: MOVB    @#SEL0,BSR0     ;PUT THE CURRENT CSR VALUES INTO THE PRINT-OUT
004454  117737  175674  002250          MOVB    @#SEL1,BSR1     ;TABLE
004462  117737  175670  002252          MOVB    @#SEL2,BSR2
004470  117737  175664  002254          MOVB    @#SEL3,BSR3
004476  117737  175660  002256          MOVB    @#SEL4,BSR4
004504  117737  175654  002260          MOVB    @#SEL5,BSR5
004512  117737  175650  002262          MOVB    @#SEL6,BSR6
004520  117737  175644  002264          MOVB    @#SEL7,BSR7
004526  117737  175640  002266          MOVB    @#SEL10,BSR10
004534  117737  175634  002270          MOVB    @#SEL11,BSR11
004542  117737  175630  002272          MOVB    @#SEL12,BSR12
004550  117737  175624  002274          MOVB    @#SEL13,BSR13
004556  117737  175620  002276          MOVB    @#SEL14,BSR14
004564  117737  175614  002300          MOVB    @#SEL15,BSR15
004572  117737  175610  002302          MOVB    @#SEL16,BSR16
004600  117737  175604  002304          MOVB    @#SEL17,BSR17
004606  000207                          RTS     PC              ;RETURN TO CALLER

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

004610  017737  175536  002246  GETWSR: MOV     @#SEL0,WSR0     ;MOVE THE 8 WORD REGISTERS TO THE OTHERWISE
004616  017737  175534  002250          MOV     @#SEL2,WSR2     ;BYTE TABLE
004624  017737  175532  002252          MOV     @#SEL4,WSR4
004632  017737  175530  002254          MOV     @#SEL6,WSR6
004640  017737  175526  002256          MOV     @#SEL10,WSR10
004646  017737  175524  002260          MOV     @#SEL12,WSR12
004654  017737  175522  002262          MOV     @#SEL14,WSR14
004662  017737  175520  002264          MOV     @#SEL16,WSR16
004670  000207                          RTS     PC              ;RETURN TO CALLER
```

```
                        .INITT1 -- INITIALIZE TIMER # 1

                        .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
                        ;*
                        ;*****************************************************************************

004672  010146          INITT1: MOV     R1,-(SP)        ;SAVE THE REGISTER WE WILL BE USING
004674  112537  002455          MOVB    (R5)+,TMP6+1    ;SETUP VALUES TO BE LOADED INTO THE LATCHES
004700  112537  002457          MOVB    (R5)+,TMP7+1
004704  111537  002467          MOVB    (R5),TMP8+1     ;GET & PROCESS BITS FOR ACR 6 & 7
004710  142737  177477  002467  BICB    #^C<BIT6+BIT7>,TMP8+1 ;EXTRACT BITS 6 & 7 & SAVE THEM FOR LATER
004716  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).

004720  106301                  ASLB    R1              ;THIS PUTS THE PASSED BIT INTO BIT 6.
004722  042701  177677          BIC     #^C<BIT6>,R1    ;WHILE HERE, CLEAR ALL OTHER BITS AND
004726  140177  175426          BICB    R1,@#SEL3       ;CLEAR THE INTERRUPT FLAG IN THE SELECT REG.
004732  106301                  ASLB    R1              ;NOW THE BIT IS IN THE CONTROLLING POSITION
004734  052701  000100          BIS     #BIT6,R1        ;SET BIT 6
004740  110137  002475          MOVB    R1,TMPE+1       ;THE CALL WILL NOW WRITE THE APPROPRIATE VALUE

004744  004537  004322          JSR     R5,WRITE        ;WRITE TO
004750  120016                  IENR                    ;THE VIA'S IER
004752  002475                  TMPE+1                  ;INTERRUPT ENABLE/DISABLE INFORMATION
004754  103431                  BCS     63$             ;EXIT ON ERROR

004756  004537  004076          JSR     R5,READ         ;READ THE CURRENT SETTING OF
004762  120013                  ACR                     ;THE VIA'S ACR
004764  002466                  TMPB
```

```
4773  004766  103424                    BCS     63$             ;EXIT ON ERROR
4774
4775  004770  013701  002466            MOV     TMPB,R1         ;GET THAT VALUE
4776  004774  042701  177477            BIC     #^C<BIT6+BIT7>,R1  ;CLEAR BITS 6 & 7
4777  005000  150137  002467            BISB    R1,TMPB+1       ;ADD CURRENT BITS 0 --> 5 TO NEW BITS 6 & 7
4778
4779  005004  004537  004322            JSR     R5,WRITE        ;WRITE THE NEW REGISTER SETTING TO VIA'S ACR
4780  005010  120013                    ACR
4781  005012  002467                    TMPB+1
4782  005014  103411                    BCS     63$             ;EXIT ON ERROR
4783
4784  005016  004537  004322            JSR     R5,WRITE        ;WRITE TO
4785  005022  120006                    T1LL                    ;LOW ORDER LATCH REGISTER (T1L-L)
4786  005024  002455                    TMP6+1                  ;THE VALUE PASSED
4787  005026  103404                    BCS     63$             ;EXIT ON ERROR
4788
4789  005030  004537  004322            JSR     R5,WRITE        ;WRITE TO
4790  005034  120007                    T1LH                    ;HIGH ORDER LATCH REGESTER (T1L-H)
4791  005036  002457                    TMP7+1                  ;THE VALUE PASSED
4792
4793
4794  005040  012601            63$:    MOV     (SP)+,R1        ;RESTORE R1
4795  005042  000205                    RTS     R5              ;RETURN
4796
4797
4798                            .SBTTL  STALL -- DELAY FOR 10.5 MICRO-SEC'S (ON LSI-11)
4799                            ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
4800                            ; STALL -- THIS SUBROUTINE STALLS FOR ABOUT 10.5 MICRO-SECONDS
4801                            ;---++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
4802
4803  005044  000207            STALL:  RTS     PC
4804
```

```
                                .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>
                                ;
                                ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

005046  010037  005062          STREG:  MOV     R0,2$           ;PUT SPECIFIED REGISTER'S ADDRESS IN I/O CALLS
005052  010037  005074                  MOV     R0,4$

005056  004537  004322                  JSR     R5,WRITE        ;WRITE IT
005062  000000                  2$:     0                       ;*** MODIFIED FROM ABOVE ***
005064  002306                          TDATA                   ;*** MODIFIED FROM ABOVE ***
005066  103435                          BCS     10$             ;ON ERROR, EXIT

005070  004537  004076                  JSR     R5,READ         ;READ IT BACK AGAIN
005074  000000                  4$:     0                       ;*** MODIFIED FROM ABOVE ***
005076  002312                          BDATA
005100  103430                          BCS     10$             ;ON ERROR, EXIT

005102  123737  002310  002312          CMPB    GDATA,BDATA     ;DID WE READ WHAT WE WROTE?
005110  000241                          CLC                     ; (THIS ISN'T NEEDED FOR THE ERROR TEST BUT
                                                                ; MUST BE CLEARED ON EXIT IF NO ERROR OCCURED)
005112  001423                          BEQ     10$             ;YES, EXIT FROM SUBTEST
005114  013737  005062  002334          MOV     2$,REGNUM       ;BUILD REGISTER #
005122  042737  177760  002334          BIC     #177760,REGNUM
005130                                  GTDF    EM25,ERR7       ;REPORT READ/WRITE ERROR
 (2)                                                            ;       QUEUE "DEVICE FATAL" ERROR # 6
 (5)  005130  012737  000001  002236                                                  MOV     #T.EDF,ERRTYP
 (5)  005136  012737  000006  002240                                                  MOV     #6,ERRNBR
 (5)  005144  012737  015577  002242                                                  MOV     #EM25,ERRMSG
 (5)  005152  012737  006624  002244                                                  MOV     #ERR7,ERRBLK
005160  000261                          SEC                     ;INDICATE THAT AN ERROR WAS DETECTED
005162  000207                  10$:    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"
                        ;--*************************************************************************

                                BGNSRV  MPIHAN
 (3)                                                                    MPIHAN::
                                MOV     R0,-(SP)        ;SAVE R0
                                TSTB    INTWCH          ;HAVE WE BEEN TOLD TO WATCH FOR TYPE "A" INT'S?
                                BNE     5$              ;YES, DO NORMAL INTERRUPT PROCESSING
                                JSR     PC,GETBSR       ;NO,  DUMP REGISTERS AND
                                GEDF    EM34,ERR3       ;       REPORT "UNEXPECTED INTERRUPT"
 (2)                                                    ;       "DEVICE FATAL" ERROR # 7
 (6)                                                                    TRAP    C$ERDF
 (7)                                                                    .WORD   7
 (7)                                                                    .WORD   EM34
 (7)                                                                    .WORD   ERR3
                                BR      10$             ;GO TO EXIT

                        5$:     INCB    INTFLG          ;INCREMENT LOW BYTE OF INTERRUPT COUNTER
                                TST     IHILNK          ;ARE WE EXPECTED TO EXECUTE ANOTHER ROUTINE?
                                BEQ     10$             ;NO, GET OUT
                                JSR     PC,@IHILNK      ;YES, GO TO IT -- I HOPE IT'S VALID!
                        10$:    MOV     (SP)+,R0        ;RESTORE R0
                                ENDSRV                  ;RETURN TO INTERRUPTED PROCESS
 (3)                                                                    L10002:
 (2)                                                                            RTI

                        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"
                        ;--*************************************************************************

                                BGNSRV  MPOHAN                                          MPOHAN::
                                MOV     R0,-(SP)        ;SAVE R0
                                TSTB    INTWCH+1        ;HAVE WE BEEN TOLD TO WATCH FOR TYPE "B" INT'S?
                                BNE     5$              ;YES, DO NORMAL INTERRUPT PROCESSING
                                JSR     PC,GETBSR       ;NO,  DUMP REGISTERS AND
                                GEDF    EM34B,ERR3      ;       REPORT "UNEXPECTED INTERRUPT"
                                                        ;       "DEVICE FATAL" ERROR # 8
                                                                                TRAP    C$ERDF
                                                                                .WORD   8
                                                                                .WORD   EM34B
                                                                                .WORD   ERR3
                                BR      10$             ;GO TO EXIT

                        5$:     INCB    INTFLG+1        ;INCREMENT HIGH BYTE OF INTERRUPT COUNTER
                                TST     IHOLNK          ;ARE WE EXPECTED TO EXECUTE ANOTHER ROUTINE?
                                BEQ     10$             ;NO, GET OUT
                                JSR     PC,@IHOLNK      ;YES, GO TO IT -- I HOPE IT'S VALID!
                        10$:    MOV     (SP)+,R0        ;RESTORE R0
                                ENDSRV                  ;RETURN TO INTERRUPTED PROCESS
                                                                                L10003:
                                                                                        RTI

                        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
                        ;-------------------------------------------------------------------------
005310                      BGNMSG  ERR1
005310                                                                      ERR1::
004737  012104              JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
005314                      ENDMSG
005314                                                                      L10004:
104423                                                                          TRAP    C$MSG
                        ;-------------------------------------------------------------------------
                        .SBTTL  ERROR HANDLER -- ERR2 -- CSR REGISTER ERROR REPORTING
                        ;-------------------------------------------------------------------------
005316                      BGNMSG  ERR2
005316                                                                      ERR2::
005316                      PRINTB  #FMT02,#TXT5,REGNUM
013746  002334                                                                  MOV     REGNUM,-(SP)
012746  013617                                                                  MOV     #TXT5,-(SP)
012746  012136                                                                  MOV     #FMT02,-(SP)
012746  000003                                                                  MOV     #3,-(SP)
010600                                                                          MOV     SP,R0
104414                                                                          TRAP    C$PNTB
062706  000010                                                                  ADD     #10,SP
004737  011310              JSR     PC,XORGB
005352                      PRINTB  #FMT02A,<B,GDATA>,<B,BDATA>,<B,XDATA>
005046                                                                          CLR     -(SP)
153716  002314                                                                  BISB    XDATA,(SP)
005046                                                                          CLR     -(SP)
153716  002312                                                                  BISB    BDATA,(SP)
005046                                                                          CLR     -(SP)
153716  002310                                                                  BISB    GDATA,(SP)
012746  012173                                                                  MOV     #FMT02A,-(SP)
012746  000004                                                                  MOV     #4,-(SP)
010600                                                                          MOV     SP,R0
104414                                                                          TRAP    C$PNTB
062706  000012                                                                  ADD     #12,SP
004737  011334              JSR     PC,ERR4$                ;DUMP THE BYTE SELECT REGISTERS
004737  012104              JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
005424                      ENDMSG
005424                                                                      L10005:
104423                                                                          TRAP    C$MSG
                        ;-------------------------------------------------------------------------
                        .SBTTL  ERROR HANDLER -- ERR3 -- DUMP THE BYTE SELECT REGISTERS
                        ;-------------------------------------------------------------------------
005426                      BGNMSG  ERR3
005426                                                                      ERR3::
004737  011334              JSR     PC,ERR4$
004737  012104              JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
005436                      ENDMSG
005436                                                                      L10006:
```

```
  (3)  005436  104423                                                                    TRAP    C$MSG
4933                        ;-------------------------------------------------------------------------------
4934                        .SBTTL  ERROR HANDLER -- ERR4 -- M-LOOP TIMEOUT ERROR HANDLING
4935                        ;-------------------------------------------------------------------------------
4936  005440               BGNMSG  ERR4
 (3)  005440                                                                          ERR4::
4937  005440  010146       MOV     R1,-(SP)              ;SAVE THE WORKING REGISTER
4938  005442  113701 002310 MOVB    GDATA,R1              ;SAVE THIS FOR LATER
4939  005446  122701 000017 CMPB    #17,R1                ;WAS THIS AN M-LOOP REQUEST?
4940  005452  103013       BHIS    5$                    ;YES, THEN REPORT THE FUNCTION CODE
4941  005454               PRINTX  #FMT5,<B,R1>          ;NO,  THEN IT MUST BE A BSEL1 SETTING
 (8)  005454  005046                                                                    CLR     -(SP)
 (8)  005456  150116                                                                    BISB    R1,(SP)
 (7)  005460  012746 012412                                                             MOV     #FMT5,-(SP)
 (6)  005464  012746 000002                                                             MOV     #2,-(SP)
 (3)  005470  010600                                                                    MOV     SP,R0
 (4)  005472  104415                                                                    TRAP    C$PNTX
 (4)  005474  062706 000006                                                             ADD     #6,SP
4942  005500  000425       BR      20$
4943
4944  005502  001001 5$:    BNE     6$                    ;IF IT WAS A 17, THIS IS A "NOP" AND
4945  005504  005001       CLR     R1                    ;  THE TEXT POINTER MUST SO REFLECT.
4946  005506  022701 000007 6$:    CMP     #7,R1         ;IS FUNCTION CODE > 7?
4947  005512  003002       BGT     7$                    ;NO,  THEN WE CAN HANDLE IT
4948  005514  012701 000006       MOV     #6,R1         ;YES, THEN IT'S UNDEFINED -- SAY SO
4949  005520  006301 7$:    ASL     R1                    ;CONVERT TO A WORD OFFSET
4950  005522               PRINTX  #FMT5A,<B,GDATA>,TXTMLT(R1)     ;REPORT THE FAILING FUNCTION
 (9)  005522  016146 017544                                                             MOV     TXTMLT(R1),-(SP)
 (8)  005526  005046                                                                    CLR     -(SP)
 (8)  005530  153716 002310                                                             BISB    GDATA,(SP)
 (7)  005534  012746 012455                                                             MOV     #FMT5A,-(SP)
 (6)  005540  012746 000003                                                             MOV     #3,-(SP)
 (3)  005544  010600                                                                    MOV     SP,R0
 (4)  005546  104415                                                                    TRAP    C$PNTX
 (4)  005550  062706 000010                                                             ADD     #10,SP
4951
4952  005554  012601 20$:    MOV     (SP)+,R1              ;RESTORE THE WORKING REGISTER
4953  005556  004737 011722       JSR     PC,ERR5$        ;DUMP THE SELECT REGISTERS
4954  005562               ENDMSG
 (3)  005562                                                                          L10007:
 (3)  005562  104423                                                                    TRAP    C$MSG
4955                        ;-------------------------------------------------------------------------------
4956                        .SBTTL  ERROR HANDLER -- ERR5 -- WORD SELECT REG. ERRORS
4957                        ;-------------------------------------------------------------------------------
4958  005564               BGNMSG  ERR5
 (3)  005564                                                                          ERR5::
4959  005564               PRINTB  #FMT02,#TXT5,REGNUM
 (9)  005564  013746 002334                                                             MOV     REGNUM,-(SP)
 (8)  005570  012746 013617                                                             MOV     #TXT5,-(SP)
 (7)  005574  012746 012136                                                             MOV     #FMT02,-(SP)
 (6)  005600  012746 000003                                                             MOV     #3,-(SP)
 (3)  005604  010600                                                                    MOV     SP,R0
 (4)  005606  104414                                                                    TRAP    C$PNTB
 (4)  005610  062706 000010                                                             ADD     #10,SP
4960  005614  004737 011310       JSR     PC,XORGB
4961  005620               PRINTB  #FMT10,GDATA,BDATA,XDATA
```

```
  (10) 005620  013746  002314                                                    MOV     XDATA,-(SP)
  (9)  005624  013746  002312                                                    MOV     BDATA,-(SP)
  (8)  005630  013746  002310                                                    MOV     GDATA,-(SP)
  (7)  005634  012746  012666                                                    MOV     #FMT10,-(SP)
  (6)  005640  012746  000004                                                    MOV     #4,-(SP)
  (3)  005644  010600                                                            MOV     SP,R0
  (4)  005646  104414                                                            TRAP    C$PNTB
  (4)  005650  062706  000012                                                    ADD     #12,SP
4962   005654  004737  011722          JSR     PC,ERR5$                ;DUMP THE SELECT REGISTERS
4963   005660                         ENDMSG
  (3)  005660                                                           L10010:
  (3)  005660  104423                                                            TRAP    C$MSG
4964                                ;-------------------------------------------------------------------------
4965                                .SBTTL  ERROR HANDLER -- ERR6 -- VIA REGISTER ERRORS W/FULL REG. DUMP
4966                                ;-------------------------------------------------------------------------
4967   005662                       BGNMSG  ERR6
  (3)  005662                                                           ERR6::
4968                                ;*** PRINT THE FIRST HALF OF THE REGISTERS ***
4969   005662  010146                MOV     R1,-(SP)        ;PRESERVE R1'S CONTENTS
4970   005664  012701  002604        MOV     #PATCR,R1       ;POINT TO EXPECTED VALUES
4971   005670                       PRINTX  #FMT06,#TXT7
  (8)  005670  012746  013644                                                    MOV     #TXT7,-(SP)
  (7)  005674  012746  012574                                                    MOV     #FMT06,-(SP)
  (6)  005700  012746  000002                                                    MOV     #2,-(SP)
  (3)  005704  010600                                                            MOV     SP,R0
  (4)  005706  104415                                                            TRAP    C$PNTX
  (4)  005710  062706  000006                                                    ADD     #6,SP
4972   005714                       PRINTX  #FMT06A,#TXT8A,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)
  (14) 005714  005046                                                            CLR     -(SP)
  (14) 005716  152116                                                            BISB    (R1)+,(SP)
  (13) 005720  005046                                                            CLR     -(SP)
  (13) 005722  152116                                                            BISB    (R1)+,(SP)
  (12) 005724  005046                                                            CLR     -(SP)
  (12) 005726  152116                                                            BISB    (R1)+,(SP)
  (11) 005730  005046                                                            CLR     -(SP)
  (11) 005732  152116                                                            BISB    (R1)+,(SP)
  (10) 005734  005046                                                            CLR     -(SP)
  (10) 005736  152116                                                            BISB    (R1)+,(SP)
  (9)  005740  005046                                                            CLR     -(SP)
  (9)  005742  152116                                                            BISB    (R1)+,(SP)
  (8)  005744  012746  014016                                                    MOV     #TXT8A,-(SP)
  (7)  005750  012746  012603                                                    MOV     #FMT06A,-(SP)
  (6)  005754  012746  000010                                                    MOV     #10,-(SP)
  (3)  005760  010600                                                            MOV     SP,R0
  (4)  005762  104415                                                            TRAP    C$PNTX
  (4)  005764  062706  000022                                                    ADD     #22,SP
4973   005770                       PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
  (9)  005770  005046                                                            CLR     -(SP)
  (9)  005772  152116                                                            BISB    (R1)+,(SP)
  (8)  005774  005046                                                            CLR     -(SP)
  (8)  005776  152116                                                            BISB    (R1)+,(SP)
  (7)  006000  012746  012651                                                    MOV     #FMT06B,-(SP)
  (6)  006004  012746  000003                                                    MOV     #3,-(SP)
  (3)  006010  010600                                                            MOV     SP,R0
  (4)  006012  104415                                                            TRAP    C$PNTX
  (4)  006014  062706  000010                                                    ADD     #10,SP
```

```
 4974  006020  012701  003122                MOV     @BT1,R1         ;POINT TO ACTUAL VALUES
 4975  006024                                PRINTX  @FMT06A,@TXT8B,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)
  (14) 006024  005046                                                                    CLR     -(SP)
  (14) 006026  152116                                                                    BISB    (R1)+,(SP)
  (13) 006030  005046                                                                    CLR     -(SP)
  (13) 006032  152116                                                                    BISB    (R1)+,(SP)
  (12) 006034  005046                                                                    CLR     -(SP)
  (12) 006036  152116                                                                    BISB    (R1)+,(SP)
  (11) 006040  005046                                                                    CLR     -(SP)
  (11) 006042  152116                                                                    BISB    (R1)+,(SP)
  (10) 006044  005046                                                                    CLR     -(SP)
  (10) 006046  152116                                                                    BISB    (R1)+,(SP)
   (9) 006050  005046                                                                    CLR     -(SP)
   (9) 006052  152116                                                                    BISB    (R1)+,(SP)
   (8) 006054  012746  014033                                                            MOV     @TXT8B,-(SP)
   (7) 006060  012746  012603                                                            MOV     @FMT06A,-(SP)
   (6) 006064  012746  000010                                                            MOV     #10,-(SP)
   (3) 006070  010600                                                                    MOV     SP,R0
   (4) 006072  104415                                                                    TRAP    C$PNTX
   (4) 006074  062706  000022                                                            ADD     #22,SP
 4976  006100                                PRINTX  @FMT06B,<B,(R1)+>,<B,(R1)+>
   (9) 006100  005046                                                                    CLR     -(SP)
   (9) 006102  152116                                                                    BISB    (R1)+,(SP)
   (8) 006104  005046                                                                    CLR     -(SP)
   (8) 006106  152116                                                                    BISB    (R1)+,(SP)
   (7) 006110  012746  012651                                                            MOV     @FMT06B,-(SP)
   (6) 006114  012746  000003                                                            MOV     #3,-(SP)
   (3) 006120  010600                                                                    MOV     SP,R0
   (4) 006122  104415                                                                    TRAP    C$PNTX
   (4) 006124  062706  000010                                                            ADD     #10,SP
 4977  006130  012701  003206                MOV     @BT2,R1         ;POINT TO XOR VALUES
 4978  006134                                PRINTX  @FMT06A,@TXT8C,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)
  (14) 006134  005046                                                                    CLR     -(SP)
  (14) 006136  152116                                                                    BISB    (R1)+,(SP)
  (13) 006140  005046                                                                    CLR     -(SP)
  (13) 006142  152116                                                                    BISB    (R1)+,(SP)
  (12) 006144  005046                                                                    CLR     -(SP)
  (12) 006146  152116                                                                    BISB    (R1)+,(SP)
  (11) 006150  005046                                                                    CLR     -(SP)
  (11) 006152  152116                                                                    BISB    (R1)+,(SP)
  (10) 006154  005046                                                                    CLR     -(SP)
  (10) 006156  152116                                                                    BISB    (R1)+,(SP)
   (9) 006160  005046                                                                    CLR     -(SP)
   (9) 006162  152116                                                                    BISB    (R1)+,(SP)
   (8) 006164  012746  014050                                                            MOV     @TXT8C,-(SP)
   (7) 006170  012746  012603                                                            MOV     @FMT06A,-(SP)
   (6) 006174  012746  000010                                                            MOV     #10,-(SP)
   (3) 006200  010600                                                                    MOV     SP,R0
   (4) 006202  104415                                                                    TRAP    C$PNTX
   (4) 006204  062706  000022                                                            ADD     #22,SP
 4979  006210                                PRINTX  @FMT06B,<B,(R1)+>,<B,(R1)+>
   (9) 006210  005046                                                                    CLR     -(SP)
   (9) 006212  152116                                                                    BISB    (R1)+,(SP)
   (8) 006214  005046                                                                    CLR     -(SP)
   (8) 006216  152116                                                                    BISB    (R1)+,(SP)
   (7) 006220  012746  012651                                                            MOV     @FMT06B,-(SP)
```

```
   (6)  006224  012746  000003                                                                MOV     #3,-(SP)
   (3)  006230  010600                                                                        MOV     SP,R0
   (4)  006232  104415                                                                        TRAP    C$PNTX
   (4)  006234  062706  000010                                                                ADD     #10,SP
 4980
 4981  006240  012701  002614                ;*** PRINT SECOND HALF OF THE REGISTERS ***
                                             MOV     @PATCR+8.,R1    ;POINT TO 2ND HALF OF REGISTERS EXPECTED VALUES
 4982  006244                                PRINTX  @FMT06,@TXT7A
   (8)  006244  012746  013731                                                                MOV     @TXT7A,-(SP)
   (7)  006250  012746  012574                                                                MOV     @FMT06,-(SP)
   (6)  006254  012746  000002                                                                MOV     #2,-(SP)
   (3)  006260  010600                                                                        MOV     SP,R0
   (4)  006262  104415                                                                        TRAP    C$PNTX
   (4)  006264  062706  000006                                                                ADD     #6,SP
 4983  006270                                PRINTX  @FMT06A,@TXT8A,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)
  (14)  006270  005046                                                                        CLR     -(SP)
  (14)  006272  152116                                                                        BISB    (R1)+,(SP)
  (13)  006274  005046                                                                        CLR     -(SP)
  (13)  006276  152116                                                                        BISB    (R1)+,(SP)
  (12)  006300  005046                                                                        CLR     -(SP)
  (12)  006302  152116                                                                        BISB    (R1)+,(SP)
  (11)  006304  005046                                                                        CLR     -(SP)
  (11)  006306  152116                                                                        BISB    (R1)+,(SP)
  (10)  006310  005046                                                                        CLR     -(SP)
  (10)  006312  152116                                                                        BISB    (R1)+,(SP)
   (9)  006314  005046                                                                        CLR     -(SP)
   (9)  006316  152116                                                                        BISB    (R1)+,(SP)
   (8)  006320  012746  014016                                                                MOV     @TXT8A,-(SP)
   (7)  006324  012746  012603                                                                MOV     @FMT06A,-(SP)
   (6)  006330  012746  000010                                                                MOV     #10,-(SP)
   (3)  006334  010600                                                                        MOV     SP,R0
   (4)  006336  104415                                                                        TRAP    C$PNTX
   (4)  006340  062706  000022                                                                ADD     #22,SP
 4984  006344                                PRINTX  @FMT06B,<B,(R1)+>,<B,(R1)+>
   (9)  006344  005046                                                                        CLR     -(SP)
   (9)  006346  152116                                                                        BISB    (R1)+,(SP)
   (8)  006350  005046                                                                        CLR     -(SP)
   (8)  006352  152116                                                                        BISB    (R1)+,(SP)
   (7)  006354  012746  012651                                                                MOV     @FMT06B,-(SP)
   (6)  006360  012746  000003                                                                MOV     #3,-(SP)
   (3)  006364  010600                                                                        MOV     SP,R0
   (4)  006366  104415                                                                        TRAP    C$PNTX
   (4)  006370  062706  000010                                                                ADD     #10,SP
 4985  006374  012701  003132                MOV     @BT1+8.,R1      ;POINT TO 2ND HALF OF ACTUAL VALUES
 4986  006400                                PRINTX  @FMT06A,@TXT8B,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)
  (14)  006400  005046                                                                        CLR     -(SP)
  (14)  006402  152116                                                                        BISB    (R1)+,(SP)
  (13)  006404  005046                                                                        CLR     -(SP)
  (13)  006406  152116                                                                        BISB    (R1)+,(SP)
  (12)  006410  005046                                                                        CLR     -(SP)
  (12)  006412  152116                                                                        BISB    (R1)+,(SP)
  (11)  006414  005046                                                                        CLR     -(SP)
  (11)  006416  152116                                                                        BISB    (R1)+,(SP)
  (10)  006420  005046                                                                        CLR     -(SP)
  (10)  006422  152116                                                                        BISB    (R1)+,(SP)
   (9)  006424  005046                                                                        CLR     -(SP)
   (9)  006426  152116                                                                        BISB    (R1)+,(SP)
```

```
  (8)  006430  012746  014033                                                    MOV     #TXT8B,-(SP)
  (7)  006434  012746  012603                                                    MOV     #FMT06A,-(SP)
  (6)  006440  012746  000010                                                    MOV     #10,-(SP)
  (3)  006444  010600                                                            MOV     SP,R0
  (4)  006446  104415                                                            TRAP    C$PNTX
  (4)  006450  062706  000022                                                    ADD     #22,SP
4987   006454                       PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
  (9)  006454  005046                                                            CLR     -(SP)
  (9)  006456  152116                                                            BISB    (R1)+,(SP)
  (8)  006460  005046                                                            CLR     -(SP)
  (8)  006462  152116                                                            BISB    (R1)+,(SP)
  (7)  006464  012746  012651                                                    MOV     #FMT06B,-(SP)
  (6)  006470  012746  000003                                                    MOV     #3,-(SP)
  (3)  006474  010600                                                            MOV     SP,R0
  (4)  006476  104415                                                            TRAP    C$PNTX
  (4)  006500  062706  000010                                                    ADD     #10,SP
4988   006504  012701  003216                       MOV     #BT2+8.,R1      ;POINT TO 2ND HALF OF XOR VALUES
4989   006510                       PRINTX  #FMT06A,#TXT8C,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)+>,<B,(R1)
  (14) 006510  005046                                                            CLR     -(SP)
  (14) 006512  152116                                                            BISB    (R1)+,(SP)
  (13) 006514  005046                                                            CLR     -(SP)
  (13) 006516  152116                                                            BISB    (R1)+,(SP)
  (12) 006520  005046                                                            CLR     -(SP)
  (12) 006522  152116                                                            BISB    (R1)+,(SP)
  (11) 006524  005046                                                            CLR     -(SP)
  (11) 006526  152116                                                            BISB    (R1)+,(SP)
  (10) 006530  005046                                                            CLR     -(SP)
  (10) 006532  152116                                                            BISB    (R1)+,(SP)
  (9)  006534  005046                                                            CLR     -(SP)
  (9)  006536  152116                                                            BISB    (R1)+,(SP)
  (8)  006540  012746  014050                                                    MOV     #TXT8C,-(SP)
  (7)  006544  012746  012603                                                    MOV     #FMT06A,-(SP)
  (6)  006550  012746  000010                                                    MOV     #10,-(SP)
  (3)  006554  010600                                                            MOV     SP,R0
  (4)  006556  104415                                                            TRAP    C$PNTX
  (4)  006560  062706  000022                                                    ADD     #22,SP
4990   006564                       PRINTX  #FMT06B,<B,(R1)+>,<B,(R1)+>
  (9)  006564  005046                                                            CLR     -(SP)
  (9)  006566  152116                                                            BISB    (R1)+,(SP)
  (8)  006570  005046                                                            CLR     -(SP)
  (8)  006572  152116                                                            BISB    (R1)+,(SP)
  (7)  006574  012746  012651                                                    MOV     #FMT06B,-(SP)
  (6)  006600  012746  000003                                                    MOV     #3,-(SP)
  (3)  006604  010600                                                            MOV     SP,R0
  (4)  006606  104415                                                            TRAP    C$PNTX
  (4)  006610  062706  000010                                                    ADD     #10,SP
4991   006614  012601                       MOV     (SP)+,R1        ;RESTORE R1
4992   006616  004737  012104               JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
4993   006622                       ENDMSG
  (3)  006622                                                                    L10011:
  (3)  006622  104423                                                                    TRAP    C$MSG
4994                        ;-------------------------------------------------------------------------
4995                        .SBTTL  ERROR HANDLER -- ERR7 -- VIA REGISTER ERRORS
4996                        ;-------------------------------------------------------------------------
4997   006624               BGNMSG  ERR7
  (3)  006624                                                                    ERR7::
```

```
 4998  006624  113701  002334                 MOVB    REGNUM,R1
 4999  006630  006301                         ASL     R1                  ;AS PASSED, THIS WAS A BYTE OFFSET
 5000  006632                                 PRINTB  #FMT07,#TXTVR,TXTVRT(R1)
  (9)  006632  016146  017566                                                     MOV     TXTVRT(R1),-(SP)
  (8)  006636  012746  014341                                                     MOV     #TXTVR,-(SP)
  (7)  006642  012746  012542                                                     MOV     #FMT07,-(SP)
  (6)  006646  012746  000003                                                     MOV     #3,-(SP)
  (3)  006652  010600                                                             MOV     SP,R0
  (4)  006654  104414                                                             TRAP    C$PNTB
  (4)  006656  062706  000010                                                     ADD     #10,SP
 5001  006662  004737  011310                 JSR     PC,XORGB
 5002  006666                                 PRINTB  #FMT02A,<B,GDATA>,<B,BDATA>,<B,XDATA>
  (10) 006666  005046                                                             CLR     -(SP)
  (10) 006670  153716  002314                                                     BISB    XDATA,(SP)
  (9)  006674  005046                                                             CLR     -(SP)
  (9)  006676  153716  002312                                                     BISB    BDATA,(SP)
  (8)  006702  005046                                                             CLR     -(SP)
  (8)  006704  153716  002310                                                     BISB    GDATA,(SP)
  (7)  006710  012746  012173                                                     MOV     #FMT02A,-(SP)
  (6)  006714  012746  000004                                                     MOV     #4,-(SP)
  (3)  006720  010600                                                             MOV     SP,R0
  (4)  006722  104414                                                             TRAP    C$PNTB
  (4)  006724  062706  000012                                                     ADD     #12,SP
 5003  006730  004737  012104                 JSR     PC,NULERR           ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
 5004  006734                                 ENDMSG
  (3)  006734                                                                   L10012:
  (3)  006734  104423                                                             TRAP    C$MSG
 5005                                   ;-------------------------------------------------------------------------
 5006                                   .SBTTL  ERROR HANDLER -- ERR47 -- FOR RAM DATA ERRORS IN STATIC TEST(S)
 5007                                   ;-------------------------------------------------------------------------
 5008  006736                                 BGNMSG  ERR47
  (3)  006736                                                                   ERR47::
 5009                                   ;       PRINT HEADING LINE # 1
 5010
 5011  006736  013700  002444                 MOV     TMP2,R0             ;GET TEST PATTERN CODE
 5012  006742  001404                         BEQ     2$                  ;ZERO IS UNDEFINED BUT THERE IS TEXT TO SAY THAT
 5013  006744  020027  000006                 CMP     R0,#6               ;THIS IT ALL WE UNDERSTAND FOR NOW
 5014  006750  003401                         BLE     2$                  ;IF WITHIN LIMITS, LET IT GO
 5015  006752  005000                         CLR     R0                  ;ELSE, MAKE IT 0 FOR "UNDEFINED"
 5016  006754  006300                 2$:     ASL     R0                  ;CONVERT TO A WORD INDEX
 5017  006756  016000  007626                 MOV     TXT47P(R0),R0       ;GET ADDRESS OF REQUIRED TEXT
 5018  006762                                 PRINTX  #FMT47A,R0          ;IDENTIFY TEST PATTERN BEING USED
  (8)  006762  010046                                                             MOV     R0,-(SP)
  (7)  006764  012746  007244                                                     MOV     #FMT47A,-(SP)
  (6)  006770  012746  000002                                                     MOV     #2,-(SP)
  (3)  006774  010600                                                             MOV     SP,R0
  (4)  006776  104415                                                             TRAP    C$PNTX
  (4)  007000  062706  000006                                                     ADD     #6,SP
 5019                                   ;       PRINT HEADING LINE # 2
 5020
 5021  007004                                 PRINTX  #FMT47B             ;STANDARD PORTION OF LINE 2
  (7)  007004  012746  007275                                                     MOV     #FMT47B,-(SP)
  (6)  007010  012746  000001                                                     MOV     #1,-(SP)
  (3)  007014  010600                                                             MOV     SP,R0
  (4)  007016  104415                                                             TRAP    C$PNTX
  (4)  007020  062706  000004                                                     ADD     #4,SP
```

```
5022                                    ;       PRINT HEADING LINE # 3
5023
5024  007024                            PRINTX  #FMT47C         ;STANDARD PORTION OF LINE 3
 (7)  007024  012746  007334                                                    MOV     #FMT47C,-(SP)
 (6)  007030  012746  000001                                                    MOV     #1,-(SP)
 (3)  007034  010600                                                            MOV     SP,R0
 (4)  007036  104415                                                            TRAP    C$PNTX
 (4)  007040  062706  000004                                                    ADD     #4,SP
5025                                    ;       PRINT HEADING LINE # 4
5026
5027  007044                            PRINTX  #FMT47E         ;STANDARD PORTION OF LINE 4
 (7)  007044  012746  007362                                                    MOV     #FMT47E,-(SP)
 (6)  007050  012746  000001                                                    MOV     #1,-(SP)
 (3)  007054  010600                                                            MOV     SP,R0
 (4)  007056  104415                                                            TRAP    C$PNTX
 (4)  007060  062706  000004                                                    ADD     #4,SP
5028                                    ;       GO PRINT DATA PORTION OF ERROR MESSAGE
5029
5030  007064                            PRINTX  #NEWLIN         ;TERMINATE HEADER & CAUSE 1 BLANK LINE
 (7)  007064  012746  012133                                                    MOV     #NEWLIN,-(SP)
 (6)  007070  012746  000001                                                    MOV     #1,-(SP)
 (3)  007074  010600                                                            MOV     SP,R0
 (4)  007076  104415                                                            TRAP    C$PNTX
 (4)  007100  062706  000004                                                    ADD     #4,SP
5031  007104  005037  007116            CLR     ER47CT          ;RE-INITIALIZE THE DATA LINE COUNTER
5032  007110  004737  007122            JSR     PC,ERR47.       ;USE COMMON SUBROUTINE TO REPORT DATA
5033  007114                            ENDMSG
 (3)  007114                                                                    L10013:
 (3)  007114  104423                                                            TRAP    C$MSG
5034
5035  007116  000000            ER47CT: .WORD   0               ;THIS VARIABLE WILL COUNT THE DATA LINES
5036  007120  000020            ER47MX: .WORD   16.             ;THIS CONSTANT LIMITS THE DATA LINES PRINTED
5037
5038  007122                    ERR47.:
5039
5040  007122  023737  007116  007120    CMP     ER47CT,ER47MX   ;HAVE WE REPORTED ENOUGH OF THESE DATA LINES?
5041  007130  103044                    BHIS    60$             ;YES.  BYPASS THIS WHOLE ROUTINE AND EXIT
5042  007132  005237  007116            INC     ER47CT          ;NO,   COUNT THIS LINE
5043
5044  007136  113701  002450            MOVB    TMP4,R1         ;GET EXPECTED DATA
5045  007142  113703  002452            MOVB    TMP5,R3         ;SETUP TO CALCULATE XOR
5046  007146  074103                    XOR     R1,R3           ;CALCULATE XOR OF EXPECTED & ACTUAL DATA
5047  007150                            PRINTX  #FMT47G,TMPA,<B,R1>,<B,TMP5>,<B,R3> ;PRINT DATA LINE
 (11) 007150  005046                                                            CLR     -(SP)
 (11) 007152  150316                                                            BISB    R3,(SP)
 (10) 007154  005046                                                            CLR     -(SP)
 (10) 007156  153716  002452                                                    BISB    TMP5,(SP)
 (9)  007162  005046                                                            CLR     -(SP)
 (9)  007164  150116                                                            BISB    R1,(SP)
 (8)  007166  013746  002464                                                    MOV     TMPA,-(SP)
 (7)  007172  012746  007421                                                    MOV     #FMT47G,-(SP)
 (6)  007176  012746  000005                                                    MOV     #5,-(SP)
 (3)  007202  010600                                                            MOV     SP,R0
 (4)  007204  104415                                                            TRAP    C$PNTX
 (4)  007206  062706  000014                                                    ADD     #14,SP
5048  007212  023737  007116  007120    CMP     ER47CT,ER47MX   ;IF THESE TWO ARE EQUAL, WE WON'T BE PRINTING
```

```
5049  007220  001010                          BNE     60$             ;ANY MORE LINES FOR A WHILE.  SO,
5050  007222                                  PRINTX  #FMT48I         ;  PUT OUT A MESSAGE TO THAT EFFECT.
 (7)  007222  012746  010656                                                          MOV     #FMT48I,-(SP)
 (6)  007226  012746  000001                                                          MOV     #1,-(SP)
 (3)  007232  010600                                                                  MOV     SP,R0
 (4)  007234  104415                                                                  TRAP    C$PNTX
 (4)  007236  062706  000004                                                          ADD     #4,SP
5051  007242  000207                  60$:    RTS     PC
5052
5053                                  .NLIST  BEX
5054  007244  047045  051445  022462  FMT47A: .ASCIZ  \%N%S2%ATEST PATTERN:  %T\
5055  007275     045  022516  031123  FMT47B: .ASCIZ  \%N%S2%A  (ALL VALUES IN OCTAL)\
5056  007334  047045  051445  022463  FMT47C: .ASCIZ  \%N%S3%A  RAM   SHOULD\
5057  007362  047045  051445  022463  FMT47E: .ASCIZ  \%N%S3%AADDRESS   BE    IS  XOR\
5058  007421     045  022516  032123  FMT47G: .ASCIZ  \%N%S4%04%S4%03%S3%03%S2%03\
5059  007454  046101  020114  047117  TXT47C: .ASCIZ  \ALL ONES\
5060  007465     101  046114  055040  TXT47D: .ASCIZ  \ALL ZEROES\
5061  007500  020061  044502  020124  TXT47E: .ASCIZ  \1 BIT ALTERNATING\
5062  007522  020062  044502  051524  TXT47F: .ASCIZ  \2 BITS ALTERNATING\
5063  007545     101  042104  042522  TXT47G: .ASCIZ  \ADDRESS IN ADDRESS\
5064  007570  047111  051103  046505  TXT47H: .ASCIZ  \INCREMENTAL VALUE IN ADDRESS\
5065                                  .LIST   BEX
5066          007626                  .EVEN
5067  007626  014247  007454  007465  TXT47P: .WORD   TXTML6,TXT47C,TXT47D,TXT47E,TXT47F,TXT47G,TXT47H
      007634  007500  007522  007545
      007642  007570
5068
5069                                  ;       "TXTML6" ABOVE IS DEFINED AS "UNDEFINED" IN THE M-LOOP FUNCTION DEF'S.
5070
5071                                  ;-------------------------------------------------------------------------
5072                                  .SBTTL  ERROR HANDLER -- ERR48 -- FOR DATA ERRORS IN "MOVING INVERSIONS TEST"
5073                                  ;-------------------------------------------------------------------------
5074  007644                          ;       BGNMSG  ERR48
 (3)  007644                                                                          ERR48::
5075                                  ;       PRINT HEADING LINE # 1
5076
5077  007644                          ;       PRINTX  #FMT48A         ;STANDARD PORTION OF LINE 1
 (7)  007644  012746  010312                                                          MOV     #FMT48A,-(SP)
 (6)  007650  012746  000001                                                          MOV     #1,-(SP)
 (3)  007654  010600                                                                  MOV     SP,R0
 (4)  007656  104415                                                                  TRAP    C$PNTX
 (4)  007660  062706  000004                                                          ADD     #4,SP
5078  007664  032737  000004  002350          ;       BIT     #BIT2,PFLAG     ;IF EXTENDED INFORMATION REQUESTED,
5079  007672  001410                          ;       BEQ     2$
5080  007674                                  ;       PRINTX  #FMT48B         ;PRINT EXTENDED PORTION OF LINE 1
 (7)  007674  012746  010361                                                          MOV     #FMT48B,-(SP)
 (6)  007700  012746  000001                                                          MOV     #1,-(SP)
 (3)  007704  010600                                                                  MOV     SP,R0
 (4)  007706  104415                                                                  TRAP    C$PNTX
 (4)  007710  062706  000004                                                          ADD     #4,SP
5081                                  ;       PRINT HEADING LINE # 2
5082
5083  007714                          2$:     PRINTX  #FMT48C         ;STANDARD PORTION OF LINE 2
 (7)  007714  012746  010414                                                          MOV     #FMT48C,-(SP)
 (6)  007720  012746  000001                                                          MOV     #1,-(SP)
 (3)  007724  010600                                                                  MOV     SP,R0
```

```
  (4)  007726  104415                                                          TRAP    C$PNTX
  (4)  007730  062706  000004                                                  ADD     #4,SP
5084
5085                                ;       PRINT HEADING LINE # 3
5086
5087  007734                                PRINTX  #FMT48E         ;STANDARD PORTION OF LINE 3
  (7)  007734  012746  010451                                                  MOV     #FMT48E,-(SP)
  (6)  007740  012746  000001                                                  MOV     #1,-(SP)
  (3)  007744  010600                                                          MOV     SP,R0
  (4)  007746  104415                                                          TRAP    C$PNTX
  (4)  007750  062706  000004                                                  ADD     #4,SP
5088  007754  032737  000004  002350        BIT     #BIT2,PFLAG     ;IF EXTENDED INFORMATION REQUESTED,
5089  007762  001410                        BEQ     6$
5090  007764                                PRINTX  #FMT48F         ;PRINT EXTENDED PORTION OF LINE 3
  (7)  007764  012746  010520                                                  MOV     #FMT48F,-(SP)
  (6)  007770  012746  000001                                                  MOV     #1,-(SP)
  (3)  007774  010600                                                          MOV     SP,R0
  (4)  007776  104415                                                          TRAP    C$PNTX
  (4)  010000  062706  000004                                                  ADD     #4,SP
5091                                ;       GO PRINT DATA PORTION OF ERROR MESSAGE
5092
5093  010004                        6$:     PRINTX  #NEWLIN         ;TERMINATE HEADER & CAUSE 1 BLANK LINE
  (7)  010004  012746  012133                                                  MOV     #NEWLIN,-(SP)
  (6)  010010  012746  000001                                                  MOV     #1,-(SP)
  (3)  010014  010600                                                          MOV     SP,R0
  (4)  010016  104415                                                          TRAP    C$PNTX
  (4)  010020  062706  000004                                                  ADD     #4,SP
5094  010024  005037  010036                CLR     ER48CT          ;RE-INITIALIZE THE DATA LINE COUNTER
5095  010030  004737  010042                JSR     PC,ERR48.       ;USE COMMON SUBROUTINE TO REPORT DATA
5096  010034                                ENDMSG
  (3)  010034                                                                L10014:
  (3)  010034  104423                                                          TRAP    C$MSG
5097
5098  010036  000000                ER48CT: .WORD   0               ;THIS VARIABLE WILL COUNT THE DATA LINES
5099  010040  000020                ER48MX: .WORD   16.             ;THIS CONSTANT LIMITS THE DATA LINES PRINTED
5100
5101  010042                        ERR48.:
5102
5103  010042  023737  010036  010040        CMP     ER48CT,ER48MX   ;HAVE WE REPORTED ENOUGH OF THESE DATA LINES?
5104  010050  103117                        BHIS    60$             ;YES,  BYPASS THIS WHOLE ROUTINE AND EXIT
5105  010052  005237  010036                INC     ER48CT          ;NO.   COUNT THIS LINE
5106
5107                        ; DETERMINT WHICH ERROR CALL GOT US HERE -- PRE-WRITE OR POST-WRITE:
5108
5109  010056  032737  000002  002476        BIT     #BIT1,TMPF      ;DID PRE-WRITE ERROR CALL GET US HERE?
5110  010064  001405                        BEQ     2$              ;NO, THEN SETUP FOR "POST" IN ERROR MESSAGE
5111  010066  012700  010750                MOV     #TXT48A,R0      ;YES, SETUP FOR "PRE" IN ERROR MESSAGE
5112  010072  113701  002450                MOVB    TMP4,R1         ;GET EXPECTED DATA (BEFORE WRITING NEW VALUE)
5113  010076  000404                        BR      4$
5114
5115  010100  012700  010755        2$:     MOV     #TXT48B,R0      ;POINT TO "POST" TEXT
5116  010104  113701  002451                MOVB    TMP4+1,R1       ;GET EXPECTED DATA (AFTER WRITING NEW VALUE)
5117  010110  013703  002452        4$:     MOV     TMP5,R3         ;SETUP TO CALCULATE XOR
5118  010114  074103                        XOR     R1,R3           ;CALCULATE XOR OF EXPECTED & ACTUAL DATA
5119  010116                                PRINTX  #FMT48G,R0,TMPA,<B,R1>,<B,TMP5>,<B,R3> ;PRINT STANDARD DATA LINE
 (12)  010116  005046                                                          CLR     -(SP)
```

```
  (12) 010120  150316                                                          BISB    R3,(SP)
  (11) 010122  005046                                                          CLR     -(SP)
  (11) 010124  153716  002452                                                  BISB    TMP5,(SP)
  (10) 010130  005046                                                          CLR     -(SP)
  (10) 010132  150116                                                          BISB    R1,(SP)
   (9) 010134  013746  002464                                                  MOV     TMPA,-(SP)
   (8) 010140  010046                                                          MOV     R0,-(SP)
   (7) 010142  012746  010563                                                  MOV     #FMT48G,-(SP)
   (6) 010146  012746  000006                                                  MOV     #6,-(SP)
   (3) 010152  010600                                                          MOV     SP,R0
   (4) 010154  104415                                                          TRAP    C$PNTX
   (4) 010156  062706  000016                                                  ADD     #16,SP
5120   010162  032737  000004  002350          BIT     #BIT2,PFLAG     ;IF EXTENDED INFORMATION REQUESTED,
5121   010170  001433                          BEQ     10$
5122                                                         ;SETUP FOR PRINTING OF EXTENDED INFORMATION
5123   010172  013701  002470                  MOV     TMPC,R1         ;DATA BIT VALUE (0 OR 1)
5124   010176  042701  177776                  BIC     #^CBIT0,R1      ;  MAKE SURE WE ONLY HAVE ONE BIT
5125   010202  005737  002472                  TST     TMPD            ;DIRECTION?
5126   010206  001003                          BNE     6$              ;BACKWARD --
5127   010210  012700  010762                  MOV     #TXT48C,R0      ;FORWARD ---
5128   010214  000402                          BR      8$
5129   010216  012700  010767          6$:     MOV     #TXT48D,R0      ;BACKWARD --
5130   010222                          8$:     PRINTX  #FMT48H,TMPB,R1,R0,<B,TMP9>  ;PRINT EXTENDED INFORMATION
  (11) 010222  005046                                                          CLR     -(SP)
  (11) 010224  153716  002462                                                  BISB    TMP9,(SP)
  (10) 010230  010046                                                          MOV     R0,-(SP)
   (9) 010232  010146                                                          MOV     R1,-(SP)
   (8) 010234  013746  002466                                                  MOV     TMPB,-(SP)
   (7) 010240  012746  010623                                                  MOV     #FMT48H,-(SP)
   (6) 010244  012746  000005                                                  MOV     #5,-(SP)
   (3) 010250  010600                                                          MOV     SP,R0
   (4) 010252  104415                                                          TRAP    C$PNTX
   (4) 010254  062706  000014                                                  ADD     #14,SP
5131   010260  023737  010036  010040  10$:     CMP     ER48CT,ER48MX   ;IF THESE TWO ARE EQUAL, WE WON'T BE PRINTING
5132   010266  001010                          BNE     60$             ;ANY MORE LINES FOR A WHILE.  SO,
5133   010270                                  PRINTX  #FMT48I         ;  PUT OUT A MESSAGE TO THAT EFFECT.
   (7) 010270  012746  010656                                                  MOV     #FMT48I,-(SP)
   (6) 010274  012746  000001                                                  MOV     #1,-(SP)
   (3) 010300  010600                                                          MOV     SP,R0
   (4) 010302  104415                                                          TRAP    C$PNTX
   (4) 010304  062706  000004                                                  ADD     #4,SP
5134   010310                          60$:
5135   010310  000207                          RTS     PC
5136                                    .NLIST  BEX
5137   010312  047045  051445  022462  FMT48A: .ASCIZ  \#N#S2#APRE OR    (ALL VALUES IN OCTAL)\
5138   010361     045  032523  040445  FMT48B: .ASCIZ  \#S5#AEXTENDED INFORMATION:\
5139   010414  047045  051445  022463  FMT48C: .ASCIZ  \#N#S3#APOST     RAM   SHOULD\
5140   010451     045  022516  031123  FMT48E: .ASCIZ  \#N#S2#AWRITE   ADDRESS   BE    IS  XOR\
5141   010520  051445  022465  041101  FMT48F: .ASCIZ  \#S5#ABIT  DATA   SEQ  LSB(DECIMAL)\
5142   010563     045  022516  031523  FMT48G: .ASCIZ  \#N#S3#T#S4#04#S4#03#S3#03#S2#03\
5143   010623     045  033123  047445  FMT48H: .ASCIZ  \#S6#01#S5#01#S3#T#S2#D2#A.\
5144   010656  047045  047045  051445  FMT48I: .ASCIZ  \#N#N#S5#AFURTHER DATA LINES SUPRESSED UNTIL NEW TEST DATA\
5145   010750  051120  020105     000  TXT48A: .ASCIZ  \PRE \
5146   010755     120  051517  000124  TXT48B: .ASCIZ  \POST\
5147   010762  043040  042127     000  TXT48C: .ASCIZ  \ FWD\
5148   010767     102  053513  000104  TXT48D: .ASCIZ  \BKWD\
```

```
5149                                    .LIST   BEX
5150                                    .EVEN
5151
5152
5153                                    ;-----------------------------------------------------------------------------
5154                                    .SBTTL  ERROR HANDLER -- ERR50 -- FOR REPORTING TIMER # 1 ERRORS
5155                                    ;-----------------------------------------------------------------------------
5156  010774                                    BGNMSG  ERR50
 (3)  010774                                                                                        ERR50::
5157  010774  010146                           MOV     R1,-(SP)        ;SAVE R1 FOR CALLER
5158  010776  113701  002467                   MOVB    TMPB+1,R1       ;GET THE MODE LAST SETUP
5159  011002  000241                           CLC                     ;SEEING AS THE CARRY BIT WILL BE ROTATED INTO
5160                                                                    ;THE DATA, WE HAD BETTER CLEAR IT JUST IN CASE.
5161  011004  042701  177477                   BIC     #^C<BIT6+BIT7>,R1 ;LOOK @ JUST THE TIMER 1 MODE DEFINITION
5162  011010  106101                           ROLB    R1              ;POSITION IT FOR PRINTOUT
5163  011012  106101                           ROLB    R1
5164  011014  106101                           ROLB    R1
5165
5166                                          ;IDENTIFY THE MODE BEING USED AT THE TIME:
5167
5168  011016                                  PRINTX  #FMT50A,R1
 (8)  011016  010146                                                                        MOV     R1,-(SP)
 (7)  011020  012746  012761                                                                MOV     #FMT50A,-(SP)
 (6)  011024  012746  000002                                                                MOV     #2,-(SP)
 (3)  011030  010600                                                                        MOV     SP,R0
 (4)  011032  104415                                                                        TRAP    C$PNTX
 (4)  011034  062706  000006                                                                ADD     #6,SP
5169                                    ;PRINT THE HEADING TO IDENTIFY THE REGISTERS:
5170
5171  011040                            PRINTX  #FMT50B
 (7)  011040  012746  013033                                                                MOV     #FMT50B,-(SP)
 (6)  011044  012746  000001                                                                MOV     #1,-(SP)
 (3)  011050  010600                                                                        MOV     SP,R0
 (4)  011052  104415                                                                        TRAP    C$PNTX
 (4)  011054  062706  000004                                                                ADD     #4,SP
5172                                    ;AND THE VALUES THAT WERE LOADED INTO THE REGISTERS:
5173
5174  011060                            PRINTX  #FMT50C,#TXT8D,<B,TMP5+1>,<B,TMP4+1>,<B,TMP7+1>,<B,TMP6+1>
 (12) 011060  005046                                                                        CLR     -(SP)
 (12) 011062  153716  002455                                                                BISB    TMP6+1,(SP)
 (11) 011066  005046                                                                        CLR     -(SP)
 (11) 011070  153716  002457                                                                BISB    TMP7+1,(SP)
 (10) 011074  005046                                                                        CLR     -(SP)
 (10) 011076  153716  002451                                                                BISB    TMP4+1,(SP)
 (9)  011102  005046                                                                        CLR     -(SP)
 (9)  011104  153716  002453                                                                BISB    TMP5+1,(SP)
 (8)  011110  012746  014065                                                                MOV     #TXT8D,-(SP)
 (7)  011114  012746  013114                                                                MOV     #FMT50C,-(SP)
 (6)  011120  012746  000006                                                                MOV     #6,-(SP)
 (3)  011124  010600                                                                        MOV     SP,R0
 (4)  011126  104415                                                                        TRAP    C$PNTX
 (4)  011130  062706  000016                                                                ADD     #16,SP
5175  011134                            PRINTX  #FMT50D,<B,TMPB+1>,<B,TMPE+1>
 (9)  011134  005046                                                                        CLR     -(SP)
 (9)  011136  153716  002475                                                                BISB    TMPE+1,(SP)
 (8)  011142  005046                                                                        CLR     -(SP)
```

```
  (8)  011144  153716  002467                                                    BISB    TMPB+1,(SP)
  (7)  011150  012746  013154                                                    MOV     #FMT50D,-(SP)
  (6)  011154  012746  000003                                                    MOV     #3,-(SP)
  (3)  011160  010600                                                            MOV     SP,R0
  (4)  011162  104415                                                            TRAP    C$PNTX
  (4)  011164  062706  000010                                                    ADD     #10,SP
5176                                    ;AND THE VALUES READ FROM THOSE REGISTERS:
5177
5178  011170                            PRINTX  #FMT50C,#TXT8E,<B,TMP5>,<B,TMP4>,<B,TMP7>,<B,TMP6>
  (12) 011170  005046                                                            CLR     -(SP)
  (12) 011172  153716  002454                                                    BISB    TMP6,(SP)
  (11) 011176  005046                                                            CLR     -(SP)
  (11) 011200  153716  002456                                                    BISB    TMP7,(SP)
  (10) 011204  005046                                                            CLR     -(SP)
  (10) 011206  153716  002450                                                    BISB    TMP4,(SP)
  (9)  011212  005046                                                            CLR     -(SP)
  (9)  011214  153716  002452                                                    BISB    TMP5,(SP)
  (8)  011220  012746  014102                                                    MOV     #TXT8E,-(SP)
  (7)  011224  012746  013114                                                    MOV     #FMT50C,-(SP)
  (6)  011230  012746  000006                                                    MOV     #6,-(SP)
  (3)  011234  010600                                                            MOV     SP,R0
  (4)  011236  104415                                                            TRAP    C$PNTX
  (4)  011240  062706  000016                                                    ADD     #16,SP
5179  011244                            PRINTX  #FMT50E,<B,TMPB>,<B,TMPD>
  (9)  011244  005046                                                            CLR     -(SP)
  (9)  011246  153716  002472                                                    BISB    TMPD,(SP)
  (8)  011252  005046                                                            CLR     -(SP)
  (8)  011254  153716  002466                                                    BISB    TMPB,(SP)
  (7)  011260  012746  013171                                                    MOV     #FMT50E,-(SP)
  (6)  011264  012746  000003                                                    MOV     #3,-(SP)
  (3)  011270  010600                                                            MOV     SP,R0
  (4)  011272  104415                                                            TRAP    C$PNTX
  (4)  011274  062706  000010                                                    ADD     #10,SP
5180
5181  011300  004737  012104            JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
5182  011304  012601                    MOV     (SP)+,R1        ;RESTORE R1 FOR CALLER
5183  011306                            ENDMSG
  (3)  011306                                                                  L10015:
  (3)  011306  104423                                                            TRAP    C$MSG
5184
5185
```

```
                                .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"

011310  010146                  XORGB:  MOV     R1,-(SP)        ;PRESERVE WORKING REGISTER
011312  013701  002310                  MOV     GDATA,R1        ;GET "GOOD" DATA
011316  013737  002312  002314          MOV     BDATA,XDATA     ;AND "BAD" DATA
011324  C74137  002314                  XOR     R1,XDATA        ;PERFORM EXCLUSIVE OR
011330  012601                          MOV     (SP)+,R1        ;RESTORE R1
011332  000207                          RTS     PC              ;RETURN


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

011334                          ERR4$:  PRINTX  #FMT4,#TXT3,#TXT1
 (9) 011334  012746  013265                                             MOV     #TXT1,-(SP)
 (8) 011340  012746  013466                                             MOV     #TXT3,-(SP)
 (7) 011344  012746  012257                                             MOV     #FMT4,-(SP)
 (6) 011350  012746  000003                                             MOV     #3,-(SP)
 (3) 011354  010600                                                     MOV     SP,R0
 (4) 011356  104415                                                     TRAP    C$PNTX
 (4) 011360  062706  000010                                             ADD     #10,SP
5212 011364                                     PRINTX  #FMT4A,<B,BSR0>,<B,BSR1>,<B,BSR2>,<B,BSR3>
(11) 011364  005046                                                     CLR     -(SP)
(11) 011366  153716  002254                                             BISB    BSR3,(SP)
(10) 011372  005046                                                     CLR     -(SP)
(10) 011374  153716  002252                                             BISB    BSR2,(SP)
 (9) 011400  005046                                                     CLR     -(SP)
 (9) 011402  153716  002250                                             BISB    BSR1,(SP)
 (8) 011406  005046                                                     CLR     -(SP)
 (8) 011410  153716  002246                                             BISB    BSR0,(SP)
 (7) 011414  012746  012317                                             MOV     #FMT4A,-(SP)
 (6) 011420  012746  000005                                             MOV     #5,-(SP)
 (3) 011424  010600                                                     MOV     SP,R0
 (4) 011426  104415                                                     TRAP    C$PNTX
 (4) 011430  062706  000014                                             ADD     #14,SP
5213 011434                                     PRINTX  #FMT4B,#TXT2
 (8) 011434  012746  013323                                             MOV     #TXT2,-(SP)
 (7) 011440  012746  012352                                             MOV     #FMT4B,-(SP)
 (6) 011444  012746  000002                                             MOV     #2,-(SP)
 (3) 011450  010600                                                     MOV     SP,R0
 (4) 011452  104415                                                     TRAP    C$PNTX
 (4) 011454  062706  000006                                             ADD     #6,SP
5214 011460                                     PRINTX  #FMT4C,<B,BSR4>,<B,BSR5>,<B,BSR6>,<B,BSR7>
(11) 011460  005046                                                     CLR     -(SP)
(11) 011462  153716  002264                                             BISB    BSR7,(SP)
```

```
   (10) 011466  005046                                                          CLR     -(SP)
   (10) 011470  153716  002262                                                 BISB    BSR6,(SP)
   (9)  011474  005046                                                          CLR     -(SP)
   (9)  011476  153716  002260                                                 BISB    BSR5,(SP)
   (8)  011502  005046                                                          CLR     -(SP)
   (8)  011504  153716  002256                                                 BISB    BSR4,(SP)
   (7)  011510  012746  012357                                                 MOV     #FMT4C,-(SP)
   (6)  011514  012746  000005                                                 MOV     #5,-(SP)
   (3)  011520  010600                                                         MOV     SP,R0
   (4)  011522  104415                                                         TRAP    C$PNTX
   (4)  011524  062706  000014                                                 ADD     #14,SP
5215    011530                       PRINTX  #FMT4B,#TXT2A
   (8)  011530  012746  013365                                                 MOV     #TXT2A,-(SP)
   (7)  011534  012746  012352                                                 MOV     #FMT4B,-(SP)
   (6)  011540  012746  000002                                                 MOV     #2,-(SP)
   (3)  011544  010600                                                         MOV     SP,R0
   (4)  011546  104415                                                         TRAP    C$PNTX
   (4)  011550  062706  000006                                                 ADD     #6,SP
5216    011554                       PRINTX  #FMT4A,<B,BSR10>,<B,BSR11>,<B,BSR12>,<B,BSR13>
   (11) 011554  005046                                                          CLR     -(SP)
   (11) 011556  153716  002274                                                 BISB    BSR13,(SP)
   (10) 011562  005046                                                          CLR     -(SP)
   (10) 011564  153716  002272                                                 BISB    BSR12,(SP)
   (9)  011570  005046                                                          CLR     -(SP)
   (9)  011572  153716  002270                                                 BISB    BSR11,(SP)
   (8)  011576  005046                                                          CLR     -(SP)
   (8)  011600  153716  002266                                                 BISB    BSR10,(SP)
   (7)  011604  012746  012317                                                 MOV     #FMT4A,-(SP)
   (6)  011610  012746  000005                                                 MOV     #5,-(SP)
   (3)  011614  010600                                                         MOV     SP,R0
   (4)  011616  104415                                                         TRAP    C$PNTX
   (4)  011620  062706  000014                                                 ADD     #14,SP
5217    011624                       PRINTX  #FMT4B,#TXT2B
   (8)  011624  012746  013424                                                 MOV     #TXT2B,-(SP)
   (7)  011630  012746  012352                                                 MOV     #FMT4B,-(SP)
   (6)  011634  012746  000002                                                 MOV     #2,-(SP)
   (3)  011640  010600                                                         MOV     SP,R0
   (4)  011642  104415                                                         TRAP    C$PNTX
   (4)  011644  062706  000006                                                 ADD     #6,SP
5218    011650                       PRINTX  #FMT4C,<B,BSR14>,<B,BSR15>,<B,BSR16>,<B,BSR17>
   (11) 011650  005046                                                          CLR     -(SP)
   (11) 011652  153716  002304                                                 BISB    BSR17,(SP)
   (10) 011656  005046                                                          CLR     -(SP)
   (10) 011660  153716  002302                                                 BISB    BSR16,(SP)
   (9)  011664  005046                                                          CLR     -(SP)
   (9)  011666  153716  002300                                                 BISB    BSR15,(SP)
   (8)  011672  005046                                                          CLR     -(SP)
   (8)  011674  153716  002276                                                 BISB    BSR14,(SP)
   (7)  011700  012746  012357                                                 MOV     #FMT4C,-(SP)
   (6)  011704  012746  000005                                                 MOV     #5,-(SP)
   (3)  011710  010600                                                         MOV     SP,R0
   (4)  011712  104415                                                         TRAP    C$PNTX
   (4)  011714  062706  000014                                                 ADD     #14,SP
5219    011720  000207                       RTS     PC
5220
5221                        ;-------------------------------------------------------------------------
```

```
                        .SBTTL .....ERROR HANDLER SUBROUTINE -- ERR5$
                        ;-------------------------------------------------------------------------
                        ;       COMMON ERROR SUBROUTINE TO PRINT SELECT REGISTERS
5225  011722            ERR5$:
                        PRINTX  #FMT4,#TXT6,#TXT4
 (9)  011722  012746  013516                                                    MOV     #TXT4,-(SP)
 (8)  011726  012746  013621                                                    MOV     #TXT6,-(SP)
 (7)  011732  012746  012257                                                    MOV     #FMT4,-(SP)
 (6)  011736  012746  000003                                                    MOV     #3,-(SP)
 (3)  011742  010600                                                            MOV     SP,R0
 (4)  011744  104415                                                            TRAP    C$PNTX
 (4)  011746  062706  000010                                                    ADD     #10,SP
5227  011752            PRINTX  #FMT11,WSR0,WSR2,WSR4,WSR6 ;DUMP THE SELECT REGISTERS
 (11) 011752  013746  002254                                                    MOV     WSR6,-(SP)
 (10) 011756  013746  002252                                                    MOV     WSR4,-(SP)
 (9)  011762  013746  002250                                                    MOV     WSR2,-(SP)
 (8)  011766  013746  002246                                                    MOV     WSR0,-(SP)
 (7)  011772  012746  012742                                                    MOV     #FMT11,-(SP)
 (6)  011776  012746  000005                                                    MOV     #5,-(SP)
 (3)  012002  010600                                                            MOV     SP,R0
 (4)  012004  104415                                                            TRAP    C$PNTX
 (4)  012006  062706  000014                                                    ADD     #14,SP
5228  012012            PRINTX  #FMT4B,#TXT4A
 (8)  012012  012746  013556                                                    MOV     #TXT4A,-(SP)
 (7)  012016  012746  012352                                                    MOV     #FMT4B,-(SP)
 (6)  012022  012746  000002                                                    MOV     #2,-(SP)
 (3)  012026  010600                                                            MOV     SP,R0
 (4)  012030  104415                                                            TRAP    C$PNTX
 (4)  012032  062706  000006                                                    ADD     #6,SP
5229  012036            PRINTX  #FMT11,WSR10,WSR12,WSR14,WSR16
 (11) 012036  013746  002264                                                    MOV     WSR16,-(SP)
 (10) 012042  013746  002262                                                    MOV     WSR14,-(SP)
 (9)  012046  013746  002260                                                    MOV     WSR12,-(SP)
 (8)  012052  013746  002256                                                    MOV     WSR10,-(SP)
 (7)  012056  012746  012742                                                    MOV     #FMT11,-(SP)
 (6)  012062  012746  000005                                                    MOV     #5,-(SP)
 (3)  012066  010600                                                            MOV     SP,R0
 (4)  012070  104415                                                            TRAP    C$PNTX
 (4)  012072  062706  000014                                                    ADD     #14,SP
5230  012076  004737  012104            JSR     PC,NULERR       ;USE COMMON ROUTINE TO TERMINATE ERROR MESSAGE
5231  012102  000207                    RTS     PC
5232
5233                    ;-------------------------------------------------------------------------
5234                    .SBTTL          SUBROUTINE TO PERFORM "PRINTB   #ENDEMB"
5235
5236  012104            NULERR: PRINTB  #ENDEMB         ;TERMINATE ERROR MESSAGE
 (7)  012104  012746  012126                                                    MOV     #ENDEMB,-(SP)
 (6)  012110  012746  000001                                                    MOV     #1,-(SP)
 (3)  012114  010600                                                            MOV     SP,R0
 (4)  012116  104414                                                            TRAP    C$PNTB
 (4)  012120  062706  000004                                                    ADD     #4,SP
5237  012124  000207                    RTS     PC
5238                    ;-------------------------------------------------------------------------
```

```
                                .SBTTL  FORMAT SPEC'S FOR ERROR HANDLERS -- "FMT___"
                                ;-----------------------------------------------------------------------------
                                ;------------- FORMAT SPEC'S USED BY ERROR HANDLERS ---------------------------
                                ;-----------------------------------------------------------------------------
                                .NLIST  BEX
012126 047045 047045    000     ENDEMB: .ASCIZ  /<15><12>/
012133    045 000116            NEWLIN: .ASCIZ  /<12>/

012136 047045 040445 040506     FMT02:  .ASCIZ  /<15><12>FAILING REG = <11>T<11>ASEL<11>02/
012173    045 022516 020101     FMT02A: .ASCIZ  /<15><12>A  EXPECTED:  <11>03<11>A   ACTUAL:  <11>03<11>A   XOR:  <11>03/
012257    045 022516 020101     FMT4:   .ASCIZ  /<15><12>A  THE CONTENTS OF ALL<11>T<12><11>T/
012317    045 022516 030523     FMT4A:  .ASCIZ  /<15><12>S1<11>03<11>S5<11>03<11>S5<11>03<11>S5<11>03/
012352 047045 052045    000     FMT4B:  .ASCIZ  /<12><11>T/
012357    045 022516 032523     FMT4C:  .ASCIZ  /<15><12><11>S5<11>03<11>S5<11>03<11>S5<11>03<11>S5<11>03/
012412 047045 040445 020040     FMT5:   .ASCIZ  /<15><12>A  WHEN <11>03<11>A LOADED INTO BSEL1/
012455    045 022516 020101     FMT5A:  .ASCIZ  /<15><12>A  ATTEMPTING "M-LOOP" FUNCTION CODE <11>02<11>A (<11>T<11>A)/
012542 040445 020040 042504     FMT07:  .ASCIZ  /<11>A  DETECTED IN <11>T<11>T<11>A --/
012574 047045 047045 052045     FMT06:  .ASCIZ  /<15><12><11>T/
012603    045 022516 022524     FMT06A: .ASCIZ  /<15><12><11>T<11>03<11>S2<11>03<11>S2<11>03<11>S2<11>03<11>S2<11>03<11>S2<11>03/
012651    045 031123 047445     FMT06B: .ASCIZ  /<11>S2<11>03<11>S2<11>03/
012666 047045 040445 020040     FMT10:  .ASCIZ  /<15><12>A  EXPECTED:<11>08<11>A  ACTUAL:<11>08<11>A  XOR:<11>08/
012742 047045 047445 022470     FMT11:  .ASCIZ  /<15><12><11>08<11>08<11>08<11>08/
012761    045 022516 020101     FMT50A: .ASCIZ  /<15><12>A  TIMER # 1 MODE:  <11>01<11>A   REGISTERS:/
013033    045 022516 030523     FMT50B: .ASCIZ  /<15><12><11>S15<11>AT1CH  T1CL  T1LH  T1LL  ACR   IFR   IER/
013114 047045 051445 022463     FMT50C: .ASCIZ  /<15><12><11>S3<11>T<11>S1<11>03<11>S3<11>03<11>S3<11>03<11>S3<11>03/
013154 051445 022463 031517     FMT50D: .ASCIZ  /<11>S3<11>03<11>S9<11>03/
013171    045 031523 047445     FMT50E: .ASCIZ  /<11>S3<11>03<11>S3<11>03/
013206 047045 022462 030523     FMT50M: .ASCIZ  /<15><12><11>S10<11>A(T1CH & T1CL HAVEN'T YET BEEN LOADED)/

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

013265    102 042523 030114     TXT1:   .ASCIZ  /BSEL0   BSEL1   BSEL2   BSEL3/
013323    040 020040 041040     TXT2:   .ASCIZ  /    BSEL4   BSEL5   BSEL6   BSEL7/
013365    102 042523 030514     TXT2A:  .ASCIZ  /BSEL10  BSEL11  BSEL12  BSEL13/
013424 020040 041040 042523     TXT2B:  .ASCIZ  /   BSEL14  BSEL15  BSEL16  BSEL17/
013466 041040 052131 020105     TXT3:   .ASCIZ  / BYTE SELECT REG'S ARE:/
013516 020040 051440 046105     TXT4:   .ASCIZ  /   SEL0    SEL2    SEL4    SEL6/
013556 020040 051440 046105     TXT4A:  .ASCIZ  /   SEL10   SEL12   SEL14   SEL16/
013617    102    000            TXT5:   .ASCIZ  /B/
013621    040 042523 042514     TXT6:   .ASCIZ  / SELECT REG'S ARE:/
013644 051040 043505 051511     TXT7:   .ASCIZ  / REGISTERS  ORB  ORA  DDRB DDRA T1CL T1CH T1LL T1LH /
013731    040 020040 020040     TXT7A:  .ASCIZ  /              T2CL T2CH SR   ACR  PCR  IFR  IER  ORA  /
014016 042440 050130 041505     TXT8A:  .ASCIZ  / EXPECTED:  /
014033    040 041501 052524     TXT8B:  .ASCIZ  / ACTUAL:    /
014050 054040 051117 020072     TXT8C:  .ASCIZ  / XOR:       /
014065    040 047514 042101     TXT8D:  .ASCIZ  / LOADED:    /
014102 051040 040505 035104     TXT8E:  .ASCIZ  / READ:      /

014117    116 050117    000     TXTML0: .ASCIZ  /NOP/
014123    122 040505 020104     TXTML1: .ASCIZ  /READ 1 BYTE/
014137    127 044522 042524     TXTML2: .ASCIZ  /WRITE 1 BYTE/
014154 050116 026522 052517     TXTML3: .ASCIZ  /NPR-OUT 256 BYTES/
014176 050116 026522 047111     TXTML4: .ASCIZ  /NPR-IN 256 BYTES/
```

```
5296  014217     123  052105  046440  TXTML5: .ASCIZ  /SET MICROPROCESSOR'S PC/
5297  014247     125  042116  043105  TXTML6: .ASCIZ  /UNDEFINED/
5298  014261     123  052105  046440  TXTML7: .ASCIZ  /SET MAINT INTR & CLR INTR DISABLE IN CPU STATUS/
5299
5300  014341     126  040511  051040  TXTVR:  .ASCIZ  /VIA REGISTER /
5301  014357     117  041122     000  TXTVR0: .ASCIZ  /ORB/
5302  014363     117  040522     000  TXTVR1: .ASCIZ  /ORA/
5303  014367     104  051104  000102  TXTVR2: .ASCIZ  /DDRB/
5304  014374  042104  040522     000  TXTVR3: .ASCIZ  /DDRA/
5305  014401     124  041461  000114  TXTVR4: .ASCIZ  /T1CL/
5306  014406  030524  044103     000  TXTVR5: .ASCIZ  /T1CH/
5307  014413     124  046061  000114  TXTVR6: .ASCIZ  /T1LL/
5308  014420  030524  044114     000  TXTVR7: .ASCIZ  /T1LH/
5309  014425     124  041462  000114  TXTVR8: .ASCIZ  /T2CL/
5310  014432  031124  044103     000  TXTVR9: .ASCIZ  /T2CH/
5311  014437     123  000122          TXTVRA: .ASCIZ  /SR/
5312  014442  041501  000122          TXTVRB: .ASCIZ  /ACR/
5313  014446  041520  000122          TXTVRC: .ASCIZ  /PCR/
5314  014452  043111  000122          TXTVRD: .ASCIZ  /IFR/
5315  014456  042511  000122          TXTVRE: .ASCIZ  /IER/
5316  014462  051117  000101          TXTVRF: .ASCIZ  /ORA/
5317
```

```
5319                                    .SBTTL  ERROR MESSAGES -- "EM___"
5320                                    ;-------------------------------------------------------------------------------
5321                                    ;------------ ERROR MESSAGES USED BY ERROR CALL'S ------------------------------
5322                                    ;-------------------------------------------------------------------------------
5323
5324  014466  044515  051103  026517   EM3:     .ASCIZ  /MICRO-DIAG. FAILURE/
5325  014512  051115  054504  052040   EM4:     .ASCIZ  /MRDY TIMEOUT/
5326  014527     115  051501  042524   EM5:     .ASCIZ  /MASTER CLR FAILURE/
5327  014552  051503  020122  042101   EM6:     .ASCIZ  /CSR ADDRESS FAILURE/
5328  014576  051503  020122  040504   EM7:     .ASCIZ  /CSR DATA PAT FAILURE/
5329  014623     102  042523  030114   EM8:     .ASCIZ  /BSEL0 SET-ALL ONES/
5330  014646  054105  042524  047122   EM9:     .ASCIZ  /EXTERNAL BUS RESET FAILURE/
5331  014701     102  042101  041440   EM14:    .ASCIZ  /BAD CSR VALUE(S) AFTER MASTER CLEAR/
5332  014745     042  051115  054504   EM15:    .ASCIZ  /"MRDY" DIDN'T GO LOW WHILE PROCESSING A COMMAND/
5333  015025     104  053115  051447   EM16:    .ASCIZ  /DMV'S RAM LOC. (CORRESPONDING TO BSEL0) NOT PROPERLY WRITTEN/
5334  015122  032466  031060  053440   EM17:    .ASCIZ  /6502 WRITE FUNC. FAILURE AFTER "RUN" BIT IS SET/
5335  015202  032466  031060  051440   EM17A:   .ASCIZ  /6502 STILL RUNNING AFTER "RUN" BIT CLEARED/
5336  015255     126  040511  051440   EM20:    .ASCIZ  /VIA STATIC REGISTER ERROR/
5337  015307     126  040511  051440   EM20A:   .ASCIZ  /VIA STATIC REGISTER ERROR -- TIMMER NOT RUNNING/
5338  015367     126  040511  051440   EM20B:   .ASCIZ  /VIA STATIC REGISTER ERROR -- TIMMER CROSS TALK ERROR/
5339  015454  042522  044507  052123   EM21:    .ASCIZ  /REGISTER NOT PROPERLY ZEROED/
5340  015511     132  051105  044517   EM22:    .ASCIZ  /ZEROING DDRB EFFECTED DDRA/
5341  015544  042532  047522  047111   EM22A:   .ASCIZ  /ZEROING DDRA EFFECTED DDRB/
5342  015577     122  040505  027504   EM25:    .ASCIZ  'READ/WRITE DATA ERROR'
5343  015625     125  042516  050130   EM34:    .ASCIZ  /UNEXPECTED "A" INTERRUPT/
5344  015656  047125  054105  042520   EM34B:   .ASCIZ  /UNEXPECTED "B" INTERRUPT/
5345  015707     122  046501  042040   EM47A:   .ASCIZ  /RAM DATA ERROR ON INITIAL WRITE/
5346  015747     122  046501  042040   EM47B:   .ASCIZ  /RAM DATA ERROR ON RE-READ AFTER TEST AREA FILLED/
5347  016030  040522  020115  040504   EM48A:   .ASCIZ  /RAM DATA ERROR -- MOVING INVERSIONS TEST/
5348  016101     042  030524  020042   EM50A:   .ASCIZ  \"T1" FLAG NOT CLEARED BY LOADING T1LH\
5349  016147     042  030524  020042   EM50B:   .ASCIZ  \"T1" FLAG NOT CLEARED BY LOADING T1CH\
5350  016215     042  030524  020042   EM50C:   .ASCIZ  \"T1" FLAG NOT CLEARED BY READING T1CL\
5351  016263     126  040511  051447   EM50D:   .ASCIZ  \VIA'S T1CL NOT DECREMENTING\
5352  016317     126  040511  051447   EM50E:   .ASCIZ  \VIA'S T1CH NOT DECREMENTING\
5353  016353     042  030524  020042   EM50F:   .ASCIZ  \"T1" FLAG NOT SET ON TIMER 1 TIMEOUT\
5354  016420  052042  021061  043040   EM50G:   .ASCIZ  \"T1" FLAG CLEARED BY READING T1CH\
5355  016462  044526  023501  020123   EM50H:   .ASCIZ  \VIA'S T1LL IMPROPERLY LOADED BY WRITING T1CL @ ADDR 4\
5356  016550  052042  021061  043040   EM50I:   .ASCIZ  \"T1" FLAG CLEARED BY READING T1LL\
5357  016612  044526  023501  020123   EM50J:   .ASCIZ  \VIA'S T1LH IMPROPERLY LOADED BY WRITING T1CH @ ADDR 5\
5358  016700  052042  021061  043040   EM50K:   .ASCIZ  \"T1" FLAG CLEARED BY READING T1LH\
5359  016742  052042  021061  043040   EM50L:   .ASCIZ  \"T1" FLAG NOT SET AFTER RE-LOADING T1CH & TIMEOUT\
5360  017024  052042  021061  043040   EM50M:   .ASCIZ  \"T1" FLAG CLEARED BY LOADING T1LL\
5361  017066  052042  021061  043040   EM50N:   .ASCIZ  \"T1" FLAG NOT CLEARED BY LOADING T1CH\
5362  017134  050042  033502  020042   EM50S:   .ASCIZ  \"PB7" W/IN VIA NOT SET ON TIMER 1 TIMEOUT\
5363  017206  050042  033502  020042   EM50U:   .ASCIZ  \"PB7" NOT SET AFTER TIMER 1 TIMEOUT\
5364  017252  050042  033502  020042   EM50V:   .ASCIZ  \"PB7" NOT DRIVEN LOW BY LOADING T1CH\
5365  017317     042  041120  021067   EM50W:   .ASCIZ  \"PB7" UNEXPECTEDLY MODIFIED BY TIMER 1\
5366  017366  052042  021061  047040   EM50X:   .ASCIZ  \"T1" NOT RESET AFTER BEING CLEARED\
5367  017431     042  041120  021067   EM50Y:   .ASCIZ  \"PB7" PREMATURELY SET DURING T1 COUNTDOWN\
5368  017503     042  041120  021067   EM50Z:   .ASCIZ  \"PB7" NOT SET AFTER SECOND CYCLE\
5369
5370                                    .EVEN
```

```
5372                                    .SBTTL  TEXT ADDRESS TABLES FOR ERROR HANDLERS -- "TXT__T"
5373                                    ;-------------------------------------------------------------------------------
5374                                    ;------------ TEXT ADDRESS TABLES USED BY ERROR HANDLERS ----------------------
5375                                    ;-------------------------------------------------------------------------------
5376
5377  017544  014117  014123  014137  TXTMLT: .WORD   TXTML0,TXTML1,TXTML2,TXTML3,TXTML4,TXTML5,TXTML6,TXTML7
5378
5379  017564  014341                          .WORD   TXTVR
5380  017566  014357  014363  014367  TXTVRT: .WORD   TXTVR0,TXTVR1,TXTVR2,TXTVR3,TXTVR4,TXTVR5,TXTVR6,TXTVR7
5381  017606  014425  014432  014437          .WORD   TXTVR8,TXTVR9,TXTVRA,TXTVRB,TXTVRC,TXTVRD,TXTVRE,TXTVRF
5382
5383                                    .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.
                        ;////////////////////////////////////////////////////////////////////////////////

017626                          BGNPROT
(3)  017626                                                             L$PROT::
017626  177777                  .WORD   -1      ;DON'T CHK CSR ADRS
017630  177777                  .WORD   -1      ;DON'T CHK MASSBUS UNIT NO.
017632  177777                  .WORD   -1      ;DON'T CHK DRIVE NO.
017634                          ENDPROT
```

```
                        .SBTTL INITIALIZE SECTION

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

017634                          BGNINIT
(3) 017634                                                              L$INIT::

017634  010637  002324          MOV     SP,PSTACK       ;SAVE BASE-LEVEL STACK POINTER
                        ;SEE IF PROGRAM JUST STARTED, BR IF YES
017640                          READEF  #EF.START
(3) 017640  012700  000040                                              MOV     #EF.START,R0
(3) 017644  104447                                                      TRAP    C$REFG
017646                          BCOMPLETE       STARST
(2) 017646  103417                                                      BCS     STARST
                        ;SEE IF PROGRAM JUST RESTARTED, BR IF YES
017650                          READEF  #EF.RESTART
(3) 017650  012700  000037                                              MOV     #EF.RESTART,R0
(3) 017654  104447                                                      TRAP    C$REFG
017656                          BCOMPLETE       RESTRT
(2) 017656  103435                                                      BCS     RESTRT
                        ;SEE IF THIS IS A NEW PASS, BR IF YES
017660                          READEF  #EF.NEW
(3) 017660  012700  000035                                              MOV     #EF.NEW,R0
(3) 017664  104447                                                      TRAP    C$REFG
017666                          BCOMPLETE       NEWST
(2) 017666  103433                                                      BCS     NEWST
                        ;SEE IF PROGRAM WAS JUST CONTINUED
017670                          READEF  #EF.CONTINUE
(3) 017670  012700  000036                                              MOV     #EF.CONTINUE,R0
(3) 017674  104447                                                      TRAP    C$REFG
017676                          BCOMPLETE       10$
(2) 017676  103401                                                      BCS     10$
017700  000436                  BR      GETPRM

017702  000137  020106  10$:    JMP     CONTIN          ;(THIS IS TO FAR AWAY FOR A "BR" INSTRUCTION)

017706                  STARST:         ;ENTER HERE IF "START" COMMAND ISSUED

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

017706  005037  002346          CLR     CONSOL          ;RESET THE CONSOLE TERMINAL FLAG
017712                          SETVEC  #4,#CONTST,#0   ;SETUP BUS TIMEOUT VECTER TO TEST FOR A CONSOLE
(7) 017712  012746  000000                                              MOV     #0,-(SP)
(6) 017716  012746  020206                                              MOV     #CONTST,-(SP)
(5) 017722  012746  000004                                              MOV     #4,-(SP)
(4) 017726  012746  000003                                              MOV     #3,-(SP)
(3) 017732  104437                                                      TRAP    C$SVEC
(2) 017734  062706  000010                                              ADD     #10,SP
017740  005737  177564          TST     @#177564        ;TRY TO ACCESS THE CONSOLE TERMINAL'S "XCSR"
017744                          CLRVEC  #4              ;WE SHOULD BE THROUGH WITH THIS BY NOW
(3) 017744  012700  000004                                              MOV     #4,R0
(3) 017750  104436                                                      TRAP    C$CVEC
```

```
                        INITIALIZE SECTION

5433  017752                        RESTRT:         ;ENTER HERE IF "RESTART" COMMAND ISSUED
5434
5435                                ;CLEAR DEVICE MAP
5436  017752  005037  002342              CLR     DEVMAP
5437
5438  017756                        NEWST:          ;ENTER HERE BEFORE EACH TEST
5439
5440  017756  012737  177777  002322      MOV     #-1,LOGDEV      ;RESET LOGICAL DEVICE TO -1
5441  017764  005237  002340              INC     FRSPAS          ;INCREMENT NO. OF PASSES AFTER LOAD
5442  017770  012737  000001  002344      MOV     #BIT0,DEVPTR    ;INIT DEVICE MAP BIT POINTER
5443                                ; GET UNIBUS ADDRESS, VECTOR, PRIORITY LEVEL, SWITCH PACKS, TEST
5444                                ;   CONNECTOR INFORMATION FOR THIS LOGICAL DEVICE
5445  017776                        GETPRM:
5446  017776  005237  002322              INC     LOGDEV          ;INCREMENT LOGICAL DEVICE NUMBER
5447  020002                              GPHARD  LOGDEV,R1       ;GET P-TABLE POINTER INTO R1
 (3)  020002  013700  002322                                                    MOV     LOGDEV,R0
 (3)  020006  104442                                                            TRAP    C$GPHRD
 (3)  020010  010001                                                            MOV     R0,R1
5448  020012                              BCOMPLETE  10$          ;BR IF DEVICE AVAILABLE
 (2)  020012  103403                                                            BCS     10$
5449  020014  006337  002344              ASL     DEVPTR          ;IF UN-AVAILABLE, SHIFT DEVICE MAP BIT POINTER
5450  020020  000766                      BR      GETPRM          ;       AND SKIP THIS DEVICE
5451
5452  020022  053737  002344  002342  10$:  BIS     DEVPTR,DEVMAP   ;ELSE, SET BIT FOR THIS DEVICE IN DEVICE MAP
5453  020030  006337  002344              ASL     DEVPTR          ;SHIFT DEVICE MAP BIT POINTER
5454
5455                                ;  "R1" WAS RETURNED WITH A POINTER TO THE CURRENT "P-TABLE"
5456
5457  020034  012100                      MOV     (R1)+,R0        ;GET THE DEVICE CSR ADDRESS
5458  020036  012703  000020              MOV     #16.,R3         ;WE HAVE TO SETUP THIS MANY ADDRESS POINTERS
5459  020042  012702  002352              MOV     #MPCSR,R2       ;THIS IS THE ADDRESS OF THE FIRST POINTER
5460  020046  010022                12$:  MOV     R0,(R2)+        ;SETUP ONE CSR POINTER
5461  020050  005200                      INC     R0              ;POINT TO THE NEXT CSR ADDRESS
5462  020052  077303                      SOB     R3,12$          ;LOOP AS LONG AS THERE ARE MORE TABLE ENTRIES
5463                                                              ;ELSE,  FALL THROUGH TO CONTINUE GETTING MORE
5464                                                              ;       P-TABLE DATA
5465
5466  020054  012100                      MOV     (R1)+,R0        ;GET INTERRUPT VECTOR
5467  020056  010037  002412              MOV     R0,MPIVEC       ;SETUP "A" VECTOR POINTER
5468  020062  022020                      CMP     (R0)+,(R0)+     ;ADD 4 TO VECTOR TO GET ADDRESS OF "B" VECTOR
5469  020064  010037  002414              MOV     R0,MPOVEC       ;SETUP "B" VECTOR POINTER
5470
5471  020070  012100                      MOV     (R1)+,R0        ;GET DMV11 DEVICE PRIORITY
5472  020072  006200                      ASR     R0              ;       RE-POSITION IT
5473  020074  006200                      ASR     R0
5474  020076  006200                      ASR     R0
5475  020100  006200                      ASR     R0
5476  020102  010037  002416              MOV     R0,MPRIOR       ;SETUP OUR VARIABLE FOR INT. VECTOR INIT'S
5477
5478  020106                        CONTIN:         ;ENTER HERE WHEN A "CONTINUE" COMMAND IS ISSUED
5479
5480  020106                              SETVEC  @#MPIVEC,#MPIHAN,@#MPRIOR  ;SETUP "A" INT. VECTOR
 (7)  020106  013746  002416                                                    MOV     @#MPRIOR,-(SP)
 (6)  020112  012746  005164                                                    MOV     #MPIHAN,-(SP)
 (5)  020116  013746  002412                                                    MOV     @#MPIVEC,-(SP)
 (4)  020122  012746  000003                                                    MOV     #3,-(SP)
```

```
  (3)  020126  104437                                                    TRAP    C$SVEC
  (2)  020130  062706  000010                                            ADD     #10,SP
5481   020134  005037  005234          CLR     IHILNK          ;WE DON'T WANT THE HANDLER TO LINK ELSEWHERE
5482   020140                          SETVEC  @#MPOVEC,#MPOHAN,@#MPRIOR  ;SETUP "B" INT. VECTOR
  (7)  020140  013746  002416                                            MOV     @#MPRIOR,-(SP)
  (6)  020144  012746  005236                                            MOV     #MPOHAN,-(SP)
  (5)  020150  013746  002414                                            MOV     @#MPOVEC,-(SP)
  (4)  020154  012746  000003                                            MOV     #3,-(SP)
  (3)  020160  104437                                                    TRAP    C$SVEC
  (2)  020162  062706  000010                                            ADD     #10,SP
5483   020166  005037  005306          CLR     IHOLNK          ;WE DON'T WANT THE HANDLER TO LINK ELSEWHERE
5484   020172  005037  002330          CLR     INTWCH          ;RESET "INTERRUPT WATCH" FLAGS (BOTH "A" & "B")
5485
5486   020176  012737  000001  002336  MOV     #1,FRSTIM       ;MARK FLAG FOR NEXT TIME THROUGH
5487   020204                          ENDINIT         ;END OF "INIT" CODE
  (3)  020204                                                          L10017:
  (3)  020204  104411                                                    TRAP    C$INIT
5488
5489                                ; ***** SUBROUTINES USED BY "INIT" CODE *****
5490
5491                                ;       INTERRUPT HANDLER FOR CONSOLE TERMINAL PRESENCE TESTING
5492
5493   020206  012737  177777  002346  CONTST: MOV     #-1,CONSOL      ;INDICATE THAT NO CONSOLE TERMINAL EXISTS!
5494   020214  000002                  RTI                     ;RETURN
5495
```

```
                        .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.
                        ;
                        ;--******************************************************************************

020216                          BGNAUTO
020216                                                                  L$AUTO::
020216                          SETVEC  #4,#AD.HIT,#0   ;SETUP INVALID-ADDRESS TRAP VECTOR
 (7) 020216  012746  000000                                                     MOV     #0,-(SP)
 (6) 020222  012746  020334                                                     MOV     #AD.HIT,-(SP)
 (5) 020226  012746  000004                                                     MOV     #4,-(SP)
 (4) 020232  012746  000003                                                     MOV     #3,-(SP)
 (3) 020236  104437                                                             TRAP    C$SVEC
 (2) 020240  062706  000010                                                     ADD     #10,SP
020244  005037  002440                  CLR     TMP0            ;INITIALIZE TRAP FLAG REGISTER
020250  012702  000001                  MOV     #1,R2           ;FLAG BIT
020254  013703  002352                  MOV     BSEL0,R3        ;INIT ADDRESS POINTER

020260  105723          1$:             TSTB    (R3)+           ;ACCESS THE CSR'S BY BYTES.
020262  006302                          ASL     R2
020264  103375                          BCC     1$

020266  013703  002352                  MOV     BSEL0,R3        ;RE-INIT ADDRESS POINTER
020272  012702  000001                  MOV     #1,R2           ;RE-INIT FLAG BIT
020276  005723          2$:             TST     (R3)+           ;ACCESS THE CSR'S BY WORDS.
020300  006302                          ASL     R2
020302  006302                          ASL     R2
020304  103374                          BCC     2$

020306                          CLRVEC  #4                      ;RESTORE THE VECTOR TO DS
 (3) 020306  012700  000004                                                     MOV     #4,R0
 (3) 020312  104436                                                             TRAP    C$CVEC
020314  005737  002440                  TST     TMP0            ;DID WE GET HIT WITH AN INVALID ADDRESS TRAP?
020320  001403                          BEQ     AD.OK           ;NO,  EXIT TEST
020322                                  DODU    LOGDEV          ;YES, DROP THIS LOGICAL DEV.
 (3) 020322  013700  002322                                                     MOV     LOGDEV,R0
 (3) 020326  104451                                                             TRAP    C$DODU
020330  000240          AD.OK:          NOP                     ;(FOR PATCHING IN A HALT IF NECESSARY)
020332                                  ENDAUTO
 (3) 020332                                                                 L10020:
 (3) 020332  104461                                                             TRAP    C$AUTO
020334  050237  002440      AD.HIT:     BIS     R2,TMP0         ;FLAG THE HIT IF WE GET IT!
020340  000002                          RTI                     ;RETURN
```

```
                        .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
```

```
                        .SBTTL DROP UNIT SECTION

                        ;//////////////////////////////////////////////////////////////////////////////
                        ;/ THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                        ;/ TO NO LONGER BE TESTED.
                        ;//////////////////////////////////////////////////////////////////////////////

020360                          BGNDU
(3) 020360                                                              L$DU::
                        ;ISSUE UNIBUS RESET TO CLEAN UP
020360                          BRESET
(3) 020360  104433                                                              TRAP    C$RESET
020362                          ENDDU
(3) 020362                                                              L10022:
(3) 020362  104453                                                              TRAP    C$DU
```

```
                        .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.
                        ;////////////////////////////////////////////////////////////////////////

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

```
 5590                                   .SBTTL TEST 1 -- DMV-11 AVAILABILITY
  (2)
  (2)                                   ;**********************************************************************************
  (2)                                   ;*
  (2)                                   ;*      TEST 1 -- DMV-11 AVAILABILITY
  (2)                                   ;*
  (3)                                   ;* EACH NORMALLY USED CSR IS ACCESSED WITH A "TST" OR "TSTB" INSTRUCTION AND IF
  (3)                                   ;* A BUS TIMEOUT OCCURS (INTERRUPT @ VECTOR ADDR 4) A FLAG WILL BE SET SHOWING
  (3)                                   ;* WHICH CSR ADDR AND INSTRUCTION FAILED. "T1.HSW" REFLECTS "TST" INSTRUCTIONS
  (3)                                   ;* AND "T1.HSB" REFLECTS "TSTB" INSTRUCTIONS.
  (3)                                   ;*
  (3)                                   ;*      EXAMPLES:
  (3)                                   ;*
  (3)                                   ;*      IF "TSTB  @BSEL1"  FAILS,  BIT # 1 OF "T1.HSB" WILL BE SET.
  (3)                                   ;*      IF "TST  @SEL4" FAILS, BIT # 4 OF "T1.HSW" WILL BE SET
  (3)                                   ;*      (NOTE: ONLY EVEN BITS IN "T1.HSW" CAN BE SET).
  (3)                                   ;*
  (3)                                   ;*  THE FLAG WORDS ARE OUTPUT IN BINARY AS "EXTENDED ERROR INFORMATION".
  (2)                                   ;*
  (2)                                   ;**********************************************************************************
  (2)                                   ;
  (2)                                   ;       BGNTST
  (5)  020366                                                                   T1::
 5591  020366  005037  020532                       CLR     T1.HSW          ;INITIALIZE TRAP FLAG REGISTER
 5592  020372  012702  000001                       MOV     #1,R2           ;FLAG BIT FOR BYTE ACCESSED CSR 0.
 5593  020376  013703  002352                       MOV     BSEL0,R3        ;INIT ADDRESS POINTER
 5594  020402                                       SETVEC  #4,#T1.HIT,#0   ;SETUP INVALID-ADDRESS TRAP VECTOR
  (7)  020402  012746  000000                                                           MOV     #0,-(SP)
  (6)  020406  012746  020524                                                           MOV     #T1.HIT,-(SP)
  (5)  020412  012746  000004                                                           MOV     #4,-(SP)
  (4)  020416  012746  000003                                                           MOV     #3,-(SP)
  (3)  020422  104437                                                                   TRAP    C$SVEC
  (2)  020424  062706  000010                                                           ADD     #10,SP
 5595
 5596  020430  105723                  1$:     TSTB    (R3)+           ;ACCESS THE CSR'S BY BYTES.
 5597  020432  006302                          ASL     R2
 5598  020434  103375                          BCC     1$
 5599
 5600  020436  013737  020532  020534          MOV     T1.HSW,T1.HSB   ;MOVE BYTE INTERRUPT FLAG TO PROPER LOCATION.
 5601  020444  005037  020532                  CLR     T1.HSW          ;INITIALIZE TRAP FLAG REGISTER
 5602  020450  012702  000001                  MOV     #1,R2           ;FLAG BIT FOR WORD ACCESSED CSR 0.
 5603  020454  013703  002352                  MOV     BSEL0,R3        ;RE-INIT ADDRESS POINTER
 5604
 5605  020460  005723                  2$:     TST     (R3)+           ;ACCESS THE CSR'S BY WORDS.
 5606  020462  006302                          ASL     R2
 5607  020464  006302                          ASL     R2
 5608  020466  103374                          BCC     2$
 5609
 5610  020470                                  CLRVEC  #4              ;RESTORE THE VECTOR TO DS
  (3)  020470  012700  000004                                                           MOV     #4,R0
  (3)  020474  104436                                                                   TRAP    C$CVEC
 5611  020476  005737  020532                  TST     T1.HSW          ;DID WE GET AN INVALID ADDRESS TRAP?
 5612  020502  001003                          BNE     3$              ;YES, REPORT FAILURE
 5613  020504  005737  020534                  TST     T1.HSB
 5614  020510  001404                          BEQ     T1.OK
 5615  020512                          3$:     GEDF    T1.EMD,T1.EM1   ;YES, REPORT THE ERROR
```

```
  (2)                                                   ;       "DEVICE FATAL" ERROR # 9
  (6)  020512  104455                                                           TRAP    C$ERDF
  (7)  020514  000011                                                           .WORD   9
  (7)  020516  020654                                                           .WORD   T1.EMD
  (7)  020520  020536                                                           .WORD   T1.EM1
5616   020522                       T1.OK:  ENDTST
  (3)  020522                                                                 L10024:
  (3)  020522  104401                                                           TRAP    C$ETST
5617
5618   020524  050237  020532       T1.HIT: BIS     R2,T1.HSW       ;FLAG THE HIT IF WE GET IT!
5619   020530  000002                       RTI                     ;RETURN
5620
5621   020532  000000               T1.HSW: .WORD   0               ;INVALID ADDRESS TRAP FLAG WORD:
5622                                                                ;BITS SET INDICATE TRAPS ON WORD ACCESSES
5623                                                                ;(BIT # SET = CSR # THAT FAILED)
5624   020534  000000               T1.HSB: .WORD   0               ;INVALID ADDRESS TRAP FLAG WORD:
5625                                                                ;BITS SET INDICATE TRAPS ON BYTE ACCESSES
5626                                                                ;(BIT # SET = CSR # THAT FAILED)
5627   020536                               BGNMSG  T1.EM1
  (3)  020536                                                                 T1.EM1::
5628   020536                               PRINTB  #T1.1,MPCSR     ;IDENTIFY ERROR AND ON WHAT DEVICE
  (8)  020536  013746  002352                                                   MOV     MPCSR,-(SP)
  (7)  020542  012746  020703                                                   MOV     #T1.1,-(SP)
  (6)  020546  012746  000002                                                   MOV     #2,-(SP)
  (3)  020552  010600                                                           MOV     SP,R0
  (4)  020554  104414                                                           TRAP    C$PNTB
  (4)  020556  062706  000006                                                   ADD     #6,SP
5629   020562                               PRINTX  #T1.2           ;IF REQUESTED, ALSO INDICATE MISSES (TRAPS)
  (7)  020562  012746  020765                                                   MOV     #T1.2,-(SP)
  (6)  020566  012746  000001                                                   MOV     #1,-(SP)
  (3)  020572  010600                                                           MOV     SP,R0
  (4)  020574  104415                                                           TRAP    C$PNTX
  (4)  020576  062706  000004                                                   ADD     #4,SP
5630   020602                               PRINTX  #T1.3
  (7)  020602  012746  021020                                                   MOV     #T1.3,-(SP)
  (6)  020606  012746  000001                                                   MOV     #1,-(SP)
  (3)  020612  010600                                                           MOV     SP,R0
  (4)  020614  104415                                                           TRAP    C$PNTX
  (4)  020616  062706  000004                                                   ADD     #4,SP
5631   020622                               PRINTX  #T1.4,T1.HSW,T1.HSB
  (9)  020622  013746  020534                                                   MOV     T1.HSB,-(SP)
  (8)  020626  013746  020532                                                   MOV     T1.HSW,-(SP)
  (7)  020632  012746  021072                                                   MOV     #T1.4,-(SP)
  (6)  020636  012746  000003                                                   MOV     #3,-(SP)
  (3)  020642  010600                                                           MOV     SP,R0
  (4)  020644  104415                                                           TRAP    C$PNTX
  (4)  020646  062706  000010                                                   ADD     #10,SP
5632   020652                               ENDMSG
  (3)  020652                                                                 L10025:
  (3)  020652  104423                                                           TRAP    C$MSG
5633
5634                                .NLIST  BEX
```

```
 5635  020654  053101  044501  040514  T1.EMD: .ASCIZ  'AVAILABILITY TEST (#1)'
 5636  020703     045  022516  042101  T1.1:   .ASCIZ  '#N#ADMV-11 # #O#A NOT RESPONDING TO CSR ACCESSING'
 5637  020765     045  031116  051445  T1.2:   .ASCIZ  '#N2#S21#ASEL #S11#ABSEL #'
 5638  021020  047045  051445  032461  T1.3:   .ASCIZ  '#N#S15#AE C A 8 6 4 2 0  FEDCBA9876543210'
 5639  021072  047045  022462  020101  T1.4:   .ASCIZ  '#N2#A   TRAP FLAGS:#B16#S2#B16'
 5640                                  .LIST   BEX
 5641          021132                  .EVEN
```

```
                        .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
(5)  021132                                                             T2::
                        ; ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY CALLING
                        ; SUBROUTINE MASCLR.
                        ;
021132  004737  003614          JSR     PC,MASCLR       ; -ATTEMPT- TO RUN THE MICRO-DIAGNOSTIC
021136  103002                  BCC     8$              ;IF NO ERROR, PROCEED
021140                          ERROR                   ;ELSE, REPORT IT AND
(3)  021140  104460                                                     TRAP    C$ERROR
021142  000436                  BR      24$             ;       EXIT THIS TEST
                        ;
                        ; FIRST, INITIALIZE INDEX REGISTERS
021144  005001          8$:     CLR     R1              ;R1 IS THE INDEX OF THE BYTE SELECT TABLE
021146  005002                  CLR     R2              ;R2 IS THE INDEX OF THE RESULTS TABLE
021150  016203  003040          MOV     RESFMC(R2),R3   ;GET THE NUMBER OF PATTERNS IN RESULTS TABLE
021154  062702  000002          ADD     #2,R2           ;MOVE POINTER TO NEXT BYTE
021160  126271  003040  002352  2$:     CMPB    RESFMC(R2),@BSEL(R1) ;COMPARE EXPECTED RESULTS WITH CSR'S.
021166  001005                  BNE     1$              ;A MISMATCH IS A DEVICE FATAL ERROR
021170  005202                  INC     R2              ;INCREMENT TABLE POINTER
021172  005201                  INC     R1              ;INCREMENT POINTER
021174  005201                  INC     R1              ;  BY 2  (WORD INCREMENT)
                        ;
021176  077310                  SOB     R3,2$           ;CONTINUE TO LOOP THROUGH TABLE
                        ;
021200  000417                  BR      24$             ;TEST COMPLETE WITH NO ERRORS, GO END TEST.
                        ;
```

```
 5682  021202  117137  002352  002312  1$:     MOVB    @BSEL(R1),BDATA ;# GET DATA BYTE THAT FAILED
 5683  021210  004737  004446                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 5684  021214  116237  003040  002310          MOVB    RESFMC(R2),GDATA ;# GET EXPECTED RESULT FROM TABLE
 5685  021222  006201                          ASR     R1              ;CONVERT WORD OFFSET TO BYTE CSR #
 5686  021224  010137  002334                  MOV     R1,REGNUM
 5687  021230                                  GEDF    EM14,ERR2       ;DEVICE FATAL ERROR, REPORT IT AND END TEST
  (2)                                                                    ;       "DEVICE FATAL" ERROR # 10
  (6)  021230  104455                                                                    TRAP    C$ERDF
  (7)  021232  000012                                                                    .WORD   10
  (7)  021234  014701                                                                    .WORD   EM14
  (7)  021236  005316                                                                    .WORD   ERR2
 5688  021240                          24$:    ENDTST
  (3)  021240                                                                L10026:
  (3)  021240  104401                                                                    TRAP    C$ETST
```

```
                        .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
(5)  021242                                                             T3::
                        ;-------------------------------------------------------------------
                        ;       ******** DETAILED TEST DESCRIPTION ********
                        ; THIS TEST PROCEEDS AS FOLLOWS:
                        ;
                        ; (1) CLEAR ALL CSRS AND VERIFY SAME (CLEARING BSEL01 HALTS 6502)
                        ; (2) WRITE 01 INTO BSEL0; VERIFY BSEL0=01,ALL OTHERS=0
                        ; (3) WRITE 02 INTO BSEL1; VERIFY BSEL0=01,BSEL1=02,ALL OTHERS=0.
                        ; (4) WRITE 04 INTO BSEL2; VERIFY BSEL0=01,BSEL1=02,BSEL2=04,ALL OTHERS=0
                        ;
                        ; (5) => (17) CONTINUE TO INCREMENTALLY WRITE DATA-PATTERN-A INTO THE BSR'S,
                        ;               CHECKING ALL BSR'S AFTER EACH WRITE, UNTIL BSR'S COMPLETELY
                        ;               FILLED WITH DATA-PATTERN-A.
                        ; NOTE: IF AN ERROR OCCURS, THE FIRST BAD BSR NUMBER AND GOOD/BAD VALUES ARE
                        ;       GIVEN, FOLLOWED BY A COMPLETE BSR DUMP.
                        ;-------------------------------------------------------------------

                        ; CLEAR DMV CSRS AND RESULTS TABLE

021242  012703  000010          MOV     #10,R3          ;GET # OF CSRS
021246  013701  002352          MOV     @#BSEL,R1       ;GET 1ST CSR ADDRESS
021252  012702  003062          MOV     #RESFT3,R2      ;GET 1ST RESULTS TABLE ADDRESS
021256  005021          1$:     CLR     (R1)+           ;CLEAR CSR, BUMP POINTER
021260  005022                  CLR     (R2)+           ;CLEAR RESULTS TABLE LOC., BUMP POINTER
021262  005022                  CLR     (R2)+           ; AND DO AGAIN
021264  077304                  SOB     R3,1$           ;LOOP UNTIL ALL DONE

                        ; NOW VERIFY CSRS ARE ALL ZEROED

021266  005002                  CLR     R2              ;CLEAR BSR ADDRESS INDEX
021270  012703  000020          MOV     #CSREGS,R3      ;GET # OF CSRS
021274  105772  002352  2$:     TSTB    @#BSEL(R2)      ;IS THIS CSR=0 ?
021300  001035                  BNE     5$              ;IF NO: GO REPORT ERROR
021302  005722                  TST     (R2)+           ;  YES: BUMP INDEX
021304  077305                  SOB     R3,2$           ;DO UNTIL ALL BSRS CHECKED

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

                        ; INITIALIZE INDEX REGISTERS
021306  005001                  CLR     R1              ;INITIALIZE PATTERN INDEX REGISTER
```

```
 5740  021310  012703  000020                    MOV     #CSREGS,R3      ;GET NUMBER OF CSR'S
 5741
 5742                                            ; THE FIRST WORD OF THE DATA TABLE CONTAINS THE NUMBER OF PATTERNS IN
 5743                                            ; THE TABLE:
 5744  021314  016104  002504                    MOV     PATA(R1),R4     ;INITIALIZE NUMBER OF PATTERNS COUNT
 5745  021320  005721                            TST     (R1)+           ;MOVE TABLE POINTER
 5746
 5747                                    ; PUT NEXT PATTERN OF DATA INTO NEXT REGISTER AND TEST AREA:
 5748                                    ;
 5749                                    ;  CALCULATE INDEX INTO DATA AREA AND TO REGISTER
 5750
 5751  021322  010102                    3$:     MOV     R1,R2           ;GET INDEX INTO TEST DATA AREA
 5752  021324  105742                            TSTB    -(R2)           ;IT'S ONE WORD TOO LARGE
 5753  021326  006302                            ASL     R2              ;CONVERT FROM BYTE TO WORD INDEX
 5754
 5755                                    ;  NOW, SETUP THE EXPECTED RESULTS AREA AND LOAD THE SELECT REGISTER
 5756
 5757  021330  116162  002504  003062            MOVB    PATA(R1),RESFT3(R2) ;UPDATE THE EXPECTED RESULTS TABLE
 5758  021336  116172  002504  002352            MOVB    PATA(R1),@BSEL(R2) ;PUT PATTERN INTO THE CSR
 5759
 5760  021344  005201                            INC     R1              ;BUMP DATA POINTER FOR NEXT TIME AROUND
 5761  021346  005002                            CLR     R2              ;INITIALIZE TABLE INDEX
 5762  021350  012703  000020                    MOV     #CSREGS,R3      ;INITIALIZE NUMBER OF REGISTERS
 5763
 5764  021354  126272  003062  002352  4$:     CMPB    RESFT3(R2),@BSEL(R2) ;COMPARE CSR WITH RESULTS TABLE
 5765  021362  001004                            BNE     5$              ;A MISMATCH IS A DEVICE FATAL ERROR
 5766  021364  005722                            TST     (R2)+           ;BUMP TABLE POINTER BY 2  (WORD INCREMENT)
 5767  021366  077306                            SOB     R3,4$           ;CONTINUE TO READ & MATCH ALL REGISTERS BEFORE
 5768                                                                    ;LOADING THE NEXT PATTERN INTO NEXT REGISTER
 5769
 5770  021370  077424                            SOB     R4,3$           ;LOOP UNTIL ALL PATTERNS ARE TESTED
 5771  021372  000417                            BR      24$             ;TEST COMPLETE ****< NO ERRORS >>**
 5772
 5773                                            ;--PREPARE THE FAILURE MESSAGE --
 5774
 5775  021374  116237  003062  002310  5$:     MOVB    RESFT3(R2),GDATA ;@ GET THE EXPECTED RESULT FROM TABLE
 5776  021402  117237  002352  002312            MOVB    @BSEL(R2),BDATA ;@ GET THE FAILED BYTE
 5777  021410  004737  004446                    JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 5778  021414  006202                            ASR     R2              ;CONVERT WORD OFFSET TO BYTE CSR ADDRESS
 5779  021416  010237  002334                    MOV     R2,REGNUM       ;GET THE REGISTER THAT FAILED
 5780  021422                                    GEDF    EM6,ERR2        ;ERROR **** DEVICE FATAL ****
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 11
  (6)  021422  104455                                                                   TRAP    C$ERDF
  (7)  021424  000013                                                                   .WORD   11
  (7)  021426  014552                                                                   .WORD   EM6
  (7)  021430  005316                                                                   .WORD   ERR2
 5781  021432                            24$:     ENDTST
  (3)  021432                                                                   L10027:
  (3)  021432  104401                                                                   TRAP    C$ETST
```

```
 5795                                   .SBTTL TEST 4 -- CSR REGISTERS DATA READ/WRITE
  (2)
  (2)                                   ;+**********************************************************************************
  (2)                                   ;*
  (2)                                   ;*      TEST 4 -- CSR REGISTERS DATA READ/WRITE
  (2)                                   ;*
  (3)                                   ;* WRITE,  READ,  AND  COMPARE  EACH BYTE OF DATA PATTERN B INTO REGISTER BSELO.
  (3)                                   ;* THEN, REPEAT THIS USING EACH OF THE REMAINING CSR'S, BSEL1-BSEL17.  WHEN BSEL1
  (3)                                   ;* IS  BEING  TESTED,  THE PROGRAM ALWAYS SETS BIT 7 IN THE DATA PATTERN SO THAT
  (3)                                   ;* RUN  WILL  NOT BE CLEARED, AND IT ALWAYS CLEARS BIT6 SO THAT MCLR WILL NOT BE
  (3)                                   ;* SET.
  (3)                                   ;*
  (3)                                   ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
  (3)                                   ;*                   200, 376, 375, 373, 367, 357, 337, 277, 177, 000
  (2)                                   ;*
  (2)                                   ;--**********************************************************************************
  (2)                                   ;
  (2)                                   ;       BGNTST
  (5)  021434                                                                    T4::
 5796  021434  004737  003774                   JSR     PC,MSTCLR       ;CALL MAINTENANCE READY INITIALIZATION. IF
 5797                                                                   ;MSTCLR SHOULD FAIL BECAUSE THE MRDY FLAG DOES
 5798                                                                   ;NOT BECOME SET, A DEVICE FATAL ERROR WILL BE
 5799                                                                   ;REPORTED, AND MSTCLR WILL SET THE "C" BIT
 5800  021440  103002                         BCC     8$              ;IF NO ERROR, PROCEED
 5801  021442                                 ERROR                   ;ELSE, REPORT IT AND
  (3)  021442  104460                                                                    TRAP    C$ERROR
 5802  021444  000453                         BR      24$             ;       EXIT THIS TEST
 5803                                   ;
 5804                                   ;  NOTE - THE FIRST BYTE LOCATION OF THE PATTERN B TABLE, USED IN THIS TEST,
 5805                                   ;           CONTAINS THE NUMBER OF TEST PATTERNS OF PATTERN B TABLE, NOT A
 5806                                   ;           TEST PATTERN.
 5807                                   ;
 5808                                   ; FIRST, INITIALIZE INDEX AND COUNT REGISTERS
 5809
 5810  021446  005001                   8$:     CLR     R1              ;R1 IS THE 'PATB' INDEX REGISTER
 5811  021450  005002                           CLR     R2              ;R2 IS THE CSR INDEX REGISTER
 5812  021452  016103  002526                   MOV     PATB(R1),R3     ;R3 CONTAINS THE NUMBER OF BYTES IN PATB
 5813  021456  062702  000002                   ADD     #2,R2           ;MOVE POINTER TO FIRST BYTE OF DATA
 5814
 5815  021462  113777  000101  160664           MOVB    101,@BSEL1      ;STOP THE MICRO-PROCESSOR!!!
 5816
 5817  021470  116137  002526  002310   1$:     MOVB    PATB(R1),GDATA  ;GET THE PATB DATA BYTE, WE ARE TO USE
 5818
 5819                                   ; DON'T GET CAUGHT BY THE NEXT INSTRUCTION!  "R2" IS AN OFFSET INTO A
 5820                                   ; WORD TABLE WHICH CONTAINS THE ADDRESSES OF THE CSR'S.  THEREFORE, WHEN
 5821                                   ; R2 = 0 -- IT POINTS TO BSELO'S ADDRESS, AND WHEN R2 = 2 -- IT POINTS TO
 5822                                   ; BSEL1'S ADDRESS.
 5823
 5824  021476  022702  000002                   CMP     #2,R2           ;IS "BSEL1" BEING TESTED?
 5825  021502  001003                           BNE     2$              ;IF YES, ALTER PATB DATA SO THAT BIT 7 IS
 5826                                                                   ;ALWAYS SET, AND BIT6 IS ALWAYS RESET.
 5827                                                                   ;ELSE, USE PATB DATA AS IS.
 5828
 5829  021504  142737  000300  002310           BICB    #RUN!MCLR,GDATA ;FORCE PATTERN TO RESET BITS 7 & 6
 5830
 5831  021512  113772  002310  002352   2$:     MOVB    GDATA,@BSELO(R2)  ;PUT PATB DATA INTO REGISTER BEING TESTED
```

```
 5832  021520  123772  002310  002352          CMPB    GDATA,@BSELO(R2)  ; COMPARE PATTERN JUST WRITTEN
 5833  021526  001414                          BEQ     5$                ;TEST PASSES IF A MATCH. ELSE, DEVICE FATAL ERROR
 5834
 5835                                          ;--PREPARE FOR THE FAILURE PRINTOUT--
 5836
 5837  021530  010237  002334                  MOV     R2,REGNUM         ;GET THE REGISTER THAT FAILED
 5838  021534  117237  002352  002312          MOVB    @BSELO(R2),BDATA  ;SCORE THE BAD DATA
 5839  021542  004737  004446                  JSR     PC,GETBSR         ;GET THE BSEL REGISTERS FOR DUMPING
 5840  021546                                  GEDF    EM7,ERR2          ;REPORT ERROR AND EXIT THE TEST
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 12
  (6)  021546  104455                                                           TRAP    C$ERDF
  (7)  021550  000014                                                           .WORD   12
  (7)  021552  014576                                                           .WORD   EM7
  (7)  021554  005316                                                           .WORD   ERR2
 5841  021556  000406                          BR      24$
 5842
 5843  021560  005201                  5$:     INC     R1                ;MOVE TABLE POINTER
 5844  021562  077336                          SOB     R3,1$             ;DECREMENT NUMBER OF PATTERNS LEFT. IF ZERO,EXIT.
 5845                                                                    ;ELSE, CONTINUE TO PATTERN TEST REGISTER
 5846  021564  005722                          TST     (R2)+             ;INCREMENT THE REGISTER INDEX BY 2
 5847  021566  020227  000040                  CMP     R2,#<CSREGS+2>    ;COMPARE REGISTER INDEX TO NUMBER OF CSR'S
 5848  021572  101336                          BHI     1$                ;IF R2 > 17, END THE TEST
 5849
 5850  021574                          24$:
 5851  021574                                  ENDTST
  (3)  021574                                                                   L10030:
  (3)  021574  104401                                                           TRAP    C$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
021576                                                                  T5::
                        ; ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY CALLING
                        ; SUBROUTINE MASCLR.

021576  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
021602  103002                  BCC     8$              ;IF NO ERROR, PROCEED
021604                          ERROR                   ;ELSE, REPORT IT AND
 (3)    021604  104460                                                  TRAP    C$ERROR
021606  000441                  BR      24$             ;       EXIT THIS TEST

021610  112777  000356  160534  8$:     MOVB    #356,@BSELO     ;# SET BSEL TO ALMOST ALL ONES
021616  122777  000356  160526          CMPB    #356,@BSELO     ;# COMPARE
021624  001011                  BNE     2$              ;A MISMATCH INDICATES A DEVICE FATAL ERROR


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

021626  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
021632  103002                  BCC     9$              ;IF NO ERROR, PROCEED
021634                          ERROR                   ;ELSE, REPORT IT AND
 (3)    021634  104460                                                  TRAP    C$ERROR
021636  000425                  BR      24$             ;       EXIT THIS TEST

021640  122777  000000  160504  9$:     CMPB    #000,@BSELO     ; THIS REGISTER SHOULD BE ZEROED DURING
                                                        ;INITIALIZATION
021646  001421                  BEQ     24$             ;IF ZERO, *** TEST PASSES ***, ELSE REPORT ERROR
                        ;--PREPARE FOR THE FAILURE PRINTOUT--
021650  112737  000356  002310  2$:     MOVB    #356,GDATA      ;# ALMOST ALL ONES IS EXPECTED DATA
021656  117737  160470  002312          MOVB    @BSELO,BDATA    ;SOMETHING OTHER THAN ALL ONES WAS FOUND. SCORE IT.
021664  004737  004446                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
021670  105077  160456                  CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
021674  012737  000000  002334          MOV     #0,REGNUM       ;GET THE REGISTER THAT FAILED
```

```
 5894  021702                                GEDF    EM5,ERR2        ;REPORT DEVICE FATAL ERROR
  (2)                                                                ;       "DEVICE FATAL" ERROR # 13
  (6)  021702  104455                                                        TRAP    C$ERDF
  (7)  021704  000015                                                        .WORD   13
  (7)  021706  014527                                                        .WORD   EM5
  (7)  021710  005316                                                        .WORD   ERR2
 5895  021712  105077  160434          24$:    CLRB    @#BSEL0         ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
 5896  021716                                ENDTST
  (3)  021716                                                                L10031:
  (3)  021716  104401                                                        TRAP    C$ETST
```

```
                        .SBTTL TEST 6 -- BUS RESET

                        ;++*************************************************************************
                        ;*
                        ;*      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.
                        ;*
                        ;--*************************************************************************
                        ;
                        ;       BGNTST
(5)  021720                                                                     T6::
5906 021720  032737  000001  002350        BIT     @#BIT0,PFLAG    ;IF BUS RESETS ARE NOT ALLOWED,
5907 021726  001075                        BNE     24$             ;  BYPASS THIS TEST
5908
5909                    ; ELSE, ISSUE A MASTER CLEAR, AND DELAY FOR MICRO-DIAGNOSTICS TO COMPLETE BY
5910                    ; CALLING SUBROUTINE MASCLR.
5911
5912 021730  004737  003614                JSR     PC,MASCLR       ; -ATTEMPT- TO RUN THE MICRO-DIAGNOSTIC
5913                                                                ;FAILURES WILL BE REPORTED BY THE SUBROUTINE
5914                                                                ;AS DEVICE FATAL AND THE "C" BIT WILL BE SET
5915 021734  103002                        BCC     8$              ;IF NO ERROR, PROCEED
5916 021736                                ERROR                   ;ELSE, REPORT IT AND
(3)  021736  104460                                                             TRAP    C$ERROR
5917 021740  000470                        BR      24$             ;       EXIT THIS TEST
5918
5919 021742  112777  000377  160402  8$:   MOVB    #377,@#BSEL0    ;SET ALL BITS IN BSEL0
5920 021750  122777  000377  160374        CMPB    #377,@#BSEL0    ;COMPARE TO ALL BITS SET
5921 021756  001040                        BNE     1$              ;A MISMATCH IS A DEVICE FATAL ERROR
5922
5923 021760                                BRESET                  ;FORCE AN EXTERNAL BUS RESET.  THIS SHOULD
(3)  021760  104433                                                             TRAP    C$RESET
5924                                                                ;CAUSE BSEL0=0 IN ABOUT 100 MICROSECONDS
5925
5926                    ; DELAY ABOUT 500 MILLISECONDS FOR THE MICRODIAGNOSTIC TO COMPLETE
5927
5928                            ;       MOV     DELAY1,R1       ;INITIALIZE COUNTER
5929                            ;2$:    TSTB    DELAY1+1        ;THIS IS A DUMMY INSTRUCTION TO LENGTHEN THE DELAY
5930                            ;       DEC     R1              ;TIME TO GET OUT OF THE DELAY?
5931                            ;       BNE     2$              ;NO,
5932
5933 021762  010246                        MOV     R2,-(SP)        ; SAVE REGISTER 2
5934 021764  012702  000010                MOV     #10,R2
5935 021770  013701  002316        2$:     MOV     DELAY1,R1       ;INITIALIZE THE LOOP COUNTER FOR DELAY LOOP
5936 021774  005301                10$:    DEC     R1              ;  ELSE, DECREMENT THE LOOP COUNTER AND
5937 021776  001376                        BNE     10$             ;  CONTINUE TO LOOP.
5938 022000  005302                        DEC     R2
5939 022002  001372                        BNE     2$
5940
5941 022004  122777  000000  160340        CMPB    #000,@#BSEL0    ;YES, CHECK FOR REGISTER TO BE ZERO
5942 022012  001443                        BEQ     24$             ;A MISMATCH IS A DEVICE FATAL ERROR
5943                                                                ;ELSE, END TEST.
5944
5945                    ;--PREPARE FOR THE FAILURE PRINTOUT--
```

```
 5946
 5947  022014  117737  160332  002312          MOVB    @BSELO,BDATA    ;GET THE ACTUAL DATA
 5948  022022  004737  004446                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 5949  022026  105077  160320                  CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
 5950  022032  012737  000000  002310          MOV     #000,GDATA      ;GET THE EXPECTED DATA
 5951  022040  012737  000000  002334          MOV     #0,REGNUM       ;GET THE REGISTER THAT FAILED
 5952  022046                                  GEDF    EM9,ERR2        ;EXTERNAL BUS RESET FAILURE
  (2)                                                                    ;       "DEVICE FATAL" ERROR # 14
  (6)  022046  104455                                                                    TRAP    C$ERDF
  (7)  022050  000016                                                                    .WORD   14
  (7)  022052  014646                                                                    .WORD   EM9
  (7)  022054  005316                                                                    .WORD   ERR2
 5953  022056  000421                          BR      24$
 5954
 5955  022060  117737  160266  002312  1$:     MOVB    @BSELO,BDATA    ;GET THE ACTUAL DATA
 5956  022066  004737  004446                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 5957  022072  105077  160254                  CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
 5958  022076  112737  000377  002310          MOVB    #377,GDATA      ;ALL ONES WAS EXPECTED DATA
 5959  022104  012737  000000  002334          MOV     #0,REGNUM       ;GET THE REGISTER THAT FAILED
 5960  022112                                  GEDF    EM8,ERR2        ;BSELO COULD NOT BE SET TO ALL ONES
  (2)                                                                    ;       "DEVICE FATAL" ERROR # 15
  (6)  022112  104455                                                                    TRAP    C$ERDF
  (7)  022114  000017                                                                    .WORD   15
  (7)  022116  014623                                                                    .WORD   EM8
  (7)  022120  005316                                                                    .WORD   ERR2
 5961  022122  105077  160224          24$:    CLRB    @BSELO          ;DISABLE INTERRUPTS AS A PRECAUTIONARY MEASURE
 5962  022126  012602                          MOV     (SP)+,R2
 5963  022130                                  ENDTST
  (3)  022130                                                                                    L10032:
  (3)  022130  104401                                                                    TRAP    C$ETST
```

```
                        .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
 022132                                                                 T7::
                        BGNSUB
 022132                                                                 T7.1:
 022132  104402                                                                 TRAP    C$BSUB
 022134  004737  003774                JSR     PC,MSTCLR       ;PUT THE MICROPROCESSOR IN THE MAINTENANCE LOOP
 022140  103003                      BCC     10$             ;IF NO ERROR, PROCEED
 022142                              ERROR                   ;ELSE, REPORT IT AND
 022142  104460                                                                 TRAP    C$ERROR
 022144  000137  022636              JMP     ENDT7           ;       EXIT THIS TEST
                        
 022150  012777  000020  160204  10$:  MOV     #SLT0,@SEL4     ;PUT ADDRESS OF SELECT REGISTER 0 IN 'ADDRESS' REG
 022156  012777  000125  160202        MOV     #125,@SEL6      ;PUT THE DATA TO BE WRITTEN IN 'DATA' REGISTER
                        
 022164  027727  160162  000400        CMP     @SEL0,#400      ;ONLY "MREQ" SHOULD BE SET
 022172  001411                      BEQ     1$              ;IF IT IS, PROCEED WITH TESTING
                                                              ;ELSE, SETUP FOR (& REPORT) THE ERROR
 022174  017737  160152  002312        MOV     @SEL0,BDATA     ;  BAD DATA
 022202  012737  000400  002310        MOV     #400,GDATA      ;  GOOD DATA
 022210  005037  002334              CLR     REGNUM          ;  REG. NUMBER
 022214  000451                      BR      4$
                        
 022216  027727  160134  000200  1$:   CMP     @SEL2,#200      ;"MRDY" SET? (ALSO CHECKED BY "MSTCLR")
 022224  001412                      BEQ     2$              ;YES, PROCEED WITH TESTING
 022226  017737  160124  002312        MOV     @SEL2,BDATA     ;  BAD DATA
 022234  012737  000200  002310        MOV     #200,GDATA      ;  GOOD DATA
 022242  012737  000002  002334        MOV     #2,REGNUM       ;  THE REG. THAT FAILED
 022250  000433                      BR      4$              ;EXIT TEST
                        
 022252  027727  160104  000020  2$:   CMP     @SEL4,#SLT0     ;COMPARE SELECT REGISTER 4 WITH THE ADDRESS SENT
 022260  001412                      BEQ     3$              ;A MISMATCH IS A DEVICE FATAL ERROR
```

```
      022262 017737 160074 002312          MOV     @SEL4,BDATA      ;GET THE BAD DATA
      022270 012737 000020 002310          MOV     #SLTO,GDATA      ;GET THE GOOD DATA
      022276 012737 000004 002334          MOV     #4,REGNUM        ;GET THE REGISTER NUMBER WHICH FAILED
      022304 000415                        BR      4$

      022306 027727 160054 000125  3$:     CMP     @SEL6,#000125    ;COMPARE SELECT REGISTER 6 WITH THE DATA SENT
      022314 001415                        BEQ     60$              ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
      022316 017737 160044 002312          MOV     @SEL6,BDATA      ;GET THE BAD DATA
      022324 012737 000125 002310          MOV     #000125,GDATA    ;GET THE GOOD DATA
      022332 012737 000006 002334          MOV     #6,REGNUM        ;GET THE REGISTER NUMBER


                                           ;--PREPARE FOR THE FAILURE PRINTOUT--

      022340                       4$:     GEDF    EM7,ERR5         ;ELSE, AN ERROR HAS BEEN FOUND
 (2)                                                                ;        "DEVICE FATAL" ERROR # 16
 (6)  022340 104455                                                              TRAP    C$ERDF
 (7)  022342 000020                                                              .WORD   16
 (7)  022344 014576                                                              .WORD   EM7
 (7)  022346 005564                                                              .WORD   ERR5
      022350                       60$:    ENDSUB
 (3)  022350                                                            L10034:
 (3)  022350 104403                                                              TRAP    C$ESUB
                                   ;#################### > P A R T  2 < ##################################
      022352                               BGNSUB
 (3)  022352                                                            T7.2:
 (3)  022352 104402                                                              TRAP    C$BSUB

      022354 112777 000002 157774          MOVB    #WRILOC,@BSEL2   ;SEND THE WRITE LOCATION COMMAND

      022362 032777 000200 157766          BIT     #200,@BSEL2      ;WE SHOULD HAVE IMEDIATLY LOST "MRDY".
      022370 001421                        BEQ     5$               ;GOT WHAT WE EXPECTED,  WAIT FOR READY AGAIN
      022372 017737 157760 002312          MOV     @BSEL2,BDATA     ;SOMETHING WRONG,  SETUP FOR AND REPORT ERROR
      022400 004737 004446                 JSR     PC,GETBSR        ;GET THE BSEL REGISTERS FOR DUMPING
      022404 012737 000002 002310          MOV     #002,GDATA       ;EXPECTED DATA
      022412 012737 000002 002334          MOV     #2,REGNUM        ;WE WERE TESTING BSEL2
      022420                               GEDF    EM15,ERR2
 (2)                                                                ;        "DEVICE FATAL" ERROR # 17
 (6)  022420 104455                                                              TRAP    C$ERDF
 (7)  022422 000021                                                              .WORD   17
 (7)  022424 014745                                                              .WORD   EM15
 (7)  022426 005316                                                              .WORD   ERR2
      022430                               ESCAPE  TST
 (3)  022430 104410                                                              TRAP    C$ESCAPE
 (3)  022432 000206                                                              .WORD   L10033-.

      022434 132777 000200 157714  5$:     BITB    #200,@BSEL2      ;WAIT FOR "MRDY" TO GO HIGH AGAIN
      022442 001774                        BEQ     5$

      022444 004737 004610                 JSR     PC,GETWSR        ;WHEN IT DOES, GET CURRENT REGISTER CONTENTS

      022450 023727 002246 000525          CMP     WSR0,#000525     ;COMPARE BYTE SELECT REGISTERS 0 AND 1
                                                                    ;REG 0 = 125, REG 1 = 001
      022456 001412                        BEQ     6$               ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
      022460 012737 000525 002310          MOV     #000525,GDATA    ;GET THE GOOD DATA
      022466 013737 002246 002312          MOV     WSR0,BDATA       ;GET THE BAD DATA
```

```
6052  022474  012737  000000  002334          MOV     #0,REGNUM       ;GET THE REGISTER NUMBER
6053  022502  000451                          BR      9$              ;EXIT TEST
6054
6055  022504  023727  002250  000200  6$:     CMP     WSR2,#000200    ;COMPARE BYTE SELECT REGISTERS 2 AND 3
6056                                                                  ;REG 2 = 200 -- "MRDY" IS SET & COMMAND IS CLEARED
6057                                                                  ;REG 3 = 000 SHOULD BE ZEROES.
6058  022512  001412                          BEQ     7$              ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
6059  022514  012737  000200  002310          MOV     #000200,GDATA   ;GET THE GOOD DATA
6060  022522  013737  002250  002312          MOV     WSR2,BDATA      ;GET THE BAD DATA
6061  022530  012737  000002  002334          MOV     #2,REGNUM       ;GET THE REGISTER NUMBER
6062  022536  000433                          BR      9$              ;EXIT TEST
6063
6064                                                                  ;SUBROUTINE ATTEMPTED TO ZERO THIS LOCATION.
6065  022540  023727  002252  000020  7$:     CMP     WSR4,#SLTO      ;REG 4 = 020, THE 6502 ADDRESS TO PUT DATA
6066                                                                  ; REG 5 = 000, ZEROED BY MSTCLR
6067  022546  001412                          BEQ     8$              ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
6068  022550  012737  000020  002310          MOV     #SLTO,GDATA     ;GET THE GOOD DATA
6069  022556  013737  002252  002312          MOV     WSR4,BDATA      ;GET THE BAD DATA
6070  022564  012737  000004  002334          MOV     #4,REGNUM       ;GET THE REGISTER NUMBER
6071  022572  000415                          BR      9$              ;EXIT TEST
6072
6073  022574  023727  002254  000125  8$:     CMP     WSR6,#000125    ;REG 6 = 125, THE WRITE DATA
6074  022602  001415                          BEQ     ENDT7           ;THIS PART OF THE TEST PASSES IF A MATCH IS FOUND
6075  022604  012737  000125  002310          MOV     #000125,GDATA   ;GET THE GOOD DATA
6076  022612  013737  002254  002312          MOV     WSR6,BDATA      ;GET THE BAD DATA
6077  022620  012737  000006  002334          MOV     #6,REGNUM       ;GET THE REGISTER NUMBER
6078                                                                  ; REG 7 = 000, ZEROED BY MSTCLR.
6079
6080                                  ;--PREPARE FOR THE FAILURE PRINTOUT--
6081
6082  022626                      9$:     GEDF    EM7,ERR5        ;REPORT ERROR.
 (2)                                                              ;       "DEVICE FATAL" ERROR # 18
 (6)  022626  104455                                                            TRAP    C$ERDF
 (7)  022630  000022                                                            .WORD   18
 (7)  022632  014576                                                            .WORD   EM7
 (7)  022634  005564                                                            .WORD   ERR5
6083  022636                      ENDT7:  ENDSUB
 (3)  022636                                                                L10035:
 (3)  022636  104403                                                            TRAP    C$ESUB
6084  022640                      ENDTST
 (3)  022640                                                                L10033:
 (3)  022640  104401                                                            TRAP    C$ETST
```

```
                                .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 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 BSEL0 = 125.
                                ;*
                                ;--*************************************************************************
                                ;
                                ;       BGNTST                                                  T8::
022642                                  JSR     PC,MSTCLR       ;CALL SUBROUTINE TO INITIALIZE THE CSR'S AND
                                                                ;PUT THE 6502 INTO THE MAINTENANCE LOOP
022646  103003                          BCC     2$              ;IF NO ERROR, PROCEED
022650                                  ERROR                   ;ELSE, REPORT IT AND
                                                                                        TRAP    C$ERROR
022650  104460
022652  000137  023206                  JMP     24$             ;       EXIT THIS TEST

                                ; DO NORMAL WRITE INTO LOCATION USED BY BSEL0

022656  004537  004334          2$:     JSR     R5,WRITEI       ;WRITE INTO BSEL0 THROUGH THE BACK DOOR!
022662  000020                          SLTO                    ;  ADDRESS OF BSEL0 WITHIN RAM
022664  000125                  10$:    125                     ;  TEST DATA
022666  103002                          BCC     5$              ;IF AN ERROR OCCURED,
022670                                  ERROR                   ;REPORT IT &
                                                                                        TRAP    C$ERROR
022670  104460
022672  000545                          BR      24$             ;  EXIT
022674  123777  022664  157450  5$:     CMPB    10$,@#BSEL0     ;DID THE DATA GO INTO BSEL0?
022702  001416                          BEQ     11$             ;YES, NOW TRY IT WITH THE "RUN" BIT OFF
022704  017737  157442  002312          MOV     @#BSEL0,BDATA   ;NO,  SETUP & PRINT ERROR MESSAGE
022712  013737  022664  002310          MOV     10$,GDATA
022720  005037  002334                  CLR     REGNUM          ;WE'RE SINGLING OUT SELO FOR THE MESSAGE
022724                                  GEDF    EM16,ERR5
                                                                ;       "DEVICE FATAL" ERROR # 19
022724  104455                                                                  TRAP    C$ERDF
022726  000023                                                                  .WORD   19
022730  015025                                                                  .WORD   EM16
022732  005564                                                                  .WORD   ERR5
022734                                  ESCAPE  TST             ;IF THIS WRITE DIDN'T WORK, THERE IS NO SENSE
022734  104410                                                                  TRAP    C$ESCAPE
022736  000250                                                                  .WORD   L10036-.
                                                                ;IN TRYING IT WITH "RUN" OFF!

022740  105077  157406          11$:    CLRB    @#BSEL0         ;CLEAR BSEL0 AGAIN
                                                                ;REG'S ARE ALREADY SETUP FROM PREVIOUS WRITE
022744  142777  000200  157402          BICB    #RUN,@#BSEL1    ;TURN OFF THE RUN BIT -- & HOPEFULLY THE 6502 ALSO
022752  112777  000002  157376          MOVB    #WRILOC,@#BSEL2 ;TELL MLOOP TO WRITE AGAIN
```

```
6127
6128                                    ;AT THIS POINT, THE DMV-11 SHOULD BE QUIESCENT.  IT SHOULDN'T EVEN KNOW THAT
6129                                    ;WE HAVE CLEARED "MRDY".  THEREFOR, THERE SHOULD BE NO CHANGE IN ANY OF THE
6130                                    ;REGISTERS FOR AS LONG AS WE CARE TO WAIT AND WATCH.  THE ONLY CHANGE THAT WE
6131                                    ;COULD POSSIBLY SEE WOULD BE "MRDY" BEING SET AGAIN AND/OR BSELO GETTING
6132                                    ;LOADED WITH THE TEST DATA -- WHICH IS WHAT THE REQUESTED COMMAND SHOULD
6133                                    ;ACCOMPLISH WHEN THE FUNCTION IS ALLOWED TO RUN AGAIN.
6134
6135  022760  013701  002320                      MOV     DELAY2,R1       ;SETUP AND WAIT FOR A WHILE.
6136  022764  132777  000200  157364  12$:        BITB    @#MRDY,@BSEL2   ;WHILE WE'RE WAITING, WE MAY AS WELL CHECK "MRDY"
6137  022772  001042                              BNE     14$             ;IF IT GETS SET, WE HAVE AN ERROR BECAUSE
6138                                                                      ;NOTHING WAS SUPPOSED TO HAPPEN WITHIN
6139                                                                      ;THE 6502 MICRO-PROCESSOR
6140  022774  105777  157352                      TSTB    @BSELO          ;WHILE WE'RE AT IT, WE MAY AS WELL LOOK AT
6141  023000  001063                              BNE     15$             ;BSELO.  THAT ALSO ISN'T SUPPOSED TO CHANGE.
6142  023002  077110                              SOB     R1,12$          ;DECREMENT AND CHECK COUNTER -- LOOP TILL DONE
6143
6144                                    ;IF EVERYTHING GOES OK, WE SHOULD FALL OUT OF THE LOOP TO HERE.  OTHERWISE,
6145                                    ;"MRDY" OR BSELO COULD CHANGE SENDING US TO "14$" OR "15$" RESPECTIVELY TO
6146                                    ;PRINT AN APPROPRIATE (WE HOPE) ERROR MESSAGE.
6147
6148                                    ;IF WE DO GET TO HERE, WE CAN NOW SET "RUN" AND THE MLOOP SHOULD PERFORM THE
6149                                    ;REQUESTED FUNCTION.
6150
6151  023004  152777  000200  157342              BISB    @#RUN,@BSEL1    ;SET "RUN" AND ALLOW THE 6502 TO RUN AGAIN
6152
6153                                    ;NOW ALL WE HAVE TO DO IS WAIT AGAIN AS BEFORE.  EXCEPT THAT THIS TIME "MRDY"
6154                                    ;OR BSELO GETTING SET IS THE VALID CONDITION -- NOT THE ERROR.  FAILURE TO
6155                                    ;PERFORM IS NOW THE ERROR WE'RE LOOKING FOR.
6156
6157  023012  013701  002320                      MOV     DELAY2,R1       ;SETUP AND WAIT FOR A WHILE.
6158  023016  132777  000200  157332  13$:        BITB    @#MRDY,@BSEL2   ;WHILE WE'RE WAITING, "MRDY" SHOULD GO NON-ZERO
6159  023024  001070                              BNE     24$             ;IF IT GETS SET, WE CAN ASSUME THAT SOMETHING
6160                                                                      ;COMPLETED.  AT LEASE WE WERE ABLE TO GET THE
6161                                                                      ;6502 MICRO-PROCESSOR RUNNING AGAIN
6162  023026  077105                              SOB     R1,13$          ;DECREMENT AND CHECK COUNTER -- LOOP TILL DONE
6163
6164                                    ;IF WE GET HERE, WE WEREN'T ABLE TO RESTORE THE 6502 TO A RUNNING STATE!
6165
6166  023030  117737  157322  002312              MOVB    @BSEL2,BDATA    ;SETUP FOR THE ERROR MESSAGE -- GET BAD DATA
6167  023036  004737  004446                      JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
6168  023042  113737  002312  002310              MOVB    BDATA,GDATA     ;PICK THE REGISTER'S DATA.  THE ONLY DIFFERANCE
6169  023050  152737  000200  002310              BISB    @#MRDY,GDATA    ;BETWEEN GOOD & BAD IS THE "MRDY" BIT
6170  023056  012737  000002  002334              MOV     #2,REGNUM       ;INDICATE THAT WE'RE LOOKING AT BSEL2
6171  023064                                      GEDF    EM17,ERR2       ;NOW REPORT THE ERROR
 (2)                                                                      ;       "DEVICE FATAL" ERROR # 20
 (6)  023064  104455                                                                      TRAP    C$ERDF
 (7)  023066  000024                                                                      .WORD   20
 (7)  023070  015122                                                                      .WORD   EM17
 (7)  023072  005316                                                                      .WORD   ERR2
6172  023074                                      ESCAPE  TST             ;EXIT TEST (OR LOOP, MAYBE?)
 (3)  023074  104410                                                                      TRAP    C$ESCAPE
 (3)  023076  000110                                                                      .WORD   L10036-.
6173
6174                                    ;IF WE GET HERE, BSEL2 CHANGED WHEN THE 6502 WASN'T SUPPOSED TO BE RUNNING!
6175
```

```
 6176  023100  117737  157252  002312  14$:    MOVB    @BSEL2,BDATA    ;GET THE UNEXPECTEDLY ALTERED CONTENTS OF BSEL2
 6177  023106  004737  004446                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 6178  023112  113737  002312  002310          MOVB    BDATA,GDATA     ;PICK THE REGISTER'S DATA.  THE ONLY DIFFERANCE
 6179  023120  142737  000200  002310          BICB    #MRDY,GDATA     ;BETWEEN GOOD & BAD IS THE "MRDY" BIT
 6180  023126  012737  000002  002334          MOV     #2,REGNUM       ;INDICATE THAT WE'RE LOOKING AT BSEL2
 6181  023134                                  GEDF    EM17A,ERR2      ;NOW REPORT THE ERROR
  (2)                                                                    ;       "DEVICE FATAL" ERROR # 21
  (6)  023134  104455                                                                    TRAP    C$ERDF
  (7)  023136  000025                                                                    .WORD   21
  (7)  023140  015202                                                                    .WORD   EM17A
  (7)  023142  005316                                                                    .WORD   ERR2
 6182  023144                                  ESCAPE  TST             ;EXIT TEST (OR LOOP, MAYBE?)
  (3)  023144  104410                                                                    TRAP    C$ESCAPE
  (3)  023146  000040                                                                    .WORD   L10036-.
 6183
 6184                                  ;IF WE GET HERE, BSEL0 CHANGED WHEN THE 6502 WASN'T SUPPOSED TO BE RUNNING!
 6185
 6186  023150  117737  157176  002312  15$:    MOVB    @BSEL0,BDATA    ;GET THE UNEXPECTEDLY ALTERED CONTENTS OF BSEL0
 6187  023156  004737  004446                  JSR     PC,GETBSR       ;GET THE BSEL REGISTERS FOR DUMPING
 6188  023162  105037  002310                  CLRB    GDATA           ;IT WAS SUPPOSED TO STAY AT ZERO
 6189  023166  105037  002334                  CLRB    REGNUM          ;INDICATE THAT WE'RE LOOKING AT BSEL0
 6190  023172                                  GEDF    EM17A,ERR2      ;NOW REPORT THE ERROR
  (2)                                                                    ;       "DEVICE FATAL" ERROR # 22
  (6)  023172  104455                                                                    TRAP    C$ERDF
  (7)  023174  000026                                                                    .WORD   22
  (7)  023176  015202                                                                    .WORD   EM17A
  (7)  023200  005316                                                                    .WORD   ERR2
 6191  023202                                  ESCAPE  TST             ;EXIT TEST (OR LOOP, MAYBE?)
  (3)  023202  104410                                                                    TRAP    C$ESCAPE
  (3)  023204  000002                                                                    .WORD   L10036-.
 6192
 6193                                  ;IF WE GET HERE, THE TEST APPEARS TO HAVE PASSED WITH FLYING COLOURS
 6194
 6195  023206                          24$:    ENDTST
  (3)  023206                                                            L10036:
  (3)  023206  104401                                                                    TRAP    C$ETST
```

```
                        .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
 (5)  023210                                                                    T9::
6211  023210  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
6212  023214  103003                  BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
6213  023216                          ERROR                   ;ELSE, REPORT ERROR
 (3)  023216  104460                                                    TRAP    C$ERROR
6214  023220                          ESCAPE  TST             ;   & EXIT TEST
 (3)  023220  104410                                                    TRAP    C$ESCAPE
 (3)  023222  000152                                                    .WORD   L10037-.
6215  023224  012737  000001  002444  1$:     MOV     #1,TMP2         ;DATA GENERATION ALGORITHM CODE
6216  023232  012737  003777  002474          MOV     #2047.,TMPE     ;LAST VALID ADDRESS
6217  023240  004737  023376          2$:     JSR     PC,T9.RST       ;RESET TMP3, TMPA, & TMPF
6218  023244  005037  002450                  CLR     TMP4            ;TEST DATA
6219  023250  005037  002452                  CLR     TMP5            ;ACTUAL DATA
6220
6221                                  ; IN THIS PHASE OF TESTING WE WRITE, READ & CHECK EACH LOCATION INDIVIDUALLY.
6222
6223  023254  004737  023414          4$:     JSR     PC,WRCRAM       ;WRITE, READ, & CHECK 1 BYTE OF RAM
6224  023260  103003                  BCC     5$              ;IF NO ERROR, PROCEED
6225  023262                          ERROR                   ;ELSE, REPORT IT
 (3)  023262  104460                                                    TRAP    C$ERROR
6226  023264                          ESCAPE  TST             ;   & LOOP IF ERROR
 (3)  023264  104410                                                    TRAP    C$ESCAPE
 (3)  023266  000106                                                    .WORD   L10037-.
6227  023270  005237  002464          5$:     INC     TMPA            ;POINT TO NEXT LOCATION
6228  023274  023737  002464  002474        CMP     TMPA,TMPE       ;HAVE WE TESTED ALL OF RAM?
6229  023302  101764                  BLOS    4$              ;NO, TEST ANOTHER BYTE
6230  023304                          BREAK                   ;ELSE, SEE IF A ^C HAS BEEN STRUCK
 (3)  023304  104422                                                    TRAP    C$BRK
6231                                                            ;THEN PROCEED TO THE NEXT PHASE OF TESTING
6232
6233                                  ; IN THIS PHASE OF TESTING WE READ & CHECK DATA WHICH SHOULD ALREADY BE IN
6234                                  ; EACH LOCATION OF RAM BEING CHECKED.
6235
6236  023306  004737  023376                  JSR     PC,T9.RST       ;RESET TMP3, TMPA, & TMPF
6237  023312  004737  023612          8$:     JSR     PC,RCRAM        ;READ & CHECK 1 BYTE OF RAM
6238  023316  103001                  BCC     9$              ;IF NO ERROR, PROCEED
6239  023320                          ERROR                   ;ELSE, REPORT IT
```

```
  (3)  023320  104460                                                          TRAP    C$ERROR
6240   023322  005237  002464          9$:     INC     TMPA            ;POINT TO NEXT LOCATION
6241   023326  023737  002464  002474         CMP     TMPA,TMPE       ;HAVE WE TESTED ALL OF RAM?
6242   023334  101766                         BLOS    8$              ;NO, TEST ANOTHER BYTE
6243   023336                                 BREAK                   ;ELSE, SEE IF A ^C HAS BEEN STRUCK
  (3)  023336  104422                                                          TRAP    C$BRK
6244                                                                   ;THEN PROCEED TO THE NEXT PHASE OF TESTING
6245
6246   023340  005037  007116                 CLR     ER47CT          ;RESET ERROR PRINT COUNT
6247   023344  005237  002444                 INC     TMP2            ;  ADVANCE TO NEXT DATA GEN. ALGORITHM CODE
6248   023350  023727  002444  000007         CMP     TMP2,#7         ;HAVE WE DONE ALL THE CODES WE'RE GOING TO DO?
6249   023356  002730                         BLT     2$              ;NO, THEN GO DO THIS PATTERN IN RAM
6250   023360  004537  004334                 JSR     R5,WRITEI       ;ELSE, CLEAR RAM LOCATION 0083 (HEX) & EXIT
6251   023364  000173                         173                     ;       (THIS CONVERTS TO 0083 HEX.)
6252   023366  000000                         0                       ;       (THIS WE HOPE, WILL CLEAR IT)
6253   023370  103001                         BCC     .+4             ;IF NO ERROR, PROCEED
6254   023372                                 ERROR                   ;ELSE, REPORT IT
  (3)  023372  104460                                                          TRAP    C$ERROR
6255   023374                                 ENDTST
  (3)  023374                                                                L10037:
  (3)  023374  104401                                                          TRAP    C$ETST
6256
6257                                ; RESET THE FOLLOWING THREE REGISTERS
6258
6259   023376  005037  002446          T9.RST: CLR     TMP3            ;TEST DATA PATTERN INDEX
6260   023402  005037  002464                  CLR     TMPA            ;RAM LOCATION ADDRESS
6261   023406  005037  002476                  CLR     TMPF            ;RESET ALL ERROR FLAGS
6262   023412  000207                         RTS     PC
6263
6264                                ; WRITE, READ, & CHECK ONE LOCATION
6265
6266   023414  010046                 WRCRAM: MOV     R0,-(SP)        ;SAVE WORKING REGISTERS
6267
6268   023416  004737  023772                 JSR     PC,PATGEN       ;GENERATE ONE DATA PATTERN BYTE
6269
6270   023422  013700  002464                 MOV     TMPA,R0         ;GET ADDRESS WHERE WE CAN CHECK IT MORE EASILY
6271   023426  020027  000020                 CMP     R0,#SLTO        ;IS ADDRESS BELOW THE SELECT REGESTER AREA?
6272   023432  103412                         BLO     2$              ;YES, GOOD.  IT CAN BE TESTED.
6273   023434  020027  000030                 CMP     R0,#SLTO+8.     ;IS IT ABOVE THE SELECT REGISTER AREA?
6274   023440  103007                         BHIS    2$              ;YES, GOOD.  IT CAN BE TESTED.
6275   023442  023727  002444  000006         CMP     TMP2,#6         ;NO, IF "INCREMENTAL", BACK UP INDEX
6276   023450  001055                         BNE     12$             ;ELSE JUST BYPASS TEST
6277   023452  005337  002446                 DEC     TMP3            ;DECREMENT INDEX TO WHAT IT WAS BEFORE "PATGEN"
6278   023456  000452                         BR      12$             ;  AND THEN BYPASS THE TESTING
6279
6280   023460  010037  023474          2$:    MOV     R0,4$           ;SETUP ALL POINTERS FOR THE CURRENT RAM LOCATION
6281   023464  010037  023506                 MOV     R0,8$
6282
6283   023470  004537  004322                 JSR     R5,WRITE        ;WRITE ONE BYTE OF THE TEST DATA
6284   023474  000000          4$:    .WORD   0               ;**** MODIFIED FROM ABOVE ****
6285   023476  002450                 TMP4                    ;TEST DATA IS IN TMP4
6286   023500  103442                 BCS     14$             ;IF ERROR WRITING, FORGET THE REST
6287
6288   023502  004537  004076                 JSR     R5,READ         ;READ THAT BYTE BACK AGAIN
6289   023506  000000          8$:    .WORD   0               ;**** MODIFIED FROM ABOVE ****
6290   023510  002452                 TMP5
```

```
 6291  023512  103435                          BCS     14$             ;IF ERROR READING, FORGET THE REST
 6292
 6293  023514  123737  002450  002452          CMPB    TMP4,TMP5       ;DID WE READ WHAT WE WROTE?
 6294  023522  001430                          BEQ     12$             ;YES, EXIT
 6295  023524  132737  000002  002476          BITB    #BIT1,TMPF      ;NO, HAVE WE ALREADY DONE THIS ERROR'S HEADER?
 6296  023532  001020                          BNE     9$              ;YES, ONLY REPORT DATA
 6297  023534  112737  000002  002476          MOVB    #BIT1,TMPF      ;ELSE, CALL MONITOR & PRINT HEADING
 6298  023542                                  GTDF    EM47A,ERR47     ;QUEUE UP THE ERROR MESSAGE
  (2)                                            ;       QUEUE "DEVICE FATAL" ERROR # 23
  (5)  023542  012737  000001  002236                                                  MOV     #T.EDF,ERRTYP
  (5)  023550  012737  000027  002240                                                  MOV     #23,ERRNBR
  (5)  023556  012737  015707  002242                                                  MOV     #EM47A,ERRMSG
  (5)  023564  012737  006736  002244                                                  MOV     #ERR47,ERRBLK
 6299  023572  000402                          BR      10$
 6300
 6301  023574  004737  007122        9$:     JSR     PC,ERR47.       ;JUST PRINT DATA
 6302  023600  000261                10$:     SEC                     ;       & SET THE ERROR FLAG
 6303  023602  000401                          BR      14$             ;       & GO DIRECTLY TO THE EXIT "RTS"
 6304
 6305  023604  000241                12$:     CLC                     ;NORMAL EXIT - MAKE SURE THE ERROR FLAG IS CLEAR
 6306  023606  012600                14$:     MOV     (SP)+,R0        ;RESTORE WORK REGISTERS
 6307  023610  000207                          RTS     PC
 6308
 6309  023612  010046                RCRAM:   MOV     R0,-(SP)        ;SAVE WORKING REGISTERS
 6310
 6311  023614  004737  023772                  JSR     PC,PATGEN       ;GENERATE ONE DATA PATTERN BYTE
 6312
 6313  023620  013700  002464                  MOV     TMPA,R0         ;GET ADDRESS WHERE WE CAN CHECK IT MORE EASILY
 6314  023624  020027  000020                  CMP     R0,#SLT0        ;IS ADDRESS BELOW THE SELECT REGESTER AREA?
 6315  023630  103412                          BLO     2$              ;YES, GOOD.  IT CAN BE TESTED.
 6316  023632  020027  000030                  CMP     R0,#SLT0+8.     ;IS IT ABOVE THE SELECT REGISTER AREA?
 6317  023636  103007                          BHIS    2$              ;YES, GOOD.  IT CAN BE TESTED.
 6318  023640  023727  002444  000006          CMP     TMP2,#6         ;NO, IF "INCREMENTAL", BACK UP INDEX
 6319  023646  001046                          BNE     12$             ;ELSE JUST BYPASS TEST
 6320  023650  005337  002446                  DEC     TMP3            ;DECREMENT INDEX TO WHAT IT WAS BEFORE "PATGEN"
 6321  023654  000443                          BR      12$             ;  AND THEN BYPASS THE TESTING
 6322
 6323  023656  010037  023666        2$:     MOV     R0,8$           ;SETUP POINTER FOR THE CURRENT RAM LOCATION
 6324
 6325  023662  004537  004076                  JSR     R5,READ         ;READ THAT BYTE BACK AGAIN
 6326  023666  000000                8$:     .WORD   0               ;**** MODIFIED FROM ABOVE ****
 6327  023670  002452                          TMP5
 6328  023672  103435                          BCS     14$             ;IF ERROR READING, FORGET THE REST
 6329
 6330  023674  123737  002450  002452          CMPB    TMP4,TMP5       ;WAS THIS LOC. STILL OK?
 6331  023702  001430                          BEQ     12$             ;YES, EXIT
 6332  023704  132737  000004  002476          BITB    #BIT2,TMPF      ;NO, HAVE WE ALREADY DONE THIS ERROR'S HEADER?
 6333  023712  001020                          BNE     9$              ;YES, ONLY REPORT DATA
 6334  023714  112737  000004  002476          MOVB    #BIT2,TMPF      ;ELSE, CALL MONITOR & PRINT HEADING
 6335  023722                                  GTDF    EM47B,ERR47     ;QUEUE UP THE ERROR MESSAGE
  (2)                                            ;       QUEUE "DEVICE FATAL" ERROR # 24
  (5)  023722  012737  000001  002236                                                  MOV     #T.EDF,ERRTYP
  (5)  023730  012737  000030  002240                                                  MOV     #24,ERRNBR
  (5)  023736  012737  015747  002242                                                  MOV     #EM47B,ERRMSG
  (5)  023744  012737  006736  002244                                                  MOV     #ERR47,ERRBLK
 6336  023752  000402                          BR      10$
```

```
6337
6338  023754  004737  007122          9$:     JSR     PC,ERR47.       ;JUST PRINT DATA
6339  023760  000261                  10$:    SEC                     ;       & SET THE ERROR FLAG
6340  023762  000401                          BR      14$             ;       & GO DIRECTLY TO THE EXIT "RTS"
6341
6342  023764  000241                  12$:    CLC                     ;NORMAL EXIT - MAKE SURE THE ERROR FLAG IS CLEAR
6343  023766  012600                  14$:    MOV     (SP)+,R0        ;RESTORE WORK REGISTERS
6344  023770  000207                          RTS     PC
6345
6346                                  ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
6347                                  ; PATGEN -- SUBROUTINE TO GENERATE A TEST DATA BYTE FOR A SPECIFIC ELEMENT
6348                                  ;
6349                                  ;       CALLING SEQUENCE:
6350                                  ;
6351                                  ;       <SET TEST PATTERN CODE # IN "TMP2">
6352                                  ;       <SET TEST PATTERN INDEX IN "TMP3">
6353                                  ;       JSR     PC,PATGEN
6354                                  ;       <NEXT SEQUENCIAL INSTRUCTION>
6355                                  ;
6356                                  ;  TEST PATTERN CODES:
6357                                  ;
6358                                  ;       1 -- ALL ONES
6359                                  ;       2 -- ALL ZEROES
6360                                  ;       3 -- 1 BIT ALTERNATING
6361                                  ;       4 -- 2 BITS ALTERNATING
6362                                  ;       5 -- ADDRESS IN ADDRESS
6363                                  ;       6 -- INCREMENTAL  (INDEX IN ADDRESS)
6364                                  ;
6365                                  ;  THE TEST PATTERN INDEX INDICATES HOW FAR INTO THE TEST PATTERN STRING OF
6366                                  ;  BYTES WE ARE.  I.E. IT SPECIFIES THE NUMBER OF THE BYTE OF THE WHOLE STRING
6367                                  ;  OF BYTES COMPOSING THE COMPLETE TEST PATTERN.
6368                                  ;
6369                                  ;--+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
6370
6371
6372  023772                          PATGEN:
6373  023772  023727  002444  000002          CMP     TMP2,#2         ;DECODE THE TEST PATTERN IDENTIFIER
6374  024000  002414                          BLT     1$              ;0, 1, OR NEGITIVE WILL GIVE "ALL ONES"
6375  024002  001417                          BEQ     2$              ;2 = "ALL ZEROES"
6376  024004  023727  002444  000004          CMP     TMP2,#4
6377  024012  002416                          BLT     3$              ;3 = "1 BIT ALTERNATING"
6378  024014  001431                          BEQ     4$              ;4 = "2 BIT ALTERNATING PATTERN"
6379  024016  023727  002446  000006          CMP     TMP3,#6
6380  024024  002441                          BLT     5$              ;5 = "ADDRESS IN ADDRESS"
6381  024026  001444                          BEQ     6$              ;6 = "INCREMENTAL"  (INDEX IN ADDRESS)
6382  024030  000404                          BR      2$              ;UNDEFINED = "ALL ZEROES"
6383
6384  024032  112737  000377  002450  1$:     MOVB    #377,TMP4       ;"ALL ONES" DATA PATTERN
6385  024040  000443                          BR      60$
6386
6387  024042  105037  002450          2$:     CLRB    TMP4            ;"ALL ZEROES" DATA PATTERN
6388  024046  000440                          BR      60$
6389
6390  024050  132737  000001  002446  3$:     BITB    #1,TMP3         ;"1 BIT ALTERNATING" PATTERN
6391  024056  001404                          BEQ     20$             ;IF EVEN, USE "252"
6392  024060  112737  000125  002450          MOVB    #125,TMP4       ;IF ODD, USE "125"
```

```
 6393  024066  000430                          BR      60$             ; PATTERN:  10101010
 6394  024070  112737  000252  002450  20$:    MOVB    #252,TMP4
 6395  024076  000424                          BR      60$             ; PATTERN:  01010101
 6396
 6397  024100  132737  000001  002446  4$:     BITB    #1,TMP3         ;"2 BIT ALTERNATING" PATTERN
 6398  024106  001404                          BEQ     22$             ;IF EVEN, USE "214"
 6399  024110  112737  000063  002450          MOVB    #063,TMP4       ;IF ODD, USE "063"
 6400  024116  000414                          BR      60$             ; PATTERN:  11001100
 6401  024120  112737  000214  002450  22$:    MOVB    #214,TMP4
 6402  024126  000410                          BR      60$             ; PATTERN:  00110011
 6403
 6404  024130  113737  002464  002450  5$:     MOVB    TMPA,TMP4       ;"ADDRESS IN ADDRESS"
 6405  024136  000404                          BR      60$
 6406
 6407  024140  113737  002446  002450  6$:     MOVB    TMP3,TMP4       ;"INCREMENTAL"  (INDEX IN ADDRESS)
 6408  024146  000400                          BR      60$
 6409
 6410  024150  005237  002446          60$:    INC     TMP3            ;INCREMENT PATTERN INDEX FOR NEXT CALL
 6411  024154  000207                  62$:    RTS     PC
 6412
 6413
```

```
6485                    .SBTTL TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)
  (2)
  (2)                   ;++*************************************************************************
  (2)                   ;*
  (2)                   ;*      TEST 10 -- DATA RAM MOVING INVERSIONS (LOC'S 0018-01FF HEX)
  (2)                   ;*
  (3)                   ;* GENERAL DESCRIPTION:
  (3)                   ;*  FIRST, THE 2K BYTE LOCATIONS IN RAM ARE LOADED WITH 0'S (SEE NOTE BELOW).
  (3)                   ;* THEN, THE FIRST LOCATION IS READ AND CHECKED, A SINGLE 1 IS WRITTEN INTO
  (3)                   ;* THE LOW BIT POSITION, AND THIS IS READ AND CHECKED. THIS IS DONE FOR ALL
  (3)                   ;* BYTES IN THE RAM, BY INCREMENTING THE ADDRESS TO POINT TO THE NEXT RAM
  (3)                   ;* LOCATION.
  (3)                   ;*  THEN, THE NEXT BIT POSITION IS CHOSEN TO INSERT A 1, AND ALL LOCATIONS
  (3)                   ;* ARE READ, WRITTEN, AND READ AS BEFORE. THIS IS CONTINUED FOR ALL BIT
  (3)                   ;* POSITIONS UNTIL THE ENTIRE RAM IS WRITTEN TO ALL 1'S. THE ABOVE OPERATIONS
  (3)                   ;* ARE PERFORMED A SECOND TIME, WITH 0'S INSERTED INTO THE RAM INSTEAD OF 1'S,
  (3)                   ;* THIS RESULTS IN THE ENTIRE RAM BEING WRITTEN TO ALL 0'S.
  (3)                   ;*  THIS TEST CONSTITUTES A THOROUGH TEST OF THE RAM. IT IS CAPABLE OF
  (3)                   ;* DETECTING THE FOLLOWING FAULTS :  STUCK ADDRESS BITS, UNI- AND BI-DIRECT-
  (3)                   ;* IONAL COUPLING BETWEEN ADDRESS BITS, STUCK MEMORY BITS, AND UNI- AND
  (3)                   ;* BI-DIRECTIONAL COUPLING BETWEEN MEMORY BITS IN BOTH ROWS AND COLUMNS OF THE
  (3)                   ;* MEMORY MATRIX.
  (3)                   ;*
  (3)                   ;* NOTE:
  (3)                   ;*  THIS TEST DOES NOT CHECK LOCATIONS 0010-001F, SO THAT THE PRIMARY CSR'S
  (3)                   ;* ARE NOT WRITTEN. IT DOES TEST LOCATIONS 0000-000F (SCRATCHPAD RAM) AND
  (3)                   ;* LOCATIONS 0020-002F (SECONDARY CSR'S), AS WELL AS 0030-0800 (BASIC RAM).
  (3)                   ;*
  (3)                   ;* THE "TMP#" REGISTERS ARE USED HERE TO CONTAIN THE VARIOUS CONSTANTS &
  (3)                   ;* VARIABLES USED THROUGHOUT THIS TEST.  A LIST OF THEIR ASSIGNMENTS SEEMS
  (3)                   ;* USEFUL SO HERE IT IS:
  (3)                   ;*
  (3)                   ;*      TMP0    POINTS TO THE FIRST LOCATION AFTER THE SELECT REGISTERS.
  (3)                   ;*
  (3)                   ;*      TMP1    ----
  (3)                   ;*
  (3)                   ;*      TMP2    TEST PATTERN ID CODE -- UNUSED BY THIS TEST.
  (3)                   ;*
  (3)                   ;*      TMP3    TEST DATA PATTERN INDEX -- UNUSED BY THIS TEST.
  (3)                   ;*
  (3)                   ;*      TMP4    TEST DATA PATTERN.  THE HIGH BYTE IS THE PATTERN BEING WRITTEN
  (3)                   ;*              ON ANY GIVEN PASS AND THE LOW BYTE IS THE PATTERN THAT WAS
  (3)                   ;*              WRITTEN BY THE PREVIOUS PASS THROUGH THE RAM.
  (3)                   ;*
  (3)                   ;*      TMP5    DATA READ FROM THE RAM.  ONLY THE LOW BYTE IS USED.
  (3)                   ;*
  (3)                   ;*      TMP6    ----
  (3)                   ;*      TMP7    ----
  (3)                   ;*      TMP8    ----
  (3)                   ;*      TMP9    ----
  (3)                   ;*
  (3)                   ;*      TMPA    RAM ADDRESS BEING TESTED.
  (3)                   ;*
  (3)                   ;*      TMPB    BIT POINTER.  NUMBER OF THE BIT WITHIN THE DATA FIELD WHICH IS
  (3)                   ;*              BEING SWITCHED ON EACH WRITE WITHIN THE CURRENT PASS.
  (3)                   ;*
```

```
(3)                                 ;*      TMPC    DATA FLAG.  BIT 0 OF THIS WORD IS THE VALUE TO WHICH THE BIT
(3)                                 ;*              IDENTIFIED IN TMPB IS BEING SET ON EACH WRITE IN THE CURRENT
(3)                                 ;*              PASS.
(3)                                 ;*
(3)                                 ;*      TMPD    DIRECTION SWITCH.  0 = FORWARD    NON-ZERO = BACKWARD
(3)                                 ;*
(3)                                 ;*      TMPE    LAST VALID ADDRESS TO BE TESTED.  (I.E. THE END OF RAM)
(3)                                 ;*
(3)                                 ;*      TMPF    ERROR FLAGS.  BIT 1 SET = THE LAST DETECTED ERROR WAS THE READ
(3)                                 ;*              OF THE PREVIOUS DATA BEFORE WRITING THE NEW DATA.  IF BIT2 IS
(3)                                 ;*              SET, THE READ AFTER WRITE FAILED.  IF EITHER IS SET WHEN AN
(3)                                 ;*              ERROR IS DETECTED, THE SUPERVISOR IS NOT CALL'D AND THEREFOR
(3)                                 ;*              IT'S ERROR COUNTER WILL NOT REFLECT THE ERROR -- INSTEAD, THE
(3)                                 ;*              DATA LINE IS PRINTED.  (UNLESS THE ERROR HANDLER'S DATA LINE
(3)                                 ;*              PRINT COUNT HAS EXCEDED ITS LIMIT -- IN WHICH CASE ITS
(3)                                 ;*              INVOCATION IS IGNORED.)
(2)                                 ;*
(2)                                 ;--*************************************************************************
(2)                                 ;
(2)                                 ;       BGNTST
(5)  024156                                                                     T10::
6486 024156  004737  003774                 JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
6487 024162  103003                         BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
6488 024164                                 ERROR                   ;ELSE, REPORT ERROR
 (3) 024164  104460                                                             TRAP    C$ERROR
6489 024166                                 ESCAPE  TST             ;   & EXIT TEST
 (3) 024166  104410                                                             TRAP    C$ESCAPE
 (3) 024170  000744                                                             .WORD   L10040-.
6490 024172                                 1$:
6491                                        ;********** ACTUAL MOVING INVERSIONS ALGORITHM ****************************
6492
6493                                        ;----------  INITIALIZE OUTER LOOP  ---------------------------------------
6494
6495 024172  012737  000030  002440                MOV     #24.,TMP0       ;INIT. POINTER TO 1'ST RAM LOC. AFTER SEL REG'S
6496 024200  012737  003777  002474                MOV     #2047.,TMPE     ;IDENTIFY LAST ADDRESS TO BE TESTED
6497 024206  005037  002462                        CLR     TMP9
6498 024212  005037  002476                        CLR     TMPF            ;ERROR FLAG -- INDICATE NO ERRORS YET
6499 024216  012737  177777  002470                MOV     #-1,TMPC        ;DATA = 1'S FIRST
6500
6501                                        ;----------  INITIALIZE THE AREA BEING TESTED BY CLEARING IT TO ZEROES  --------
6502
6503                                        ;   ZERO OUT LOCATIONS 0 THROUGH 10 (HEX) -- THOSE BELOW THE SELECT REGISTERS
6504
6505 024224  005037  024240                        CLR     3$              ;INITIALIZE ADDRESS
6506 024230  012703  000020                        MOV     #SLT0,R3        ;RAM ADDRESS OF BSEL0 WILL DO AS BYTE COUNT
6507
6508 024234  004537  004334                2$:     JSR     R5,WRITEI       ;ZERO OUT LOC'S 0 --> 10 (HEX)
6509 024240  000000                        3$:     .WORD   0               ;  ADDRESS
6510 024242  000000                                0                       ;  DATA
6511 024244  103003                                BCC     .+10            ;IF NO ERROR, PROCEED
6512 024246                                        ERROR                   ;ELSE, REPORT IT
 (3) 024246  104460                                                             TRAP    C$ERROR
6513 024250                                        ESCAPE  TST             ;       AND EXIT THIS TEST
 (3) 024250  104410                                                             TRAP    C$ESCAPE
 (3) 024252  000662                                                             .WORD   L10040-.
6514 024254  005237  024240                        INC     3$              ;POINT TO NEXT LOCATION
```

```
6515  024260  077313                          SOB     R3,2$           ;IF MORE TO BE DONE, DO IT
6516
6517                                  ;   ZERO OUT THE REST OF RAM -- ALL LOC'S ABOVE THE SELECT REGISTERS
6518
6519  024262  013737  002440  024306          MOV     TMP0,6$         ;FIRST LOCATION OF TEST AREA (18 HEX)
6520  024270  013703  002474                  MOV     TMPE,R3         ;START WITH "LAST ADDR. TO BE TESTED" AND CALC.
6521  024274  163703  002440                  SUB     TMP0,R3         ;THE # OF LOCATIONS TO BE TESTED (800-18 (HEX))
6522  024300  005203                          INC     R3              ; (THIS MAKES SURE WE GET EVERY SINGLE BYTE)
6523
6524  024302  004537  004334          4$:     JSR     R5,WRITEI       ;ZERO OUT THE ALL OF THE TEST AREA
6525  024306  000000          6$:     .WORD   0
6526  024310  000000                  0
6527  024312  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6528  024314                          ERROR                   ;ELSE, REPORT IT
 (3)  024314  104460                                                          TRAP    C$ERROR
6529  024316                          ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  024316  104410                                                          TRAP    C$ESCAPE
 (3)  024320  000614                                                          .WORD   L10040-.
6530  024322  005237  024306                  INC     6$              ;POINT TO NEXT LOCATION
6531  024326  077313                          SOB     R3,4$           ;IF MORE TO BE DONE, DO IT
6532  024330  105037  002450                  CLRB    TMP4            ;THIS IS WHAT WE JUST SET ALL RAM LOCATIONS TO
6533
6534                                  ;----------  BEGINNING OF OUTER LOOP  ----------------------------------------
6535
6536  024334  005037  002472          8$:     CLR     TMPD            ;"SET FWD SEQUENCE"  (DIRECTION FLAG)
6537  024340  005037  002466                  CLR     TMPB            ;"SET BIT POSITION = 0"  (BIT POINTER)
6538                                                                  ;"SET ADDRESS = 0"  BUT OUR MEMORY STARTS @
6539                                                                  ;    18 HEX.  SO:
6540  024344  005037  002464                  CLR     TMPA            ;       INITIALIZE ADDRESS POINTER
6541  024350  112737  000001  002451          MOVB    #BIT0,TMP4+1    ;INITIALIZE CURRENT & NEXT DATA BYTES
6542
6543                                  ;----------  "READ CURRENT ADDRESS"  -----------------------------------------
6544
6545  024356  000240          10$:    NOP
6546  024360  000240                  NOP
6547  024362                          BREAK                   ;FIRST SEE IF A ↑C HAS BEEN STRUCK BY OPERATOR
 (3)  024362  104422                                                          TRAP    C$BRK
6548  024364  013737  002464  024376          MOV     TMPA,40$        ;NO.  PUT ADDRESS INTO READ CALL
6549  024372  004537  004076                  JSR     R5,READ         ;GO READ ONE LOCATION
6550  024376  000000          40$:    0               ;**** MODIFIED ABOVE **** (ADDRESS)
6551  024400  002452                  TMP5            ;ADDRESS OF DATA READ
6552  024402  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
6553  024404                          ERROR                   ;ELSE, REPORT IT
 (3)  024404  104460                                                          TRAP    C$ERROR
6554  024406                          ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  024406  104410                                                          TRAP    C$ESCAPE
 (3)  024410  000524                                                          .WORD   L10040-.
6555
6556                                  ;----------  CHECK DATA (FIRST TIME)  -----------------------------------------
6557
6558  024412  000240                  NOP
6559  024414  000240                  NOP
6560  024416  123737  002452  002450          CMPB    TMP5,TMP4       ;CHECK AGAINST EXPECTED DATA
6561  024424  001421                  BEQ     12$             ;IF OK, PROCEED
6562  024426  032737  000006  002476          BIT     #BIT1+BIT2,TMPF ;NO.  HAS AN ERROR ALREADY BEEN REPORTED?
6563  024434  001010                  BNE     42$             ;YES, JUST PRINT DATA IF WANTED
```

```
 6564  024436  012737  000002  002476          MOV     #BIT1,TMPF      ;NO,  SET FLAG FOR NEXT TIME
 6565  024444                                  GEDF    EM48A,ERR48     ;  AND PRINT COMPLETE ERROR MESSAGE
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 25
  (6)  024444  104455                                                                   TRAP    C$ERDF
  (7)  024446  000031                                                                   .WORD   25
  (7)  024450  016030                                                                   .WORD   EM48A
  (7)  024452  007644                                                                   .WORD   ERR48
 6566  024454  000405                          BR      12$             ;PROCEED WITH TESTING
 6567  024456  012737  000002  002476  42$:    MOV     #BIT1,TMPF      ;INDICATE A "PRE" WRITE ERROR
 6568  024464  004737  010042                  JSR     PC,ERR48.       ;USE ERROR HANDLER ONLY -- NO HEADER
 6569
 6570                                  ;---------- WRITE NEW DATA ----------------------------------------------
 6571
 6572  024470  013737  002464  024502  12$:    MOV     TMPA,44$        ;GET THIS ADDRESS FOR THIS WRITE CALL
 6573  024476  004537  004322                  JSR     R5,WRITE        ;WRITE THE UPDATED DATA IN THIS LOCATION
 6574  024502  000000                  44$:    .WORD   0
 6575  024504  002451                          TMP4+1                  ;NEW DATA ELEMENT RESIDES IN TMPD+1
 6576  024506  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 6577  024510                                  ERROR                   ;ELSE, REPORT IT
  (3)  024510  104460                                                                   TRAP    C$ERROR
 6578  024512                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  024512  104410                                                                   TRAP    C$ESCAPE
  (3)  024514  000420                                                                   .WORD   L10040-.
 6579
 6580                                  ;---------- RE-"READ CURRENT ADDRESS" -----------------------------------
 6581
 6582  024516  013737  002464  024530          MOV     TMPA,46$        ;GET ADDRESS FOR THIS READ
 6583  024524  004537  004076                  JSR     R5,READ         ;READ DATA JUST WRITTEN
 6584  024530  000000                  46$:    .WORD   0
 6585  024532  002452                          TMP5
 6586  024534  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 6587  024536                                  ERROR                   ;ELSE, REPORT IT
  (3)  024536  104460                                                                   TRAP    C$ERROR
 6588  024540                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  024540  104410                                                                   TRAP    C$ESCAPE
  (3)  024542  000372                                                                   .WORD   L10040-.
 6589
 6590                                  ;---------- CHECK NEW DATA VALUE ----------------------------------------
 6591
 6592  024544  000240                          NOP
 6593  024546  000240                          NOP
 6594  024550  123737  002451  002452          CMPB    TMP4+1,TMP5     ;DID THE WRITE WORK CORRECTLY?
 6595  024556  001421                          BEQ     14$             ;YES,  PROCEED WITH TESTING
 6596  024560  032737  000006  002476          BIT     #BIT1+BIT2,TMPF ;NO,  HAS AN ERROR ALREADY BEEN REPORTED?
 6597  024566  001010                          BNE     48$             ;YES, ONLY USE ERROR HANDLER -- NO HEADER PLEASE
 6598  024570  012737  000004  002476          MOV     #BIT2,TMPF      ;NO,  INDICATE THAT WE'RE PRINTING A HEADER HERE
 6599  024576                                  GEDF    EM48A,ERR48     ;REPORT RE-WRITE ERROR
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 26
  (6)  024576  104455                                                                   TRAP    C$ERDF
  (7)  024600  000032                                                                   .WORD   26
  (7)  024602  016030                                                                   .WORD   EM48A
  (7)  024604  007644                                                                   .WORD   ERR48
 6600  024606  000405                          BR      14$             ;PROCEED WITH TESTING
 6601
 6602  024610  012737  000004  002476  48$:    MOV     #BIT2,TMPF      ;INDICATE A "POST" WRITE ERROR
 6603  024616  004737  010042                  JSR     PC,ERR48.       ;JUST REPORT DATA -- NO HEADER
```

```
6604
6605                                    ;----------  "FORWARD SEQUENCE ?"  ----------------------------------------
6606
6607  024622  000240                    14$:    NOP
6608  024624  005737  002472                    TST     TMPD            ;CHECK DIRECTION -- 0 = FORWARD
6609  024630  001056                    BNE     26$             ;REVERSE ===> PROCESS REVERSE ADDRESSING
6610                                                            ;FORWARD
6611
6612                                    ;----------  PROCESS FORWARD SEQUENCE -- "LAST ADDRESS"  ---------------------
6613
6614  024632  000240                    16$:    NOP
6615  024634  023737  002464  002474            CMP     TMPA,TMPE       ;WAS THIS ADDR. THE LAST ONE?
6616  024642  001413                    BEQ     18$             ;YES, THEN CHECK THE BIT POSITION
6617  024644  005237  002464            50$:    INC     TMPA            ;NO,  THEN INCREMENT THE ADDR.
6618
6619                                    ;  HERE WE MAKE SURE THE ADDRESS IS NOT WITHIN THE SELECT REGISTER AREA.  IF IT
6620                                    ;  IS, WE WON'T USE IT -- BUT GO BACK AND DECREMENT TO THE NEXT ADDRESS AGAIN.
6621
6622  024650  022737  000020  002464    51$:    CMP     #SLTO,TMPA      ;IS IT BELOW THE AREA WE CAN'T CHECK?
6623  024656  101237                    BMI     10$             ;YES, THEN WE CAN CHECK THIS LOCATION -- DO IT
6624  024660  023737  002440  002464            CMP     TMPO,TMPA       ;IS IT BELOW THE BOTTOM ADDRESS?
6625  024666  101633                    BLOS    10$             ;NO,  TEST THIS LOCATION
6626  024670  000765                    BR      50$             ;YES, PERFORM THE INCREMENT AGAIN
6627
6628                                    ;----------  "FWD" SEQUENCE -- "LAST BIT POSITION?"  -------------------------
6629
6630  024672  000240                    18$:    NOP
6631  024674  005037  010036                    CLR     ER48CT          ;RESET ERROR PRINT COUNT
6632  024700  023727  002466  000007            CMP     TMPB,#7         ;DID WE JUST PROCESS THE LAST BIT POSITION?
6633  024706  002016                    BGE     20$             ;YES, THEN WERE WE DOING 1'S OR 0'S
6634  024710  005237  002466                    INC     TMPB            ;NO,  THEN INCREMENT THE BIT COUNTER
6635  024714  005037  002464            24$:    CLR     TMPA            ;RE-INITIALIZE ADDRESS POINTER
6636  024720  113737  002451  002450    57$:    MOVB    TMP4+1,TMP4     ;USE "NEXT" DATA AS "CURRENT" DATA
6637  024726  013700  002470                    MOV     TMPC,R0         ;USE ONE BIT OF THE "DATA" SWITCH TO
6638  024732  006000                            ROR     R0
6639  024734  106137  002451                    ROLB    TMP4+1          ;BUILD A NEW "NEXT" DATA VALUE
6640  024740  000137  024356            55$:    JMP     10$             ;       & TEST IT
6641
6642                                    ;----------  "FWD" SEQUENCE -- "DATA = 1?"  ----------------------------------
6643
6644  024744  000240                    20$:    NOP
6645  024746  005037  002466                    CLR     TMPB            ;POINT TO BIT 0,
6646  024752  005137  002470                    COM     TMPC            ;SWITCH DATA.  IF 1'S, DO 0'S;  IF 0'S DO 1'S
6647  024756  001756                    BEQ     24$             ;IF WENT TO FORWARD, .....
6648  024760  005137  002472                    COM     TMPD            ;SWITCH DIRECTION
6649  024764  000755                    BR      57$             ;ELSE, BACKWARD.....
6650
6651                                    ;----------  "BKWD" SEQUENCE -- "ADDRESS = 0?"  ------------------------------
6652
6653  024766  000240                    26$:    NOP
6654  024770  005737  002464                    TST     TMPA            ;HAVE WE JUST PROCESSED THE FIRST ADDRESS?
6655  024774  001413                    BEQ     28$             ;YES,  CHECK BIT POSITION
6656  024776  005337  002464            52$:    DEC     TMPA            ;NO,   DECREMENT THE ADDRESS
6657
6658                                    ;  HERE WE MAKE SURE THE ADDRESS IS NOT WITHIN THE SELECT REGISTER AREA.  IF IT
6659                                    ;  IS, WE WON'T USE IT -- BUT GO BACK AND DECREMENT TO THE NEXT ADDRESS AGAIN.
```

```
6660
6661  025002  022737  000020  002464  56$:    CMP     #SLTO,TMPA      ;IS IT BELOW THE AREA WE CAN'T CHECK?
6662  025010  101031                          BHI     58$             ;YES, THEN WE CAN CHECK THIS LOCATION -- DO IT
6663  025012  023737  002440  002464          CMP     TMPO,TMPA       ;IS IT BELOW THE BOTTOM ADDRESS?
6664  025020  101425                          BLOS    58$             ;NO,  TEST THIS LOCATION
6665  025022  000765                          BR      52$             ;YES, PERFORM THE DECREMENT AGAIN
6666
6667                                  ;----------  "BKWD" SEQUENCE -- "LAST BIT POSITION"  ------------------------
6668
6669  025024  000240                  28$:    NOP
6670  025026  005037  010036                  CLR     ER48CT          ;RESET ERROR PRINT COUNT
6671  025032  022737  000007  002466          CMP     #7,TMPB         ;LAST BIT POSITION?
6672  025040  003417                          BLE     30$             ;YES, CHECK DATA
6673  025042  005237  002466                  INC     TMPB            ;NO,  INCREMENT BIT POINTER,
6674  025046  113737  002451  002450  29$:    MOVB    TMP4+1,TMP4     ;USE "NEXT" DATA AS "CURRENT" DATA
6675  025054  013700  002470                  MOV     TMPC,R0         ;USE ONE BIT OF THE "DATA" SWITCH TO
6676  025060  006000                          ROR     R0
6677  025062  106137  002451                  ROLB    TMP4+1          ;BUILD A NEW "NEXT" DATA VALUE
6678  025066  013737  002474  002464          MOV     TMPE,TMPA       ;       POINT TO LAST ADDRESS AGAIN,
6679  025074  000137  024356          58$:    JMP     10$             ;       & TEST IT
6680
6681                                  ;----------  "BKWD" SEQUENCE -- "DATA = 1?"  --------------------------------
6682
6683  025100  000240                  30$:    NOP
6684  025102  005137  002470                  COM     TMPC            ;SWITCH DATA TYPE
6685  025106  001003                          BNE     32$             ;NOW 1'S -- CHECK ADDRESS'S "LSB"
6686  025110  005037  002466                  CLR     TMPB            ;NOW 0'S -- POINT TO BIT POSITION 0 AGAIN
6687  025114  000754                          BR      29$             ;       RESET ADDRESS & TEST IT
6688
6689
6690                                  ;----------  "STOP"  ----------------------------------------------------------
6691
6692  025116  000240                  32$:    NOP
6693  025120  004537  004334          38$:    JSR     R5,WRITEI       ;CLEAR RAM LOCATION 0083 (HEX) & EXIT
6694  025124  000173                          173                     ;       (THIS CONVERTS TO 0083 HEX.)
6695  025126  000000                          0                       ;       (THIS WE HOPE, WILL CLEAR IT)
6696  025130  103001                          BCC     .+4             ;IF NO ERROR, PROCEED
6697  025132                                  ERROR                   ;ELSE, REPORT IT
 (3)  025132  104460                                                                  TRAP    C$ERROR
6698  025134                                  ENDTST                  ;THATS ALL FOLKS!
 (3)  025134                                                                        L10040:
 (3)  025134  104401                                                                 TRAP    C$ETST
6699                                  ;-------------------------------------------------------------------------
6700                                  .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
 (5)  025136                                                                    T11::
6727  025136  004737  003774          JSR     PC,MSTCLR       ;INIT DMV AND START UP THE MAINT. LOOP
6728  025142  103002                  BCC     1$              ;IF NO ERROR, PROCEED
6729  025144                          ERROR                   ;ELSE,  REPORT IT AND
 (3)  025144  104460                                                            TRAP    C$ERROR
6730  025146  000546                  BR      25$             ;       EXIT THIS CLEAR
6731
6732  025150  004537  004334    1$:   JSR     R5,WRITEI       ;CLEAR THE TIMER 1 LATCHES
6733  025154  120006                  T1LL
6734  025156  000000                  0
6735  025160  103002                  BCC     30$             ;IF AN ERROR OCCURED,
6736  025162                          ERROR                   ;REPORT IT &
 (3)  025162  104460                                                            TRAP    C$ERROR
6737  025164  000537                  BR      25$             ;  EXIT
6738  025166  004537  004334    30$:  JSR     R5,WRITEI
6739  025172  120007                  T1LH
6740  025174  000000                  0
6741  025176  103002                  BCC     31$             ;IF AN ERROR OCCURED,
6742  025200                          ERROR                   ;REPORT IT &
 (3)  025200  104460                                                            TRAP    C$ERROR
6743  025202  000530                  BR      25$             ;  EXIT
6744
6745                    ; LOAD UP THE VIA'S REGISTERS WITH THE FIXED DATA STREAM OF PATTERN "C"
6746
6747  025204  013703  002556    31$:  MOV     PATC,R3         ;GET COUNT OF # OF WRITES TO BE PERFORMED
6748  025210  012702  002560          MOV     #PATC+2,R2      ;SETUP POINTER TO REGISTER ADDRESSES & DATA
```

```
 6749
 6750  025214  012737  120000  025236  2$:     MOV     #ORB,4$         ;ADDRESS OF FIRST REGISTER
 6751  025222  152237  025236                  BISB    (R2)+,4$        ;OR IN REGISTER # TO BUILD REGISTER ADDRESS
 6752  025226  112237  025240                  MOVB    (R2)+,5$        ;THIS IS THE DATA WE WANT TO WRITE
 6753
 6754  025232  004537  004334                  JSR     R5,WRITEI       ;WRITE ONE REGISTER WITH THE DESIRED DATA
 6755  025236  000000                  4$:     0                       ;*** MODIFIED FROM ABOVE ***  DESTINATION ADDR.
 6756  025240  000000                  5$:     0                       ;*** MODIFIED FROM ABOVE ***  DATA
 6757
 6758  025242  103002                          BCC     32$             ;IF AN ERROR OCCURED,
 6759  025244                                  ERROR                   ;REPORT IT &
  (3)  025244  104460                                                                     TRAP    C$ERROR
 6760  025246  000506                          BR      25$             ;  EXIT
 6761  025250  077317                  32$:    SOB     R3,2$           ;LOOP UNTIL THE WHOLE TABLE HAS BEEN WRITTEN
 6762
 6763                                  ; READ BACK THE VIA'S REGISTERS
 6764
 6765  025252  012703  000020                  MOV     #PATCM-PATCR,R3 ;GET COUNT OF # OF REG'S TO BE READ
 6766  025256  012737  120000  025276          MOV     #ORB,7$         ;ADDRESS OF FIRST REGISTER
 6767  025264  012737  003122  025300          MOV     #BT1,8$         ;DESTINATION BUFFER AREA
 6768
 6769  025272  004537  004076          6$:     JSR     R5,READ         ;READ ONE REGISTER
 6770  025276  000000                  7$:     0                       ;*** MODIFIED FROM ABOVE ***  SOURCE ADDRESS
 6771  025300  000000                  8$:     0                       ;*** MODIFIED IN LINE *** DESTINATION ADDRESS
 6772  025302  103002                          BCC     33$             ;IF AN ERROR OCCURED,
 6773  025304                                  ERROR                   ;REPORT IT &
  (3)  025304  104460                                                                     TRAP    C$ERROR
 6774  025306  000466                          BR      25$             ;  EXIT
 6775
 6776  025310  005237  025276          33$:    INC     7$              ;POINT TO NEXT REGISTER
 6777  025314  005237  025300                  INC     8$              ;POINT TO NEXT BUFFER LOCATION
 6778  025320  077314                          SOB     R3,6$           ;LOOP UNTIL ALL REGISTERS HAVE BEEN READ
 6779
 6780                                  ; CHECK THE VALUES READ AGAINST THE EXPECTED VALUES
 6781
 6782  025322  012701  002604                  MOV     #PATCR,R1       ;POINTER TO EXPECTED DATA VALUES
 6783  025326  012702  003122                  MOV     #BT1,R2         ;POINTER TO DATA READ
 6784  025332  012704  003206                  MOV     #BT2,R4         ;POINTER TO "XOR" VALUES
 6785  025336  012705  002624                  MOV     #PATCM,R5       ;POINTER TO "MASK" VALUES
 6786  025342  012703  000010                  MOV     #8.,R3          ;NUMBER OF WORDS TO BE PROCESSED
 6787  025346  005037  002332                  CLR     ERRFLG          ;RESET THE ERROR FLAG
 6788
 6789  025352  012114                  9$:     MOV     (R1)+,(R4)      ;GET EXPECTED VALUE (2 BYTES AT A TIME)
 6790  025354  012200                          MOV     (R2)+,R0        ;GET ACTUAL VALUE AND SETUP FOR "XOR"
 6791  025356  074014                          XOR     R0,(R4)         ;DEVELOPE "XOR"
 6792  025360  042524                          BIC     (R5)+,(R4)+     ;CLEAR THOSE BITS WE DON'T CARE ABOUT
 6793  025362  001402                          BEQ     10$             ;IF NO ERROR, SKIP NEXT INSTRUCTION
 6794  025364  005237  002332                  INC     ERRFLG          ;IF ERROR,  SET FLAG TO SAY SO!
 6795  025370  077310                  10$:    SOB     R3,9$           ;LOOP UNTIL ALL VALUES CHECKED
 6796
 6797  025372  005737  002332                  TST     ERRFLG          ;WAS THERE AN ERROR DETECTED?
 6798  025376  001406                          BEQ     12$             ;NO,  PROCEED WITH TESTING
 6799  025400                                  GEDF    EM20,ERR6       ;YES, REPORT A VIA REGISTER ERROR
  (2)                                                                     ;       "DEVICE FATAL" ERROR # 27
  (6)  025400  104455                                                                     TRAP    C$ERDF
  (7)  025402  000033                                                                     .WORD   27
```

```
 (7)  025404  015255                                                        .WORD   EM20
 (7)  025406  005662                                                        .WORD   ERR6
6800  025410                        ESCAPE  TST          ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
 (3)  025410  104410                                                        TRAP    C$ESCAPE
 (3)  025412  000344                                                        .WORD   L10041-.
6801
6802
6803
6804  025414  004537  004210   12$:  JSR     R5,READI     ;GET THE CURRENT VALUE OF THE VIA'S
6805  025420  120003               DDRA                   ;   "DDRA" REGISTER FOR LATER ERROR CHECKING
6806  025422  000000          15$: 0
6807  025424  103002               BCC     34$          ;IF AN ERROR OCCURED,
6808  025426                       ERROR                ;REPORT IT &
 (3)  025426  104460                                                        TRAP    C$ERROR
6809  025430  000415               BR      25$          ;  EXIT
6810  025432  004537  004334   34$:  JSR     R5,WRITEI    ;LOAD DDRB WITH 000
6811  025436  120002               DDRB
6812  025440  000000               0
6813  025442  103002               BCC     35$          ;IF AN ERROR OCCURED,
6814  025444                       ERROR                ;REPORT IT &
 (3)  025444  104460                                                        TRAP    C$ERROR
6815  025446  000406               BR      25$          ;  EXIT
6816  025450  004537  004076   35$:  JSR     R5,READ      ;READ IT BACK AND CHECK IT
6817  025454  120002               DDRB
6818  025456  002312               BDATA
6819  025460  103002               BCC     36$          ;IF AN ERROR OCCURED,
6820  025462                       ERROR                ;REPORT IT &
 (3)  025462  104460                                                        TRAP    C$ERROR
6821  025464  000534          25$: BR      24$          ;  EXIT
6822  025466  105737  002312   36$: TSTB    BDATA        ;THIS SHOULD NOW BE ZERO
6823  025472  001413               BEQ     14$          ;IT IS, PRECEDE TESTING
6824  025474  105037  002310       CLRB    GDATA        ;IT ISN'T!  SETUP FOR & REPORT ERROR
6825  025500  012737  000002  002334   MOV     #2,REGNUM    ;IDENTIFY THE DDRB REG.
6826  025506                       GEDF    EM21,ERR7    ;       REPORT ERROR
 (2)                                                    ;       "DEVICE FATAL" ERROR # 28
 (6)  025506  104455                                                        TRAP    C$ERDF
 (7)  025510  000034                                                        .WORD   28
 (7)  025512  015454                                                        .WORD   EM21
 (7)  025514  006624                                                        .WORD   ERR7
6827  025516                        ESCAPE TST           ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
 (3)  025516  104410                                                        TRAP    C$ESCAPE
 (3)  025520  000236                                                        .WORD   L10041-.
6828
6829  025522  113737  025422  002310  14$:  MOVB    15$,GDATA    ;THIS IS WHAT WE EXPECT TO READ NOW
6830  025530  004537  004076               JSR     R5,READ      ;READ BACK DDRA -- IT SHOULD BE = 366
6831  025534  120003               DDRA
6832  025536  002312               BDATA
6833  025540  103002               BCC     37$          ;IF AN ERROR OCCURED,
6834  025542                       ERROR                ;REPORT IT &
 (3)  025542  104460                                                        TRAP    C$ERROR
6835  025544  000504               BR      24$          ;  EXIT
6836  025546  123737  002310  002312  37$:  CMPB    GDATA,BDATA  ;IS IT REALLY A 377?
6837  025554  001411               BEQ     16$          ;YES, PROCEED WITH TESTING
6838  025556  012737  000003  002334       MOV     #3,REGNUM    ;IDENTIFY THE DDRA REG.
6839  025564                       GEDF    EM22,ERR7    ;NO,    REPORT ERROR
 (2)                                                    ;       "DEVICE FATAL" ERROR # 29
```

```
  (6)  025564  104455                                                                  TRAP    C$ERDF
  (7)  025566  000035                                                                  .WORD   29
  (7)  025570  015511                                                                  .WORD   EM22
  (7)  025572  006624                                                                  .WORD   ERR7
6840   025574                          ESCAPE TST              ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
  (3)  025574  104410                                                                  TRAP    C$ESCAPE
  (3)  025576  000160                                                                  .WORD   L10041-.
6841
6842   025600  004537  004334    16$:  JSR     R5,WRITEI       ;RE-LOAD DDRB WITH 377
6843   025604  120002                  DDRB
6844   025606  177777    17$:  -1
6845   025610  103002                  BCC     38$             ;IF AN ERROR OCCURED,
6846   025612                          ERROR                   ;REPORT IT &
  (3)  025612  104460                                                                  TRAP    C$ERROR
6847   025614  000460                  BR      24$             ;  EXIT
6848   025616  004537  004334    38$:  JSR     R5,WRITEI       ;AND NOW CLEAR DDRA TO ZEROS
6849   025622  120003                  DDRA
6850   025624  000000                  0
6851   025626  103002                  BCC     39$             ;IF AN ERROR OCCURED,
6852   025630                          ERROR                   ;REPORT IT &
  (3)  025630  104460                                                                  TRAP    C$ERROR
6853   025632  000451                  BR      24$             ;  EXIT
6854
6855   025634  004537  004076    39$:  JSR     R5,READ         ;NOW, DID DDRA GO TO ZEROES
6856   025640  120003                  DDRA
6857   025642  002312                  BDATA
6858   025644  105737  002312          TSTB    BDATA
6859   025650  001413                  BEQ     18$             ;YES, BUT WHAT ABOUT DDRB?
6860   025652  105037  002310          CLRB    GDATA           ;NO,  SETUP FOR AND
6861   025656  012737  000003  002334  MOV     #3,REGNUM       ;IDENTIFY THE DDRA REG.
6862   025664                          GEDF    EM21,ERR7       ;       REPORT THE ERROR
  (2)                                                         ;       "DEVICE FATAL" ERROR # 30
  (6)  025664  104455                                                                  TRAP    C$ERDF
  (7)  025666  000036                                                                  .WORD   30
  (7)  025670  015454                                                                  .WORD   EM21
  (7)  025672  006624                                                                  .WORD   ERR7
6863   025674                          ESCAPE  TST             ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
  (3)  025674  104410                                                                  TRAP    C$ESCAPE
  (3)  025676  000060                                                                  .WORD   L10041-.
6864
6865   025700  004537  004076    18$:  JSR     R5,READ         ;WHAT ABOUT DDRB -- IT SHOULD BE 377 NOW
6866   025704  120002                  DDRB
6867   025706  002312                  BDATA
6868   025710  103002                  BCC     40$             ;IF AN ERROR OCCURED,
6869   025712                          ERROR                   ;REPORT IT &
  (3)  025712  104460                                                                  TRAP    C$ERROR
6870   025714  000420                  BR      24$             ;  EXIT
6871   025716  123737  002312  025606  40$:  CMPB    BDATA,17$       ;IS IT?
6872   025724  001414                  BEQ     24$             ;YES, EXIT TEST
6873   025726  113737  025606  002310  MOVB    17$,GDATA       ;NO,  SETUP FOR AND
6874   025734  012737  000002  002334  MOV     #2,REGNUM       ;IDENTIFY THE DDRB REG.
6875   025742                          GEDF    EM22A,ERR7      ;       REPORT ERROR
  (2)                                                         ;       "DEVICE FATAL" ERROR # 31
  (6)  025742  104455                                                                  TRAP    C$ERDF
  (7)  025744  000037                                                                  .WORD   31
  (7)  025746  015544                                                                  .WORD   EM22A
```

```
  (7)  025750  006624                                                    .WORD   ERR7
6876   025752                        ESCAPE  TST          ;EXIT FROM THIS TEST -- LOOP IF REQUESTED
  (3)  025752  104410                                                    TRAP    C$ESCAPE
  (3)  025754  000002                                                    .WORD   L10041-.
6877
6878   025756                 24$:   ENDTST
  (3)  025756                                                  L10041:
  (3)  025756  104401                                                    TRAP    C$ETST
```

```
                        .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
                                                                                T12::
6891  025760  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
6892  025764  103003                  BCC     30$             ;IF AN ERROR OCCURED,
6893  025766                          ERROR                   ;REPORT IT &
 (3)  025766  104460                                                    TRAP    C$ERROR
6894  025770                          ESCAPE  TST             ;  EXIT
 (3)  025770  104410                                                    TRAP    C$ESCAPE
 (3)  025772  000046                                                    .WORD   L10042-.
6895
6896  025774  012701  002526  30$:    MOV     #PATB,R1        ;POINT TO PATTERN TABLE
6897  026000  012103                  MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
6898
6899  026002                  T12.LP:
6900  026002                          BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
 (3)  026002                                                            T12.1:
 (3)  026002  104402                                                    TRAP    C$BSUB
6901
6902  026004  111137  002306          MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
6903  026010  112137  002310          MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
6904  026014  012700  120002          MOV     #DDRB,R0        ;SPECIFY THE REGISTER BEING TESTED
6905  026020  004737  005046          JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
6906  026024  103003                  BCC     10$             ;WAS AN ERROR FOUND?
6907  026026                          ERROR                   ;YES, REPORT IT AND
 (3)  026026  104460                                                    TRAP    C$ERROR
6908  026030                          ESCAPE  TST             ;       EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
 (3)  026030  104410                                                    TRAP    C$ESCAPE
 (3)  026032  000006                                                    .WORD   L10042-.
6909
6910  026034                  10$:    ENDSUB
 (3)  026034                                                    L10043:
 (3)  026034  104403                                                    TRAP    C$ESUB
6911
6912  026036  077317                  SOB     R3,T12.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
6913                                                          ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
6914
6915  026040                          ENDTST
 (3)  026040                                                    L10042:
 (3)  026040  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
                                                                                T13::
6929  026042  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
6930  026046  103003                   BCC     30$             ;IF AN ERROR OCCURED,
6931  026050                           ERROR                   ;REPORT IT &
 (3)  026050  104460                                                    TRAP    C$ERROR
6932  026052                           ESCAPE  TST             ;  EXIT
 (3)  026052  104410                                                    TRAP    C$ESCAPE
 (3)  026054  000046                                                    .WORD   L10044-.
6933
6934  026056  012701  002526    30$:    MOV     #PATB,R1        ;POINT TO PATTERN TABLE
6935  026062  012103                   MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
6936
6937  026064                    T13.LP:
6938  026064                           BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
 (3)  026064                                                            T13.1:
 (3)  026064  104402                                                    TRAP    C$BSUB
6939
6940  026066  111137  002306           MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
6941  026072  112137  002310           MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
6942  026076  012700  120003           MOV     #DDRA,R0        ;SPECIFY THE REGISTER BEING TESTED
6943  026102  004737  005046           JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
6944  026106  103003                   BCC     10$             ;WAS AN ERROR FOUND?
6945  026110                           ERROR                   ;YES, REPORT IT AND
 (3)  026110  104460                                                    TRAP    C$ERROR
6946  026112                           ESCAPE  TST             ;       EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
 (3)  026112  104410                                                    TRAP    C$ESCAPE
 (3)  026114  000006                                                    .WORD   L10044-.
6947
6948  026116                    10$:    ENDSUB
 (3)  026116                                                                    L10045:
 (3)  026116  104403                                                    TRAP    C$ESUB
6949
6950  026120  077317                   SOB     R3,T13.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
6951                                                            ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
6952
6953  026122                           ENDTST
 (3)  026122                                                                    L10044:
 (3)  026122  104401                                                    TRAP    C$ETST
```

```
                                .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
                                                                                        T14::
6968  026124  004737  003774            JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
6969  026130  103003                    BCC     30$             ;IF AN ERROR OCCURED,
6970  026132                            ERROR                   ;REPORT IT &
 (3)  026132  104460                                                            TRAP    C$ERROR
6971  026134                            ESCAPE  TST             ;  EXIT
 (3)  026134  104410                                                            TRAP    C$ESCAPE
 (3)  026136  000066                                                            .WORD   L10046-.
6972
6973  026140  004537  004334    30$:    JSR     R5,WRITEI       ;INITIALIZE PORT B FOR I/O
6974  026144  120002                    DDRB
6975  026146  177777                    -1
6976  026150  103003                    BCC     31$             ;IF AN ERROR OCCURED,
6977  026152                            ERROR                   ;REPORT IT &
 (3)  026152  104460                                                            TRAP    C$ERROR
6978  026154                            ESCAPE  TST             ;  EXIT
 (3)  026154  104410                                                            TRAP    C$ESCAPE
 (3)  026156  000046                                                            .WORD   L10046-.
6979
6980  026160  012701  002526    31$:    MOV     #PATB,R1        ;POINT TO PATTERN TABLE
6981  026164  012103                    MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
6982
6983  026166                    T14.LP:
6984  026166                            BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
 (3)  026166                                                                    T14.1:
 (3)  026166  104402                                                            TRAP    C$BSUB
6985
6986  026170  111137  002306            MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
6987  026174  112137  002310            MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
6988  026200  012700  120000            MOV     #ORB,R0         ;SPECIFY THE REGISTER BEING TESTED
6989  026204  004737  005046            JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
6990  026210  103003                    BCC     10$             ;WAS AN ERROR FOUND?
6991  026212                            ERROR                   ;YES, REPORT IT AND
 (3)  026212  104460                                                            TRAP    C$ERROR
6992  026214                            ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
 (3)  026214  104410                                                            TRAP    C$ESCAPE
 (3)  026216  000006                                                            .WORD   L10046-.
6993
```

```
 6994  026220                          10$:    ENDSUB
  (3)  026220                                                                  L10047:
  (3)  026220  104403                                                                    TRAP    C$ESUB
 6995
 6996  026222  077317                          SOB     R3,T14.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
 6997                                                                  ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
 6998
 6999  026224                                  ENDTST
  (3)  026224                                                                  L10046:
  (3)  026224  104401                                                                    TRAP    C$ETST
```

```
7060                            .SBTTL TEST 15 -- VIA'S T1 DATA READ/WRITE
 (2)
 (2)                            ;+*********************************************************************************
 (2)                            ;*
 (2)                            ;*      TEST 15 -- VIA'S T1 DATA READ/WRITE
 (2)                            ;*
 (3)                            ;*      T1 == "TIMER #1"
 (3)                            ;*
 (3)                            ;* THIS TEST WRITES, READS, AND CHECKS THE T1 LATCHES AND COUNTER REGISTERS
 (3)                            ;* WITH DATA PATTERNS IN EACH OF 3 SUBTESTS.
 (3)                            ;*
 (3)                            ;*
 (3)                            ;* FIRST SUBTEST:  CHECKS FOR PROPER LOADING OF LATCHES
 (3)                            ;*      IT ALSO CHECKS TO BE SURE THAT THE COUNTER APPEARS TO BE DOING
 (3)                            ;*      SOMETHING TO THE COUNTERS.  AS LONG AS THEY HAVE CHANGED FROM THE
 (3)                            ;*      VALUE LOADED INTO THEM, WE WILL BE SATISFIED.
 (3)                            ;*
 (3)                            ;* A. A MASTER CLEAR IS PERFORMED.
 (3)                            ;* B. ALL LATCHES ARE LOADED TO ZEROES (JUST IN CASE), ACR6 & ACR7 ARE SET
 (3)                            ;*    TO ZERO (MODE 00), AND "T1" INTERRUPT ENABLE FLAG IS CLEARED.
 (3)                            ;*
 (3)                            ;* C. T1L-L(ADR 04) IS LOADED WITH THE CURRENT BYTE OF DATA PATTERN B.
 (3)                            ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
 (3)                            ;* E. T1C-L(ADR 04) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
 (3)                            ;*
 (3)                            ;* F. T1L-L(ADR 06) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
 (3)                            ;* G. T1L-L(ADR 06) IS READ AND COMPARED TO THE BYTE JUST WRITTEN.
 (3)                            ;*
 (3)                            ;* H. T1L-L(ADR 06) IS RE-LOADED WITH 0 TO MAKE T1C-H DECREMENT FAST.
 (3)                            ;*    T1L-H(ADR 05) IS LOADED WITH THE ORIGINAL TEST DATA PATTERN BYTE.
 (3)                            ;* I. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE LOADED INTO T1L-H.
 (3)                            ;*
 (3)                            ;* J. T1C-H(ADR 05) IS READ AND CHECKED TO BE DIFFERENT THAN THE TEST BYTE.
 (3)                            ;*
 (3)                            ;* K. T1L-H(ADR 07) IS LOADED WITH THE COMPLEMENT OF THE CURRENT DATA BYTE.
 (3)                            ;* L. T1L-H(ADR 07) IS READ AND COMPARED TO THE BYTE JUST LOADED.
 (3)                            ;*
 (3)                            ;* M. STEPS C-L ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
 (3)                            ;*
 (3)                            ;*
 (3)                            ;* SECOND SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
 (3)                            ;*                  FROM T1L-L TO T1L-H
 (3)                            ;*
 (3)                            ;* A. T1L-H(ADR 07) IS LOADED WITH 000 TO CLEAR IT.
 (3)                            ;* B. T1L-L(ADR 06) IS LOADED WITH A BYTE OF DATA PATTERN B.
 (3)                            ;* C. T1L-L(ADR 06) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
 (3)                            ;* D. T1L-H(ADR 07) IS READ AND COMPARED TO 000.
 (3)                            ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
 (3)                            ;*
 (3)                            ;*
 (3)                            ;* THIRD SUBTEST:  CHECKS FOR CROSS-TALK AND ADDRESSING ERRORS
 (3)                            ;*                  FROM T1L-H TO T1L-L
 (3)                            ;*
 (3)                            ;* A. T1L-L(ADR 04) IS LOADED WITH 000 TO CLEAR IT
 (3)                            ;* B. T1L-H(ADR 07) IS LOADED WITH A BYTE OF DATA PATTERN B.
 (3)                            ;* C. T1L-H(ADR 07) IS READ AND COMPARED TO THE DATA JUST WRITTEN.
```

```
  (3)                           ;* D. T1L-L(ADR 06) IS READ AND COMPARED TO 000.
  (3)                           ;* E. STEPS B-D ARE REPEATED USING EACH BYTE OF DATA PATTERN B.
  (3)                           ;*
  (3)                           ;*   DATA PATTERN B = 125, 252, 000, 377, 001, 002, 004, 010, 020, 040, 100,
  (3)                           ;*                    200, 376, 375, 373, 367, 357, 337, 277, 177, 000
  (2)                           ;*
  (2)                           ;--**********************************************************************************
  (2)                           ;
  (2)                           ;       BGNTST
  (5)  026226                                                                                    T15::
7061
7062                            ; ***---*** STEP A ***---***
7063
7064  026226  004737  003774            JSR     PC,MSTCLR       ;INIT DMV & START UP M-LOOP
7065  026232  103003                    BCC     1$              ;IF NO ERRORS, PROCEED
7066  026234                            ERROR                   ;ELSE, REPORT ERROR &
  (3)  026234  104460                                                                    TRAP    C$ERROR
7067  026236                            ESCAPE  TST             ;       GET OUT OF THE TEST
  (3)  026236  104410                                                                    TRAP    C$ESCAPE
  (3)  026240  001030                                                                    .WORD   L10050-.
7068  026242                    1$:
7069
7070                            ; ***---*** STEP B ***---***
7071
7072  026242  004537  004672            JSR     R5,INITT1       ;INITIALIZE THE TIMER'S REGISTERS
7073  026246  000000                    0                       ; WITH ZEROES
7074  026250  000000                    .WORD   0               ; 00 --> ACR6 & ACR7 AND DISABLE INTERRUPTS
7075  026252  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
7076  026254                            ERROR                   ;ELSE, REPORT IT
  (3)  026254  104460                                                                    TRAP    C$ERROR
7077  026256                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  026256  104410                                                                    TRAP    C$ESCAPE
  (3)  026260  001010                                                                    .WORD   L10050-.
7078
7079                            ;WE WANT THE LEAST ACTIVE OPERATING MODE FOR THIS TIMER WHILE WE ARE TESTING
7080                            ;IT.  THE MODE WE'RE USING HERE IS DOCUMENTED THUSLY:  "GENERATE A SINGLE
7081                            ;TIME-OUT INTERRUPT EACH TIME T1 IS LOADED.  PB7 DISABLED."
7082                            ;AS AN ADDED PRECAUTION, WE ARE DISABLING INTERRUPTS BY CLEARING THE "T1" FLAG
7083                            ;WITHIN "IER".
7084
7085  026262                            BGNSUB                  ;BEGIN THE FIRST SUBTEST
  (3)  026262                                                                            T15.1:
  (3)  026262  104402                                                                    TRAP    C$BSUB
7086  026264  012701  002526            MOV     #PATB,R1        ;POINT TO THE APPROPRIATE PATTERN TABLE
7087  026270  012103                    MOV     (R1)+,R3        ;EXTRACT THE BYTE COUNT FROM THE TABLE
7088
7089  026272                    T16.LP:
7090  026272  112137  002306            MOVB    (R1)+,TDATA     ;GET ONE BYTE OF THE TEST DATA
7091  026276  013737  002306  002310     MOV     TDATA,GDATA     ;THE TEST DATA IS NORMALLY THE GOOD DATA TOO
7092
7093  026304                            BGNSEG
  (3)  026304  104404                                                                    TRAP    C$BSEG
7094
7095                            ; ***---*** STEP C ***---***
7096
7097  026306  004537  004322            JSR     R5,WRITE        ;LOAD T1L-L(ADDR 04)
```

```
                                        T1CL
                                        TDATA                   ;THE TEST DATA FROM "TDATA"

                                ; ***---*** STEP D ***---***

                                        JSR     R5,READ         ;READ T1L-L(ADDR 06)
                                        T1LL
                                        BDATA
                                        CMPB    GDATA,BDATA     ;AND CHECK IT
                                        BEQ     2$              ;IF OK, PROCEED
                                        MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
                                        GEDF    EM20,ERR7       ; REPORT FAILURE
                                                                ;       "DEVICE FATAL" ERROR # 32
                                                                                        TRAP    C$ERDF
                                                                                        .WORD   32
                                                                                        .WORD   EM20
                                                                                        .WORD   ERR7

                                ; ***---*** STEP E ***---***

                                2$:     JSR     R5,READ         ;READ T1C-L(ADDR 04)
                                        T1CL
                                        BDATA
                                        CMPB    GDATA,BDATA     ;AND CHECK IT. SEEING AS THE TIMER IS RUNNING,
                                        BNE     4$              ;THIS MUST NOT EQUAL THE SET VALUE!
                                        JSR     R5,READ         ;IF IT IS, MAYBE WE JUST READ IT AT THE WRONG
                                        T1CL                    ;TIME!  RE-READ AND CHECK ONE MORE TIME.
                                        BDATA
                                        CMPB    GDATA,BDATA     ;CHECK IT AGAIN, SAM.
                                        BNE     4$              ;THIS TIME IT SHOULD BE DIFFERENT.
                                                                ;OTHERWISE, WE HAVE A LEGITIMATE FAILURE
                                        MOV     #4,REGNUM       ;  IDENTIFY THE FAILING REGISTER &
                                        GEDF    EM20A,ERR7      ;  REPORT FAILURE
                                                                ;       "DEVICE FATAL" ERROR # 33
                                                                                        TRAP    C$ERDF
                                                                                        .WORD   33
                                                                                        .WORD   EM20A
                                                                                        .WORD   ERR7

                                ; ***---*** STEP F ***---***

                                4$:     COMB    TDATA           ;USE THE ONE'S COMPLEMENT THIS TIME
                                        COMB    GDATA           ;THE EXPECTED DATA IS ALSO THE COMPLEMENT
                                        JSR     R5,WRITE        ;LOAD T1L-L(ADDR 06)
                                        T1LL
                                        TDATA                   ;THE TEST DATA FROM "TDATA"

                                ; ***---*** STEP G ***---***

                                6$:     JSR     R5,READ         ;READ T1L-L(ADDR 06)
                                        T1LL
                                        BDATA
                                        CMPB    GDATA,BDATA     ;AND CHECK IT
                                        BEQ     8$              ;IF OK, PROCEED
                                        MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
```

```
                                        GEDF    EM20,ERR7       ; REPORT FAILURE
 (2)                                                            ;       "DEVICE FATAL" ERROR # 34
 (6)  026500  104455                                                            TRAP    C$ERDF
 (7)  026502  000042                                                            .WORD   34
 (7)  026504  015255                                                            .WORD   EM20
 (7)  026506  006624                                                            .WORD   ERR7
                                ; ***---*** STEP H ***---***
                        8$:     COMB    TDATA           ;RESTORE THE DATA TO THE ORIGINAL VALUE
                                COMB    GDATA
                                JSR     R5,WRITEI       ;SET THE LOW LATCH TO MAKE SURE THE HIGH
                                T1LL                    ;COUNTER IS DOING MOST OF THE WORK
                                1
                                JSR     R5,WRITE        ;LOAD T1L-H(ADDR 05)
                                T1CH
                                TDATA                   ;THE TEST DATA FROM "TDATA"
                                ; ***---*** STEP I ***---***
                                JSR     R5,READ         ;READ T1L-H(ADDR 07)
                                T1LH
                                BDATA
                                CMPB    GDATA,BDATA     ;AND CHECK IT
                                BEQ     10$             ;IF OK, PROCEED
                                MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
                                GEDF    EM20,ERR7       ; REPORT FAILURE
 (2)                                                            ;       "DEVICE FATAL" ERROR # 35
 (6)  026566  104455                                                            TRAP    C$ERDF
 (7)  026570  000043                                                            .WORD   35
 (7)  026572  015255                                                            .WORD   EM20
 (7)  026574  006624                                                            .WORD   ERR7
                                ; ***---*** STEP J ***---***
                        10$:    JSR     R5,READ         ;READ T1C-H(ADDR 05)
                                T1CH
                                BDATA
                                MOV     #5,REGNUM       ;IDENTIFY THE REGISTER BEING CHECKED
                                TSTB    TDATA           ;WAS THE TEST DATA "000"?
                                BEQ     14$             ;YES, THEN WE CAN'T BE SURE OF THE RESULTS!
                                CMPB    GDATA,BDATA     ;NO, CHECK IT
                                BNE     14$             ;IT SHOULDN'T = THE LOADED VALUE
                                GEDF    EM20A,ERR7      ;IT DID!  REPORT FAILURE
 (2)                                                            ;       "DEVICE FATAL" ERROR # 36
 (6)  026632  104455                                                            TRAP    C$ERDF
 (7)  026634  000044                                                            .WORD   36
 (7)  026636  015307                                                            .WORD   EM20A
 (7)  026640  006624                                                            .WORD   ERR7
                                                                ;AND CONTINUE TESTING
                                ; ***---*** STEP K ***---***
                        14$:    COMB    TDATA           ;USE THE ONE'S COMPLEMENT THIS TIME
                                COMB    GDATA           ;THE EXPECTED DATA IS ALSO THE COMPLEMENT
                                JSR     R5,WRITE        ;LOAD T1L-H(ADDR 07)
                                T1LH
```

```
 7185  026660  002306                          TDATA                   ;THE TEST DATA FROM "TDATA"
 7186
 7187                                  ; ***---*** STEP L ***---***
 7188
 7189  026662  004537  004076                  JSR     R5,READ         ;READ T1L-H(ADDR 07)
 7190  026666  120007                          T1LH
 7191  026670  002312                          BDATA
 7192  026672  123737  002310  002312          CMPB    GDATA,BDATA     ;AND CHECK IT
 7193  026700  001407                          BEQ     16$             ;IF OK, PROCEED
 7194  026702  012737  000007  002334          MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
 7195  026710                                  GEDF    EM20,ERR7       ; REPORT FAILURE
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 37
  (6)  026710  104455                                                                   TRAP    C$ERDF
  (7)  026712  000045                                                                   .WORD   37
  (7)  026714  015255                                                                   .WORD   EM20
  (7)  026716  006624                                                                   .WORD   ERR7
 7196
 7197                                  ; ***---*** STEP M ***---***
 7198
 7199  026720                          16$:    ENDSEG
  (3)  026720                                                                   10000$:
  (3)  026720  104405                                                                   TRAP    C$ESEG
 7200
 7201  026722  000402                          BR      21$
 7202  026724  000137  026272          20$:    JMP     T16.LP
 7203  026730  077303                  21$:    SOB     R3,20$          ;IF MORE DATA, DO ANOTHER BYTE
 7204                                                                  ;ELSE, EXIT SUBTEST
 7205  026732                                  ENDSUB
  (3)  026732                                                                   L10051:
  (3)  026732  104403                                                                   TRAP    C$ESUB
 7206
 7207
 7208  026734                                  BGNSUB                  ;BEGIN THE SECOND SUBTEST
  (3)  026734                                                                   T15.2:
  (3)  026734  104402                                                                   TRAP    C$BSUB
 7209  026736  012701  002526                  MOV     #PATB,R1        ;POINT TO THE APPROPRIATE PATTERN TABLE
 7210  026742  012103                          MOV     (R1)+,R3        ;EXTRACT THE BYTE COUNT FROM THE TABLE
 7211
 7212  026744                          T16.L1:
 7213  026744  112137  002306                  MOVB    (R1)+,TDATA     ;GET ONE BYTE OF THE TEST DATA
 7214  026750  013737  002306  002310          MOV     TDATA,GDATA     ;THE TEST DATA IS NORMALLY THE GOOD DATA TOO
 7215
 7216
 7217                                  ; ***---*** STEP A ***---***
 7218
 7219  026756  004537  004334                  JSR     R5,WRITEI       ;CLEAR T1L-H(ADDR 07)
 7220  026762  120007                          T1LH
 7221  026764  000000                          0                       ;THE TEST DATA FROM "TDATA"
 7222
 7223  026766                                  BGNSEG
  (3)  026766  104404                                                                   TRAP    C$BSEG
 7224
 7225                                  ; ***---*** STEP B ***---***
 7226
 7227  026770  004537  004322                  JSR     R5,WRITE        ;LOAD T1L-L(ADDR 06)
 7228  026774  120006                          T1LL
```

```
7229  026776  002306                          TDATA                   ;THE TEST DATA FROM "TDATA"
7230
7231                                  ; ***---*** STEP C ***---***
7232
7233  027000  004537  004076                  JSR     R5,READ         ;READ T1L-L(ADDR 06)
7234  027004  120006                          T1LL
7235  027006  002312                          BDATA
7236  027010  123737  002310  002312          CMPB    GDATA,BDATA     ;AND CHECK IT
7237  027016  001407                          BEQ     2$              ;IF OK, PROCEED
7238  027020  012737  000006  002334          MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
7239  027026                                  GEDF    EM20,ERR7       ; REPORT FAILURE
 (2)                                                                  ;       "DEVICE FATAL" ERROR # 38
 (6)  027026  104455                                                                  TRAP    C$ERDF
 (7)  027030  000046                                                                  .WORD   38
 (7)  027032  015255                                                                  .WORD   EM20
 (7)  027034  006624                                                                  .WORD   ERR7
7240
7241                                  ; ***---*** STEP D ***---***
7242
7243  027036  004537  004076          2$:     JSR     R5,READ         ;READ T1L-H(ADDR 07)
7244  027042  120007                          T1LH
7245  027044  002312                          BDATA
7246  027046  105737  002312                  TSTB    BDATA           ;AND CHECK IT -- THIS SHOULD STILL BE ZERO
7247  027052  001411                          BEQ     10$             ;IF OK, PROCEED
7248  027054  005037  002310                  CLR     GDATA
7249  027060  012737  000007  002334          MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
7250  027066                                  GEDF    EM20B,ERR7      ; REPORT FAILURE
 (2)                                                                  ;       "DEVICE FATAL" ERROR # 39
 (6)  027066  104455                                                                  TRAP    C$ERDF
 (7)  027070  000047                                                                  .WORD   39
 (7)  027072  015367                                                                  .WORD   EM20B
 (7)  027074  006624                                                                  .WORD   ERR7
7251
7252                                  ; ***---*** STEP E ***---***
7253
7254  027076                          10$:    ENDSEG
 (3)  027076                                                                  10000$:
 (3)  027076  104405                                                                  TRAP    C$ESEG
7255
7256  027100  000402                          BR      21$
7257  027102  000137  026744          20$:    JMP     T16.L1
7258  027106  077303                  21$:    SOB     R3,20$          ;IF MORE DATA, DO ANOTHER BYTE
7259                                                                  ;ELSE, EXIT SUBTEST
7260  027110                                  ENDSUB
 (3)  027110                                                                  L10052:
 (3)  027110  104403                                                                  TRAP    C$ESUB
7261
7262
7263  027112                                  BGNSUB                  ;BEGIN THE THIRD SUBTEST
 (3)  027112                                                                  T15.3:
 (3)  027112  104402                                                                  TRAP    C$BSUB
7264  027114  012701  002526                  MOV     #PATB,R1        ;POINT TO THE APPROPRIATE PATTERN TABLE
7265  027120  012103                          MOV     (R1)+,R3        ;EXTRACT THE BYTE COUNT FROM THE TABLE
7266
7267  027122                          T16.L2:
7268  027122  112137  002306                  MOVB    (R1)+,TDATA     ;GET ONE BYTE OF THE TEST DATA
```

```
 7269  027126  013737  002306  002310          MOV     TDATA,GDATA     ;THE TEST DATA IS NORMALLY THE GOOD DATA TOO
 7270
 7271
 7272                                  ; ***---*** STEP A ***---***
 7273
 7274  027134  004537  004334                  JSR     R5,WRITEI       ;CLEAR T1L-L(ADDR 04)
 7275  027140  120004                          T1CL
 7276  027142  000000                          0
 7277
 7278  027144                                  BGNSEG
  (3)  027144  104404                                                                  TRAP    C$BSEG
 7279
 7280                                  ; ***---*** STEP B ***---***
 7281
 7282  027146  004537  004322                  JSR     R5,WRITE        ;LOAD T1L-H(ADDR 07)
 7283  027152  120007                          T1LH
 7284  027154  002306                          TDATA                   ;THE TEST DATA FROM "TDATA"
 7285
 7286                                  ; ***---*** STEP C ***---***
 7287
 7288  027156  004537  004076                  JSR     R5,READ         ;READ T1L-H(ADDR 07)
 7289  027162  120007                          T1LH
 7290  027164  002312                          BDATA
 7291  027166  123737  002310  002312          CMPB    GDATA,BDATA     ;AND CHECK IT
 7292  027174  001407                          BEQ     10$             ;IF OK, PROCEED
 7293  027176  012737  000007  002334          MOV     #7,REGNUM       ;IDENTIFY THE FAILING REGISTER &
 7294  027204                                  GEDF    EM20,ERR7       ; REPORT FAILURE
  (2)                                                                 ;       "DEVICE FATAL" ERROR # 40
  (6)  027204  104455                                                                  TRAP    C$ERDF
  (7)  027206  000050                                                                  .WORD   40
  (7)  027210  015255                                                                  .WORD   EM20
  (7)  027212  006624                                                                  .WORD   ERR7
 7295
 7296                                  ; ***---*** STEP D ***---***
 7297
 7298  027214  004537  004076          10$:    JSR     R5,READ         ;READ T1L-L(ADDR 06)
 7299  027220  120006                          T1LL
 7300  027222  002312                          BDATA
 7301  027224  105737  002312                  TSTB    BDATA           ;AND CHECK IT
 7302  027230  001411                          BEQ     2$              ;IF OK, PROCEED
 7303  027232  005037  002310                  CLR     GDATA
 7304  027236  012737  000006  002334          MOV     #6,REGNUM       ;IDENTIFY THE FAILING REGISTER &
 7305  027244                                  GEDF    EM20B,ERR7      ; REPORT FAILURE
  (2)                                                                 ;       "DEVICE FATAL" ERROR # 41
  (6)  027244  104455                                                                  TRAP    C$ERDF
  (7)  027246  000051                                                                  .WORD   41
  (7)  027250  015367                                                                  .WORD   EM20B
  (7)  027252  006624                                                                  .WORD   ERR7
 7306
 7307                                  ; ***---*** STEP E ***---***
 7308
 7309  027254                          2$:     ENDSEG
  (3)  027254                                                                 10000$:
  (3)  027254  104405                                                                  TRAP    C$ESEG
 7310
 7311  027256  000402                          BR      21$
```

```
 7312  027260  000137  027122          20$:    JMP     T16.L2
 7313  027264  077303                  21$:    SOB     R3,20$          ;IF MORE DATA, DO ANOTHER BYTE
 7314                                                                  ;ELSE, EXIT SUBTEST
 7315  027266                          ENDSUB
  (3)  027266                                                                  L10053:
  (3)  027266  104403                                                                 TRAP    C$ESUB
 7316
 7317  027270                          ENDTST
  (3)  027270                                                                  L10050:
  (3)  027270  104401                                                                 TRAP    C$ETST
```

```
                        .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
                                                                                T16::
027272
027272  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
027276  103003                  BCC     30$             ;IF AN ERROR OCCURED,
027300                          ERROR                   ;REPORT IT &
027300  104460                                                          TRAP    C$ERROR
027302                          ESCAPE  TST             ;  EXIT
027302  104410                                                          TRAP    C$ESCAPE
027304  000046                                                          .WORD   L10054-.

027306  012701  002526  30$:    MOV     #PATB,R1        ;POINT TO PATTERN TABLE
027312  012103                  MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE

027314                  T18.LP:
027314                          BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
027314                                                                  T16.1:
027314  104402                                                          TRAP    C$BSUB

027316  111137  002306          MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
027322  112137  002310          MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
027326  012700  120012          MOV     #SR,R0          ;SPECIFY THE REGISTER BEING TESTED
027332  004737  005046          JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
027336  103003                  BCC     10$             ;WAS AN ERROR FOUND?
027340                          ERROR                   ;YES, REPORT IT AND
027340  104460                                                          TRAP    C$ERROR
027342                          ESCAPE  TST             ;       EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
027342  104410                                                          TRAP    C$ESCAPE
027344  000006                                                          .WORD   L10054-.

027346                  10$:    ENDSUB
027346                                                          L10055:
027346  104403                                                          TRAP    C$ESUB

027350  077317                  SOB     R3,T18.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
                                                        ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST

027352                          ENDTST
027352                                                          L10054:
027352  104401                                                          TRAP    C$ETST
```

```
                                .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
                                                                                        T17::
7369  027354  004737  003774            JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
7370  027360  103003                    BCC     30$             ;IF AN ERROR OCCURED,
7371  027362                            ERROR                   ;REPORT IT &
 (3)  027362  104460                                                            TRAP    C$ERROR
7372  027364                            ESCAPE  TST             ;  EXIT
 (3)  027364  104410                                                            TRAP    C$ESCAPE
 (3)  027366  000046                                                            .WORD   L10056-.
7373
7374  027370  012701  002526    30$:    MOV     #PATB,R1        ;POINT TO PATTERN TABLE
7375  027374  012103                    MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
7376
7377  027376                    T19.LP:
7378  027376                            BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
 (3)  027376                                                                    T17.1:
 (3)  027376  104402                                                            TRAP    C$BSUB
7379
7380  027400  111137  002306            MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
7381  027404  112137  002310            MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
7382  027410  012700  120013            MOV     #ACR,R0         ;SPECIFY THE REGISTER BEING TESTED
7383  027414  004737  005046            JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
7384  027420  103003                    BCC     10$             ;WAS AN ERROR FOUND?
7385  027422                            ERROR                   ;YES, REPORT IT AND
 (3)  027422  104460                                                            TRAP    C$ERROR
7386  027424                            ESCAPE  TST             ;     EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
 (3)  027424  104410                                                            TRAP    C$ESCAPE
 (3)  027426  000006                                                            .WORD   L10056-.
7387
7388  027430                    10$:    ENDSUB
 (3)  027430                                                            L10057:
 (3)  027430  104403                                                            TRAP    C$ESUB
7389
7390  027432  077317                    SOB     R3,T19.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
7391                                                            ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
7392
7393  027434                            ENDTST
 (3)  027434                                                            L10056:
 (3)  027434  104401                                                            TRAP    C$ETST
```

```
 7406                                   .SBTTL TEST 18 -- VIA'S PCR DATA READ/WRITE
  (2)
  (2)                                   ;+*********************************************************************************
  (2)                                   ;*
  (2)                                   ;*      TEST 18 -- VIA'S PCR DATA READ/WRITE
  (2)                                   ;*
  (3)                                   ;*      PCR == "PERIPHERAL CONTROL REGISTER"
  (3)                                   ;*
  (3)                                   ;* FIRST, A MASTER CLEAR IS PERFORMED. THEN :
  (3)                                   ;* READ/WRITE BITS 0-7 OF THE PCR REGISTER ARE TESTED BY WRITING, READING,
  (3)                                   ;* AND COMPARING EACH BYTE OF A SUBSET OF DATA PATTERN B.
  (3)                                   ;*   DATA PATTERN B (SUBSET) =  125, 252, 000, 377, 001, 002, 004, 010, 020,
  (3)                                   ;*                              040, 100, 200.
  (2)                                   ;*
  (2)                                   ;--*********************************************************************************
  (2)                                   ;
  (5)  027436                           ;       BGNTST                                                  T18::
 7407  027436  004737  003774                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
 7408  027442  103003                          BCC     30$             ;IF AN ERROR OCCURED,
 7409  027444                                   ERROR                   ;REPORT IT &
  (3)  027444  104460                                                                      TRAP    C$ERROR
 7410  027446                                   ESCAPE  TST             ;  EXIT
  (3)  027446  104410                                                                      TRAP    C$ESCAPE
  (3)  027450  000050                                                                      .WORD   L10060-.
 7411
 7412  027452  012701  002530          30$:    MOV     #PATB+2,R1      ;POINT TO PATTERN TABLE
 7413  027456  012703  002543                  MOV     #PATB+15,R3     ;GET # OF ENTRIES IN TABLE
 7414
 7415  027462                          T20.LP:
 7416  027462                                   BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
  (3)  027462                                                                              T18.1:
  (3)  027462  104402                                                                      TRAP    C$BSUB
 7417
 7418  027464  111137  002306                  MOVB    (R1),TDATA      ;SETUP TEST DATA BYTE FOR "STREG"
 7419  027470  112137  002310                  MOVB    (R1)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
 7420  027474  012700  120014                  MOV     #PCR,R0         ;SPECIFY THE REGISTER BEING TESTED
 7421  027500  004737  005046                  JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
 7422  027504  103003                          BCC     10$             ;WAS AN ERROR FOUND?
 7423  027506                                   ERROR                   ;YES, REPORT IT AND
  (3)  027506  104460                                                                      TRAP    C$ERROR
 7424  027510                                   ESCAPE  TST             ;       EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
  (3)  027510  104410                                                                      TRAP    C$ESCAPE
  (3)  027512  000006                                                                      .WORD   L10060-.
 7425
 7426  027514                          10$:    ENDSUB
  (3)  027514                                                                          L10061:
  (3)  027514  104403                                                                      TRAP    C$ESUB
 7427
 7428  027516  077317                          SOB     R3,T20.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
 7429                                                                   ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
 7430  027520                                   ENDTST
  (3)  027520                                                                          L10060:
  (3)  027520  104401                                                                      TRAP    C$ETST
```

```
 7449                                   .SBTTL TEST 19 -- VIA'S IER DATA READ/WRITE
  (2)
  (2)                                   ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  (2)                                   ;*
  (2)                                   ;*      TEST 19 -- VIA'S IER DATA READ/WRITE
  (2)                                   ;*
  (3)                                   ;*      IER == "INTERRUPT ENABLE REGISTER"
  (3)                                   ;*
  (3)                                   ;* BITS 0-6 OF THE IER CAN BE SET OR CLEARED ON A WRITE, UNDER CONTROL OF THE
  (3)                                   ;* SET/CLEAR CONTROL BIT 7. TO TEST THIS , EACH BYTE OF DATA PATTERN D IS
  (3)                                   ;* WRITTEN INTO IER, AND THE REGISTER IS READ AND COMPARED TO THE CORRESPOND-
  (3)                                   ;* ING BYTE OF DATA PATTERN E.
  (3)                                   ;*
  (3)                                   ;*   DATA PATTERN D = 200, 201, 202, 204, 210, 220, 240, 300, 200, 000, 001,
  (3)                                   ;*                   002, 004, 010, 020, 040, 100, 000, 325, 125, 252, 052
  (3)                                   ;*
  (3)                                   ;*   DATA PATTERN E = 000, 001, 003, 007, 017, 037, 077, 177, 177, 177, 176,
  (3)                                   ;*                   174, 170, 160, 140, 100, 000, 000, 125, 000, 052, 000
  (3)                                   ;*
  (2)                                   ;*
  (2)                                   ;--------------------------------------------------------------------------------
  (2)                                   ;
  (2)                                   ;       BGNTST
  (5)  027522                                                                    T19::
 7450  027522  004737  003774                    JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
 7451  027526  103003                          BCC     30$             ;IF AN ERROR OCCURED,
 7452  027530                                 ERROR                   ;REPORT IT &
  (3)  027530  104460                                                                    TRAP    C$ERROR
 7453  027532                                 ESCAPE  TST             ;  EXIT
  (3)  027532  104410                                                                    TRAP    C$ESCAPE
  (3)  027534  000052                                                                    .WORD   L10062-.
 7454
 7455  027536  012701  002644          30$:    MOV     #PATD,R1        ;POINT TO PATTERN TABLE
 7456  027542  012103                          MOV     (R1)+,R3        ;GET # OF ENTRIES IN TABLE
 7457  027544  012702  002676                  MOV     #PATE+2,R2      ;POINT TO "EXPECTED" DATA PATTERN TABLE
 7458
 7459  027550                         T21.LP:
 7460  027550                                 BGNSUB                  ;THE SUBTEST ONLY TESTS THE ONE PATTERN
  (3)  027550                                                                    T19.1:
  (3)  027550  104402                                                                    TRAP    C$BSUB
 7461
 7462  027552  112137  002306                  MOVB    (R1)+,TDATA     ;SETUP TEST DATA BYTE FOR "STREG"
 7463  027556  112237  002310                  MOVB    (R2)+,GDATA     ;SETUP EXPECTED DATA BYTE FOR "STREG"
 7464  027562  012700  120016                  MOV     #IENR,R0        ;SPECIFY THE REGISTER BEING TESTED
 7465  027566  004737  005046                  JSR     PC,STREG        ;PERFORM STATIC TEST OF THE SPECIFIED REGISTER
 7466  027572  103003                          BCC     10$             ;WAS AN ERROR FOUND?
 7467  027574                                 ERROR                   ;YES, REPORT IT AND
  (3)  027574  104460                                                                    TRAP    C$ERROR
 7468  027576                                 ESCAPE  TST             ;       EXIT FROM THE TEST.  "CKLOOP" IS IMPLIED
  (3)  027576  104410                                                                    TRAP    C$ESCAPE
  (3)  027600  000006                                                                    .WORD   L10062-.
 7469
 7470  027602                         10$:    ENDSUB
  (3)  027602                                                                    L10063:
  (3)  027602  104403                                                                    TRAP    C$ESUB
 7471
```

```
 7472  027604  077317                    SOB     R3,T21.LP       ;IF THERE IS IN FACT MORE DATA, LOOP BACK TO
 7473                                                              ;TEST IT.  ELSE, FALL OUT OF LOOP AND TEST
 7474
 7475  027606                            ENDTST
  (3)  027606                                                                L10062:
  (3)  027606  104401                                                                TRAP    C$ETST
```

```
                                .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
 (5)  027610                                                                    T20::
 7489
 7490  027610  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
 7491  027614  103003                  BCC     1$              ;IF AN ERROR OCCURED,
 7492  027616                          ERROR                   ;REPORT IT &
 (3)  027616  104460                                                            TRAP    C$ERROR
 7493  027620                          ESCAPE  TST             ;  EXIT
 (3)  027620  104410                                                            TRAP    C$ESCAPE
 (3)  027622  000252                                                            .WORD   L10064-.
 7494
 7495  027624  012737  000377  002310  1$:     MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
 7496  027632  013737  002310  002306          MOV     GDATA,TDATA
 7497
 7498                                  ;  WE'LL USE "STREG" TO LOAD & CHECK "DDRB" WITH 377 THEREBY SETTING UP
 7499                                  ;  "ORB" FOR BI-DIRECTIONAL TRANSFERS
 7500
 7501  027640  012700  120002                  MOV     #DDRB,R0                ;POINT TO ORB
 7502  027644  004737  005046                  JSR     PC,STREG        ;LOAD & TEST IT
 7503  027650  103003                          BCC     4$              ;IF OK, PROCEED WITH TESTING
 7504  027652                                  ERROR                   ;ELSE, REPORT THE ERROR
 (3)  027652  104460                                                            TRAP    C$ERROR
 7505  027654                                  ESCAPE  TST             ;       & QUIT
 (3)  027654  104410                                                            TRAP    C$ESCAPE
 (3)  027656  000216                                                            .WORD   L10064-.
 7506
 7507                                  ;  NOW WE'LL USE "STREG" TO SET & CHECK "ORB"
 7508
 7509  027660  012700  120000          4$:     MOV     #ORB,R0         ;POINT TO DDRB
 7510  027664  004737  005046                  JSR     PC,STREG        ;LOAD & TEST "ORB"
 7511  027670  103003                          BCC     5$              ;IF NO ERROR HERE, PROCEED
 7512  027672                                  ERROR                   ;ELSE, REPORT THE ERROR
 (3)  027672  104460                                                            TRAP    C$ERROR
 7513  027674                                  ESCAPE  TST             ;       & QUIT
 (3)  027674  104410                                                            TRAP    C$ESCAPE
 (3)  027676  000176                                                            .WORD   L10064-.
 7514
 7515  027700  004737  003774          5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
 7516  027704  103003                          BCC     10$             ;IF NO ERROR HERE, PROCEED
 7517  027706                                  ERROR                   ;ELSE, REPORT IT
```

```
  (3)  027706  104460                                                          TRAP    C$ERROR
7518   027710                          ESCAPE  TST             ;       & QUIT
  (3)  027710  104410                                                          TRAP    C$ESCAPE
  (3)  027712  000162                                                          .WORD   L10064-.
7519
7520   027714  005037  002310    10$:  CLR     GDATA           ;FOR TESTING PURPOSES LATER
7521
7522   027720  004537  004076          JSR     R5,READ         ;READ THE "RESET" VALUE OF THE "DDRB"
7523   027724  120002                  DDRB
7524   027726  002312                  BDATA
7525   027730  103003                  BCC     12$             ;IF NO ERROR READING IT, PROCEED
7526   027732                          ERROR                   ;ELSE, REPORT IT
  (3)  027732  104460                                                          TRAP    C$ERROR
7527   027734                          ESCAPE  TST             ;       & QUIT
  (3)  027734  104410                                                          TRAP    C$ESCAPE
  (3)  027736  000136                                                          .WORD   L10064-.
7528
7529   027740  123737  002312  002310  12$:  CMPB    BDATA,GDATA     ;DID IT GET CLEARE?
7530   027746  001407                  BEQ     14$             ;YES, GOOD.  NOW CHECK "ORB"
7531   027750  012737  000002  002334        MOV     #DDRB&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
7532   027756                          GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
  (2)                                           ;       "DEVICE FATAL" ERROR # 42
  (6)  027756  104455                                                          TRAP    C$ERDF
  (7)  027760  000052                                                          .WORD   42
  (7)  027762  014527                                                          .WORD   EM5
  (7)  027764  006624                                                          .WORD   ERR7
7533
7534   027766  012737  000377  002310  14$:  MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
7535   027774  013737  002310  002306        MOV     GDATA,TDATA
7536
7537                                  ;  WE'LL USE "STREG" TO LOAD & CHECK "DDRB" WITH 377 THEREBY SETTING UP
7538                                  ;  "ORB" FOR BY-DIRECTIONAL TRANSFERS
7539
7540   030002  012700  120002                MOV     #DDRB,R0                ;POINT TO ORB
7541   030006  004737  005046                JSR     PC,STREG        ;LOAD & TEST IT
7542   030012  103003                  BCC     16$             ;IF OK, PROCEED WITH TESTING
7543   030014                          ERROR                   ;ELSE, REPORT THE ERROR
  (3)  030014  104460                                                          TRAP    C$ERROR
7544   030016                          ESCAPE  TST             ;       & QUIT
  (3)  030016  104410                                                          TRAP    C$ESCAPE
  (3)  030020  000054                                                          .WORD   L10064-.
7545
7546   030022  005037  002310    16$:  CLR     GDATA           ;SETUP FOR TESTING ORB
7547   030026  004537  004076          JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "ORB"
7548   030032  120000                  ORB
7549   030034  002312                  BDATA
7550   030036  103003                  BCC     18$             ;IF NO ERROR READING IT, PROCEED
7551   030040                          ERROR                   ;ELSE, REPORT IT
  (3)  030040  104460                                                          TRAP    C$ERROR
7552   030042                          ESCAPE  TST             ;       & QUIT
  (3)  030042  104410                                                          TRAP    C$ESCAPE
  (3)  030044  000030                                                          .WORD   L10064-.
7553
7554   030046  123737  002310  002312  18$:  CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
7555   030054  001407                  BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
7556   030056  012737  000000  002334        MOV     #ORB&<17>,REGNUM        ;NO!    BUILD REGISTER # POINTER
```

```
 7557  030064                          GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
  (2)                                                           ;       "DEVICE FATAL" ERROR # 43
  (6)  030064  104455                                                   TRAP    C$ERDF
  (7)  030066  000053                                                   .WORD   43
  (7)  030070  014527                                                   .WORD   EM5
  (7)  030072  006624                                                   .WORD   ERR7
 7558
 7559  030074                    32$:  ENDTST
  (3)  030074                                                   L10064:
  (3)  030074  104401                                                   TRAP    C$ETST
```

```
                        .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
030076                                                                  T21::

030076  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
030102  103003                  BCC     1$              ;IF AN ERROR OCCURED,
030104                          ERROR                   ;REPORT IT &
(3) 030104  104460                                                      TRAP    C$ERROR
030106                          ESCAPE  TST             ;  EXIT
(3) 030106  104410                                                      TRAP    C$ESCAPE
(3) 030110  000114                                                      .WORD   L10065-.

030112  012737  000377  002310  1$:     MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
030120  013737  002310  002306          MOV     GDATA,TDATA
030126  012700  120002                  MOV     #DDRB,R0

                        ;  NOW WE'LL USE "STREG" TO SET & CHECK "DDRB"

030132  004737  005046          JSR     PC,STREG        ;LOAD & TEST "DDRB"
030136  103003                  BCC     5$              ;IF NO ERROR HERE, PROCEED
030140                          ERROR                   ;ELSE, REPORT IT
(3) 030140  104460                                                      TRAP    C$ERROR
030142                          ESCAPE  TST             ;       & QUIT
(3) 030142  104410                                                      TRAP    C$ESCAPE
(3) 030144  000060                                                      .WORD   L10065-.

030146  004737  003774  5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
030152  103003                  BCC     10$             ;IF NO ERROR HERE, PROCEED
030154                          ERROR                   ;ELSE, REPORT IT
(3) 030154  104460                                                      TRAP    C$ERROR
030156                          ESCAPE  TST             ;       & QUIT
(3) 030156  104410                                                      TRAP    C$ESCAPE
(3) 030160  000044                                                      .WORD   L10065-.

030162  005037  002310  10$:     CLR     GDATA           ;FOR TESTING PURPOSES LATER
030166  004537  004076          JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "DDRB"
030172  120002                  DDRB
030174  002312                  BDATA

030176  123737  002310  002312          CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
```

```
 7602  030204  001407                    BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
 7603  030206  012737  000002  002334    MOV     #DDRB&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
 7604  030214                            GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
  (2)                                               ;       "DEVICE FATAL" ERROR # 44
  (6)  030214  104455                                                       TRAP    C$ERDF
  (7)  030216  000054                                                       .WORD   44
  (7)  030220  014527                                                       .WORD   EM5
  (7)  030222  006624                                                       .WORD   ERR7
 7605
 7606  030224                    32$:    ENDTST
  (3)  030224                                                       L10065:
  (3)  030224  104401                                                       TRAP    C$ETST
```

```
                        .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
030226                                                                  T22::

                        JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
                        BCC     1$              ;IF AN ERROR OCCURED,
                        ERROR                   ;REPORT IT &
                                                                        TRAP    C$ERROR
                        ESCAPE  TST             ;  EXIT
                                                                        TRAP    C$ESCAPE
                                                                        .WORD   L10066-.

                        MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
                        MOV     GDATA,TDATA
                        MOV     #DDRA,R0

                        ;  NOW WE'LL USE "STREG" TO SET & CHECK "DDRA"

                        JSR     PC,STREG        ;LOAD & TEST "DDRA"
                        BCC     5$              ;IF NO ERROR HERE, PROCEED
                        ERROR                   ;ELSE, REPORT IT
                                                                        TRAP    C$ERROR
                        ESCAPE  TST             ;       & QUIT
                                                                        TRAP    C$ESCAPE
                                                                        .WORD   L10066-.

                        JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
                        BCC     10$             ;IF NO ERROR HERE, PROCEED
                        ERROR                   ;ELSE, REPORT IT
                                                                        TRAP    C$ERROR
                        ESCAPE  TST             ;       & QUIT
                                                                        TRAP    C$ESCAPE
                                                                        .WORD   L10066-.

                        CLR     GDATA           ;FOR TESTING PURPOSES LATER
                        JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "DDRA"
                        DDRA
                        BDATA

                        CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
                        BEQ     32$             ;YES, THIS TEST IS DONE. EXIT
                        MOV     #DDRA&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
                        GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
```

```
  (2)                                                    ;       "DEVICE FATAL" ERROR # 45
  (6)  030344  104455                                                          TRAP    C$ERDF
  (7)  030346  000055                                                          .WORD   45
  (7)  030350  014527                                                          .WORD   EM5
  (7)  030352  006624                                                          .WORD   ERR7
7649
7650  030354                          32$:    ENDTST
  (3)  030354                                                        L10066:
  (3)  030354  104401                                                          TRAP    C$ETST
```

```
                        .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
(5) 030356                                                                      T23::

030356  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
030362  103003                  BCC     1$              ;IF AN ERROR OCCURED,
030364                          ERROR                   ;REPORT IT &
(3) 030364  104460                                                              TRAP    C$ERROR
030366                          ESCAPE  TST             ;  EXIT
(3) 030366  104410                                                              TRAP    C$ESCAPE
(3) 030370  000120                                                              .WORD   L10067-.

030372  004537  004334  1$:     JSR     R5,WRITEI       ;FORCE SR TO MODE 0
030376  120013                  ACR
030400  000000                  0
030402  012737  000123  002310  MOV     #123,GDATA      ;SETUP FOR CALL TO STREG
030410  013737  002310  002306  MOV     GDATA,TDATA
030416  012700  120012          MOV     #SR,R0

                        ;  NOW WE'LL USE "STREG" TO SET & CHECK "SR"

030422  004737  005046          JSR     PC,STREG        ;LOAD & TEST "SR"
030426  103003                  BCC     5$              ;IF NO ERROR HERE, PROCEED
030430                          ERROR                   ;ELSE, REPORT IT
(3) 030430  104460                                                              TRAP    C$ERROR
030432                          ESCAPE  TST             ;       & QUIT
(3) 030432  104410                                                              TRAP    C$ESCAPE
(3) 030434  000054                                                              .WORD   L10067-.

030436  004737  003774  5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
030442  103003                  BCC     10$             ;IF NO ERROR HERE, PROCEED
030444                          ERROR                   ;ELSE, REPORT IT
(3) 030444  104460                                                              TRAP    C$ERROR
030446                          ESCAPE  TST             ;       & QUIT
(3) 030446  104410                                                              TRAP    C$ESCAPE
(3) 030450  000040                                                              .WORD   L10067-.

030452  004537  004076  10$:    JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "SR"
030456  120012                  SR                      ;       (IT SHOULDN'T HAVE CHANGED)
030460  002312                  BDATA

030462  123737  002310  002312  CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
030470  001407                  BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
```

```
 7693  030472  012737  000012  002334          MOV     #SR&<17>,REGNUM ;NO!     BUILD REGISTER # POINTER
 7694  030500                                  GEDF    EM5,ERR7        ;REPORT  MASTER CLEAR FAILURE
  (2)                                                                   ;        "DEVICE FATAL" ERROR # 46
  (6)  030500  104455                                                                TRAP    C$ERDF
  (7)  030502  000056                                                                .WORD   46
  (7)  030504  014527                                                                .WORD   EM5
  (7)  030506  006624                                                                .WORD   ERR7
 7695
 7696  030510                          32$:    ENDTST
  (3)  030510                                                                   L10067:
  (3)  030510  104401                                                                TRAP    C$ETST
```

```
                        .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
030512                                                                  T24::

030512  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
030516  103003                  BCC     1$              ;IF AN ERROR OCCURED,
030520                          ERROR                   ;REPORT IT &
 (3)    030520  104460                                                  TRAP    C$ERROR
030522                          ESCAPE  TST             ;  EXIT
 (3)    030522  104410                                                  TRAP    C$ESCAPE
 (3)    030524  000114                                                  .WORD   L10070-.

030526  012737  000252  002310  1$:     MOV     #252,GDATA      ;SETUP FOR CALL TO STREG
030534  013737  002310  002306          MOV     GDATA,TDATA
030542  012700  120013                  MOV     #ACR,R0

                        ;  NOW WE'LL USE "STREG" TO SET & CHECK "ACR"

030546  004737  005046          JSR     PC,STREG        ;LOAD & TEST "ACR"
030552  103003                  BCC     5$              ;IF NO ERROR HERE, PROCEED
030554                          ERROR                   ;ELSE, REPORT IT
 (3)    030554  104460                                                  TRAP    C$ERROR
030556                          ESCAPE  TST             ;       & QUIT
 (3)    030556  104410                                                  TRAP    C$ESCAPE
 (3)    030560  000060                                                  .WORD   L10070-.

030562  004737  003774  5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
030566  103003                  BCC     10$             ;IF NO ERROR HERE, PROCEED
030570                          ERROR                   ;ELSE, REPORT IT
 (3)    030570  104460                                                  TRAP    C$ERROR
030572                          ESCAPE  TST             ;       & QUIT
 (3)    030572  104410                                                  TRAP    C$ESCAPE
 (3)    030574  000044                                                  .WORD   L10070-.

030576  005037  002310  10$:     CLR     GDATA           ;FOR TESTING PURPOSES LATER
030602  004537  004076          JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "ACR"
030606  120013                  ACR
030610  002312                  BDATA

030612  123737  002310  002312          CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
030620  001407                  BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
030622  012737  000013  002334          MOV     #ACR&<17>,REGNUM        ;NO!    BUILD REGISTER # POINTER
030630                          GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
```

```
  (2)                                                   ;       "DEVICE FATAL" ERROR # 47
  (6)  030630  104455                                                   TRAP    C$ERDF
  (7)  030632  000057                                                   .WORD   47
  (7)  030634  014527                                                   .WORD   EM5
  (7)  030636  006624                                                   .WORD   ERR7
7739
7740  030640                        32$:    ENDTST
  (3)  030640                                                 L10070:
  (3)  030640  104401                                                   TRAP    C$ETST
```

```
                        .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
                                                                                T25::
030642
                                JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
030642  004737  003774
030646  103003          BCC     1$              ;IF AN ERROR OCCURED,
030650                  ERROR                   ;REPORT IT &
030650  104460                                                          TRAP    C$ERROR
030652                  ESCAPE  TST             ;  EXIT
030652  104410                                                          TRAP    C$ESCAPE
030654  000114                                                          .WORD   L10071-.

030656  012737  000377  002310  1$:     MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
030664  013737  002310  002306          MOV     GDATA,TDATA
030672  012700  120014                  MOV     #PCR,R0

                        ;  NOW WE'LL USE "STREG" TO SET & CHECK "PCR"

030676  004737  005046                  JSR     PC,STREG        ;LOAD & TEST "PCR"
030702  103003          BCC     5$              ;IF NO ERROR HERE, PROCEED
030704                  ERROR                   ;ELSE, REPORT IT
030704  104460                                                          TRAP    C$ERROR
030706                  ESCAPE  TST             ;       & QUIT
030706  104410                                                          TRAP    C$ESCAPE
030710  000060                                                          .WORD   L10071-.

030712  004737  003774  5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
030716  103003          BCC     10$             ;IF NO ERROR HERE, PROCEED
030720                  ERROR                   ;ELSE, REPORT IT
030720  104460                                                          TRAP    C$ERROR
030722                  ESCAPE  TST             ;       & QUIT
030722  104410                                                          TRAP    C$ESCAPE
030724  000044                                                          .WORD   L10071-.

030726  005037  002310  10$:     CLR     GDATA           ;FOR TESTING PURPOSES LATER
030732  004537  004076          JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "PCR"
030736  120014                  PCR
030740  002312                  BDATA

030742  123737  002310  002312          CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
030750  001407          BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
030752  012737  000014  002334          MOV     #PCR&<17>,REGNUM        ;NO!    BUILD REGISTER # POINTER
030760                  GEDF    EM5,ERR7        ;REPORT MASTER CLEAR FAILURE
```

```
  (2)                                                    ;       "DEVICE FATAL" ERROR # 48
  (6)  030760  104455                                                        TRAP    C$ERDF
  (7)  030762  000060                                                        .WORD   48
  (7)  030764  014527                                                        .WORD   EM5
  (7)  030766  006624                                                        .WORD   ERR7
7783
7784  030770                                 32$:    ENDTST
  (3)  030770                                                              L10071:
  (3)  030770  104401                                                        TRAP    C$ETST
```

```
                        .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
(5) 030772                                                                      T26::
7796
7797  030772  004737  003774           JSR     PC,MSTCLR       ;INIT DMV & START UP THE MAINT. LOOP
7798  030776  103003                   BCC     1$              ;IF AN ERROR OCCURED,
7799  031000                           ERROR                   ;REPORT IT &
(3) 031000  104460                                                              TRAP    C$ERROR
7800  031002                           ESCAPE  TST             ;  EXIT
(3) 031002  104410                                                              TRAP    C$ESCAPE
(3) 031004  000122                                                              .WORD   L10072-.
7801
7802  031006  105077  151340   1$:     CLRB    @#BSEL0         ;MAKE SURE NO Q-BUS INTERRUPTS RESULT FROM
7803                                                           ;       TESTING THE IER REGISTER
7804  031012  012737  000377  002310   MOV     #377,GDATA      ;SETUP FOR CALL TO STREG
7805  031020  013737  002310  002306   MOV     GDATA,TDATA
7806  031026  012700  120016           MOV     #IENR,R0
7807
7808                            ;  NOW WE'LL USE "STREG" TO SET & CHECK "IER"
7809
7810  031032  004737  005046           JSR     PC,STREG        ;LOAD & TEST "IER"
7811  031036  103003                   BCC     5$              ;IF NO ERROR HERE, PROCEED
7812  031040                           ERROR                   ;ELSE, REPORT IT
(3) 031040  104460                                                              TRAP    C$ERROR
7813  031042                           ESCAPE  TST             ;       & QUIT
(3) 031042  104410                                                              TRAP    C$ESCAPE
(3) 031044  000062                                                              .WORD   L10072-.
7814
7815  031046  004737  003774   5$:     JSR     PC,MSTCLR       ;ISSUE THE MASTER CLEAR (STAY IN M-LOOP)
7816  031052  103003                   BCC     10$             ;IF NO ERROR HERE, PROCEED
7817  031054                           ERROR                   ;ELSE, REPORT IT
(3) 031054  104460                                                              TRAP    C$ERROR
7818  031056                           ESCAPE  TST             ;       & QUIT
(3) 031056  104410                                                              TRAP    C$ESCAPE
(3) 031060  000046                                                              .WORD   L10072-.
7819
7820  031062  012737  000200  002310  10$:     MOV     #200,GDATA      ;FOR TESTING PURPOSES LATER
7821  031070  004537  004076           JSR     R5,READ         ;NOW READ THE "RESET" VALUE OF "IER"
7822  031074  120016                   IENR
7823  031076  002312                   BDATA
7824
7825  031100  123737  002310  002312   CMPB    GDATA,BDATA     ;WAS IT PROPERLY RESET?
7826  031106  001407                   BEQ     32$             ;YES, THIS TEST IS DONE, EXIT
```

```
 7827  031110  012737  000016  002334          MOV     @IENR&<17>,REGNUM       ;NO!    BUILD REGISTER # POINTER
 7828  031116                                  GEDF    EM5,ERR7                ;REPORT MASTER CLEAR FAILURE
  (2)                                                                             ;       "DEVICE FATAL" ERROR # 49
  (6)  031116  104455                                                                             TRAP    C$ERDF
  (7)  031120  000061                                                                             .WORD   49
  (7)  031122  014527                                                                             .WORD   EM5
  (7)  031124  006624                                                                             .WORD   ERR7
 7829
 7830  031126                          32$:    ENDTST
  (3)  031126                                                                                 L10072:
  (3)  031126  104401                                                                             TRAP    C$ETST
 7831
```

```
 7878                                   .SBTTL TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE
  (2)
  (2)                                   ;+**********************************************************************************
  (2)                                   ;*
  (2)                                   ;*      TEST 27 -- VIA TIMER # 1 ONE-SHOT MODE
  (2)                                   ;*
  (3)                                   ;* THIS TEST VERIFIES THAT THE TIMER 1 COUNTER IS OPERATIONAL IN ONE-SHOT
  (3)                                   ;* MODE, IN EACH OF TWO SUBTESTS.
  (3)                                   ;*
  (3)                                   ;* IN THE FIRST SUBTEST, THE FOLLOWING IS PERFORMED :
  (3)                                   ;*
  (3)                                   ;*    A  MASTER  CLEAR IS DONE AND THE TIMER IS PLACED IN ONE-SHOT MODE BY
  (3)                                   ;*    SETTING BOTH ACR7 & ACR6 TO 0.
  (3)                                   ;*
  (3)                                   ;*    THE  PROGRAM  CHECKS  FOR  THE  "T1"  FLAG  (BIT 6) IN THE IFR TO BE
  (3)                                   ;*    INITIALLY CLEARED.
  (3)                                   ;*
  (3)                                   ;*    T1L-L  (ADR  04)  & T1C-H (ADR 05) ARE BOTH LOADED WITH 252 (OCTAL).
  (3)                                   ;*    (THIS  IS  EQUIVALENT  TO  AAAA  (HEX) OR 43,690 (DECIMAL).) LOADING
  (3)                                   ;*    T1C-H STARTS THE COUNTER.
  (3)                                   ;*
  (3)                                   ;*    THE  PROGRAM  PERIODICALLY  CHECKS  THE COUNTER TO VERIFY THAT IT IS
  (3)                                   ;*    DECREMENTING  AND THAT IT EVENTUALLY UNDERFLOWS PAST 0 AND CONTINUES
  (3)                                   ;*    TO  DECREMENT.
  (3)                                   ;*
  (3)                                   ;*    T1L-L  (ADR  04)  IS LOADED WITH 001 & T1C-H (ADR 05) IS LOADED WITH
  (3)                                   ;*    000  IN  ORDER TO SET "T1" WITH A QUICK UNDERFLOW. THE "T1" FLAG BIT
  (3)                                   ;*    IN IFR IS READ AND CHECKED TO BE SET.
  (3)                                   ;*
  (3)                                   ;*    T1C-H, T1L-L, & T1L-H (ADDR'S 05, 06, & 07 RESP.) ARE READ AND AFTER
  (3)                                   ;*    EACH THE "T1" INTERRUPT FLAG IS CHECKED TO BE STILL SET.
  (3)                                   ;*
  (3)                                   ;*    T1C-L (ADDR 04) IS READ AND "T1" IS CHECKED TO BE CLEARED.
  (3)                                   ;*
  (3)                                   ;*    T1C-H  IS  LOADED  WITH  0 AGAIN TO INITIATE A NEW COUNT DOWN (WHICH
  (3)                                   ;*    SHOULD  UNDERFLOW  ALMOST  IMMEDIATELY)  AND  THE "T1" BIT IN IFR IS
  (3)                                   ;*    CHECKED TO BE SET AGAIN.
  (3)                                   ;*
  (3)                                   ;*    T1L-L IS LOADED WITH 125 (OCTAL) AND "T1" BIT IS CHECKED TO BE STILL
  (3)                                   ;*    SET.
  (3)                                   ;*
  (3)                                   ;*    T1C-H IS LOADED WITH 125, AND THE "T1" BIT IS READ AND CHECKED TO BE
  (3)                                   ;*    CLEARED BY THE LOADING OF T1C-H.
  (3)                                   ;*
  (2)                                   ;*
  (2)                                   ;*  IN THE SECOND SUBTEST,  ALL OF THE ABOVE OPERATIONS ARE REPEATED,
  (2)                                   ;*    WITH ACR BIT 7 SET TO 1, AND ACR BIT 6 SET TO 0. "PB7" (BIT 7 OF ORB)
  (2)                                   ;*    WILL BE MONITORED FOR ITS EXPECTED LEVELS DURING THIS SUBTEST.
  (2)                                   ;*
  (2)                                   ;-**********************************************************************************
  (2)                                   ;
  (5)  031130                           ;       BGNTST
                                                                        T27::
 7879  031130                                   BGNSUB
  (3)  031130                                                           T27.1:
  (3)  031130  104402                                                           TRAP    C$BSUB
```

```
7880                                    ;-------------------------------------------------------------------------------
7881
7882  031132  004737  003774            JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
7883  031136  103003                    BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
7884  031140                            ERROR                   ;ELSE, REPORT ERROR
 (3)  031140  104460                                                            TRAP    C$ERROR
7885  031142                            ESCAPE  TST             ;   & EXIT TEST
 (3)  031142  104410                                                            TRAP    C$ESCAPE
 (3)  031144  004742                                                            .WORD   L10073-.
7886  031146  004537  004672    1$:     JSR     R5,INITT1       ;INITIALIZE TIMER # 1
7887  031152  000000                    0                       ;       0 ==> LATCHES
7888  031154  000000                    0                       ;       MODE 0 & "T1" INT. ENABLE FLAG CLEARED
7889  031156  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
7890  031160                            ERROR                   ;ELSE, REPORT IT
 (3)  031160  104460                                                            TRAP    C$ERROR
7891  031162                            ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  031162  104410                                                            TRAP    C$ESCAPE
 (3)  031164  004722                                                            .WORD   L10073-.
7892  031166  004737  036142            JSR     PC,GETT1        ;IS "T1" SET?
7893  031172  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
7894  031174                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
 (3)  031174  104410                                                            TRAP    C$ESCAPE
 (3)  031176  002202                                                            .WORD   L10074-.
7895  031200  103143                    BCC     6$              ;NO, GOOD.
7896  031202  004537  004076            JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
7897  031206  120004                    T1CL
7898  031210  002450                    TMP4
7899  031212  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
7900  031214                            ERROR                   ;ELSE, REPORT IT
 (3)  031214  104460                                                            TRAP    C$ERROR
7901  031216                            ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  031216  104410                                                            TRAP    C$ESCAPE
 (3)  031220  004666                                                            .WORD   L10073-.
7902  031222  004537  004076            JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
7903  031226  120005                    T1CH
7904  031230  002452                    TMP5
7905  031232  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
7906  031234                            ERROR                   ;ELSE, REPORT IT
 (3)  031234  104460                                                            TRAP    C$ERROR
7907  031236                            ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  031236  104410                                                            TRAP    C$ESCAPE
 (3)  031240  004646                                                            .WORD   L10073-.
7908  031242  004537  004076            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
7909  031246  120006                    T1LL
7910  031250  002454                    TMP6
7911  031252  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
7912  031254                            ERROR                   ;ELSE, REPORT IT
 (3)  031254  104460                                                            TRAP    C$ERROR
7913  031256                            ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  031256  104410                                                            TRAP    C$ESCAPE
 (3)  031260  004626                                                            .WORD   L10073-.
7914  031262  004537  004076            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
7915  031266  120007                    T1LH
7916  031270  002456                    TMP7
7917  031272  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
7918  031274                            ERROR                   ;ELSE, REPORT IT
```

```
  (3)  031274  104460                                                          TRAP    C$ERROR
7919   031276                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031276  104410                                                          TRAP    C$ESCAPE
  (3)  031300  004606                                                          .WORD   L10073-.
7920   031302  004537  004076        JSR     R5,READ         ;GET ACR FOR ERROR MESSAGE
7921   031306  120013                ACR
7922   031310  002466                TMP8
7923   031312  103003                BCC     .+10            ;IF NO ERROR, PROCEED
7924   031314                        ERROR                   ;ELSE, REPORT IT
  (3)  031314  104460                                                          TRAP    C$ERROR
7925   031316                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031316  104410                                                          TRAP    C$ESCAPE
  (3)  031320  004566                                                          .WORD   L10073-.
7926   031322                        GEDF    EM50A,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
  (2)                                                   ;       "DEVICE FATAL" ERROR # 50
  (6)  031322  104455                                                          TRAP    C$ERDF
  (7)  031324  000062                                                          .WORD   50
  (7)  031326  016101                                                          .WORD   EM50A
  (7)  031330  010774                                                          .WORD   ERR50
7927   031332                        PRINTX  #FMT50M         ;  & SAY THE COUNTERS HAVEN'T BEEN LOADED YET!
  (7)  031332  012746  013206                                                  MOV     #FMT50M,-(SP)
  (6)  031336  012746  000001                                                  MOV     #1,-(SP)
  (3)  031342  010600                                                          MOV     SP,R0
  (4)  031344  104415                                                          TRAP    C$PNTX
  (4)  031346  062706  000004                                                  ADD     #4,SP
7928
7929                            ;-------------------------------------------------------------------------
7930
7931   031352  112737  000002  002453        MOVB    #2,TMP5+1
7932   031360  004537  004322                JSR     R5,WRITE        ;INIT TIMER # 1 BY WRITING INTO
7933   031364  120005                        T1CH                    ;T1C-H (ADDR 05)
7934   031366  002453                        TMP5+1
7935   031370  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
7936   031372                                ERROR                   ;ELSE, REPORT IT
  (3)  031372  104460                                                          TRAP    C$ERROR
7937   031374                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031374  104410                                                          TRAP    C$ESCAPE
  (3)  031376  004510                                                          .WORD   L10073-.
7938   031400  004737  036142                JSR     PC,GETT1        ;IS "T1" SET?
7939   031404  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
7940   031406                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  031406  104410                                                          TRAP    C$ESCAPE
  (3)  031410  001770                                                          .WORD   L10074-.
7941   031412  103036                        BCC     6$              ;NO, GOOD.
7942   031414  004537  004076                JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
7943   031420  120004                        T1CL
7944   031422  002450                        TMP4
7945   031424  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
7946   031426                                ERROR                   ;ELSE, REPORT IT
  (3)  031426  104460                                                          TRAP    C$ERROR
7947   031430                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031430  104410                                                          TRAP    C$ESCAPE
  (3)  031432  004454                                                          .WORD   L10073-.
7948   031434  004537  004076                JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
7949   031440  120005                        T1CH
7950   031442  002452                        TMP5
```

```
 7951  031444  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7952  031446                            ERROR                   ;ELSE, REPORT IT
  (3)  031446  104460                                                            TRAP    C$ERROR
 7953  031450                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031450  104410                                                            TRAP    C$ESCAPE
  (3)  031452  004434                                                            .WORD   L10073-.
 7954  031454  004537  004076            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 7955  031460  120007                    T1LH
 7956  031462  002456                    TMP7
 7957  031464  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7958  031466                            ERROR                   ;ELSE, REPORT IT
  (3)  031466  104460                                                            TRAP    C$ERROR
 7959  031470                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031470  104410                                                            TRAP    C$ESCAPE
  (3)  031472  004414                                                            .WORD   L10073-.
 7960  031474                            GEDF    EM50B,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
  (2)                                               ;       "DEVICE FATAL" ERROR # 51
  (6)  031474  104455                                                            TRAP    C$ERDF
  (7)  031476  000063                                                            .WORD   51
  (7)  031500  016147                                                            .WORD   EM50B
  (7)  031502  010774                                                            .WORD   ERR50
 7961  031504                            ESCAPE  SUB             ;AND EXIT SUBTEST
  (3)  031504  104410                                                            TRAP    C$ESCAPE
  (3)  031506  001672                                                            .WORD   L10074-.
 7962
 7963                       ;-------------------------------------------------------------------------
 7964
 7965  031510  004537  004076    6$:     JSR     R5,READ         ;GET ACR FOR LATER ERROR MESSAGES
 7966  031514  120013                    ACR
 7967  031516  002466                    TMPB
 7968  031520  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7969  031522                            ERROR                   ;ELSE, REPORT IT
  (3)  031522  104460                                                            TRAP    C$ERROR
 7970  031524                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031524  104410                                                            TRAP    C$ESCAPE
  (3)  031526  004360                                                            .WORD   L10073-.
 7971  031530  112737  000377  002445    MOVB    #377,TMP2+1     ;INITIALIZE ORB FOR INPUT/OUTPUT
 7972  031536  004537  004322            JSR     R5,WRITE
 7973  031542  120002                    DORB
 7974  031544  002445                    TMP2+1
 7975  031546  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7976  031550                            ERROR                   ;ELSE, REPORT IT
  (3)  031550  104460                                                            TRAP    C$ERROR
 7977  031552                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031552  104410                                                            TRAP    C$ESCAPE
  (3)  031554  004332                                                            .WORD   L10073-.
 7978  031556  112737  000377  002441    MOVB    #377,TMP0+1     ;SETUP VALUE FOR ORB
 7979  031564  004537  004322            JSR     R5,WRITE        ;DO IT
 7980  031570  120000                    ORB
 7981  031572  002441                    TMP0+1
 7982  031574  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 7983  031576                            ERROR                   ;ELSE, REPORT IT
  (3)  031576  104460                                                            TRAP    C$ERROR
 7984  031600                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031600  104410                                                            TRAP    C$ESCAPE
  (3)  031602  004304                                                            .WORD   L10073-.
```

```
 7985  031604  004537  036110            JSR     R5,LODT1C       ;LOAD TIMER # 1
 7986  031610     252                7$:  .BYTE   252
 7987  031611     252                8$:  .BYTE   252
 7988
 7989                                ;-------------------------------------------------------------------------------
 7990
 7991  031612  004737  036326            JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
 7992  031616  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 7993  031620                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  031620  104410                                                            TRAP    C$ESCAPE
  (3)  031622  001556                                                            .WORD   L10074-.
 7994  031624  103404                    BCS     9$              ;IT IS.  (SET BY LOADING DDRB & ORB ABOVE)
 7995  031626                            GEDF    EM50W,ERR1      ;IF NOT, TIMER 1 CLEARED IT!!!
  (2)                                               ;       "DEVICE FATAL" ERROR # 52
  (6)  031626  104455                                                            TRAP    C$ERDF
  (7)  031630  000064                                                            .WORD   52
  (7)  031632  017317                                                            .WORD   EM50W
  (7)  031634  005310                                                            .WORD   ERR1
 7996  031636  004737  036200        9$: JSR     PC,KICKT1       ;IT TAKES SO MUCH TIME TO CHECK FOR (& MAYBE
 7997                                                ;  EVEN REPORT) THIS ERROR THAT WE SHOULD
 7998                                                ;  KICK OFF THE TIMER AGAIN
 7999  031642  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 8000  031644                            ERROR                   ;ELSE, REPORT IT
  (3)  031644  104460                                                            TRAP    C$ERROR
 8001  031646                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031646  104410                                                            TRAP    C$ESCAPE
  (3)  031650  004236                                                            .WORD   L10073-.
 8002  031652  000240                    NOP                     ;
 8003  031654  000240                    NOP                     ;NOW WAIT A LITTLE WHILE -- LET T1CL CHANGE
 8004  031656  000240                    NOP                     ;
 8005  031660  004537  004076            JSR     R5,READ         ;READ THE LOW COUNTER
 8006  031664  120004                    T1CL
 8007  031666  002450                    TMP4
 8008  031670  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 8009  031672                            ERROR                   ;ELSE, REPORT IT
  (3)  031672  104460                                                            TRAP    C$ERROR
 8010  031674                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031674  104410                                                            TRAP    C$ESCAPE
  (3)  031676  004210                                                            .WORD   L10073-.
 8011  031700  123737  002450  031610    CMPB    TMP4,7$         ;MAKE SURE THE COUNTER IS DECREMENTING
 8012  031706  001024                    BNE     12$             ;IT IS, NOW SEE IF THE HIGH COUNTER IS TOO
 8013  031710  004537  004076            JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
 8014  031714  120005                    T1CH
 8015  031716  002452                    TMP5
 8016  031720  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 8017  031722                            ERROR                   ;ELSE, REPORT IT
  (3)  031722  104460                                                            TRAP    C$ERROR
 8018  031724                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031724  104410                                                            TRAP    C$ESCAPE
  (3)  031726  004160                                                            .WORD   L10073-.
 8019  031730  004537  004076            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8020  031734  120006                    T1LL
 8021  031736  002454                    TMP6
 8022  031740  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 8023  031742                            ERROR                   ;ELSE, REPORT IT
  (3)  031742  104460                                                            TRAP    C$ERROR
```

```
 8024  031744                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  031744  104410                                                                    TRAP    C$ESCAPE
  (3)  031746  004140                                                                    .WORD   L10073-.
 8025  031750                                GEDF    EM50D,ERR50     ;IT WASN'T -- REPORT THE ERROR
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 53
  (6)  031750  104455                                                                    TRAP    C$ERDF
  (7)  031752  000065                                                                    .WORD   53
  (7)  031754  016263                                                                    .WORD   EM50D
  (7)  031756  010774                                                                    .WORD   ERR50
 8026  031760  012703  000100          12$:    MOV     #100,R3         ;INIT. TIMEOUT VALUE
 8027  031764  004537  004076          13$:    JSR     R5,READ         ;READ THE HIGH COUNTER
 8028  031770  120005                          T1CH
 8029  031772  002452                          TMP5
 8030  031774  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8031  031776                                ERROR                   ;ELSE, REPORT IT
  (3)  031776  104460                                                                    TRAP    C$ERROR
 8032  032000                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032000  104410                                                                    TRAP    C$ESCAPE
  (3)  032002  004104                                                                    .WORD   L10073-.
 8033  032004  123737  002452  03$611       CMPB    TMP5,#8$        ;DID IT CHANGE FROM THE LOADED VALUE?
 8034  032012  001037                          BNE     17$             ;YES, PROCEED WITH TESTING
 8035  032014  077315                          SOB     R3,13$          ;NO,  IF NO TIMEOUT, TRY AGAIN
 8036  032016  004537  004076                JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
 8037  032022  120015                          IFR
 8038  032024  002472                          TMPD
 8039  032026  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8040  032030                                ERROR                   ;ELSE, REPORT IT
  (3)  032030  10446C                                                                    TRAP    C$ERROR
 8041  032032                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032032  104410                                                                    TRAP    C$ESCAPE
  (3)  032034  004052                                                                    .WORD   L10073-.
 8042  032036  004537  004076              JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8043  032042  120006                          T1LL
 8044  032044  002454                          TMP6
 8045  032046  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8046  032050                                ERROR                   ;ELSE, REPORT IT
  (3)  032050  104460                                                                    TRAP    C$ERROR
 8047  032052                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032052  104410                                                                    TRAP    C$ESCAPE
  (3)  032054  004032                                                                    .WORD   L10073-.
 8048  032056  004537  004076              JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8049  032062  120007                          T1LH
 8050  032064  002456                          TMP7
 8051  032066  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8052  032070                                ERROR                   ;ELSE, REPORT IT
  (3)  032070  104460                                                                    TRAP    C$ERROR
 8053  032072                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032072  104410                                                                    TRAP    C$ESCAPE
  (3)  032074  004012                                                                    .WORD   L10073-.
 8054  032076                                GEDF    EM50E,ERR50     ;ELSE, REPORT THAT HIGH COUNTER ISN'T RUNNING
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 54
  (6)  032076  104455                                                                    TRAP    C$ERDF
  (7)  032100  000066                                                                    .WORD   54
  (7)  032102  016317                                                                    .WORD   EM50E
  (7)  032104  010774                                                                    .WORD   ERR50
 8055  032106                                ESCAPE  SUB             ;IN THAT CASE, WE CAN'T PROCEED WITH TESTING EITHER
```

```
  (3)  032106  104410                                                                    TRAP    C$ESCAPE
  (3)  032110  001270                                                                    .WORD   L10074-.
 8056                          ;-------------------------------------------------------------------------
 8057
 8058  032112  112737  000377  002445  17$:    MOVB    #377,TMP2+1     ;INITIALIZE ORB FOR INPUT/OUTPUT
 8059  032120  004537  004322                  JSR     R5,WRITE
 8060  032124  120002                          DORB
 8061  032126  002445                          TMP2+1
 8062  032130  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8063  032132                                  ERROR                   ;ELSE, REPORT IT
  (3)  032132  104460                                                                    TRAP    C$ERROR
 8064  032134                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032134  104410                                                                    TRAP    C$ESCAPE
  (3)  032136  003750                                                                    .WORD   L10073-.
 8065  032140  123737  002440  002441          CMPB    TMP0,TMP0+1     ;CLEAR PB7 BY WRITING INTO ORB
 8066  032146  004537  004334                  JSR     R5,WRITEI
 8067  032152  120000                          ORB
 8068  032154  000030                          30                      ;  (THIS CLEARS DTR & RTS! ALSO)
 8069  032156  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8070  032160                                  ERROR                   ;ELSE, REPORT IT
  (3)  032160  104460                                                                    TRAP    C$ERROR
 8071  032162                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032162  104410                                                                    TRAP    C$ESCAPE
  (3)  032164  003722                                                                    .WORD   L10073-.
 8072  032166  004537  036110                  JSR     R5,LODT1C       ;RE-LOAD TIMER # 1 WITH A VALUE WHICH CAUSE AN
 8073  032172     001          18$:    .BYTE   1                       ;ALMOST IMMEDIATE TIMEOUT
 8074  032173     000          19$:    .BYTE   0                       ; (ADDRESS OF HIGH BYTE FOR T1C-H (ADDR 05))
 8075                          ;-------------------------------------------------------------------------
 8076
 8077  032174  004737  036142                  JSR     PC,GETT1        ;WAS "T1" SET BY THE ABOVE OPERATION?
 8078  032200  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
 8079  032202                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  032202  104410                                                                    TRAP    C$ESCAPE
  (3)  032204  001174                                                                    .WORD   L10074-.
 8080  032206  103426                          BCS     20$             ;YES, OK -- CONTINUE ERROR CHECKING
 8081  032210  004537  004076                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8082  032214  120006                          T1LL
 8083  032216  002454                          TMP6
 8084  032220  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8085  032222                                  ERROR                   ;ELSE, REPORT IT
  (3)  032222  104460                                                                    TRAP    C$ERROR
 8086  032224                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032224  104410                                                                    TRAP    C$ESCAPE
  (3)  032226  003660                                                                    .WORD   L10073-.
 8087  032230  004537  004076                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8088  032234  120007                          T1LH
 8089  032236  002456                          TMP7
 8090  032240  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8091  032242                                  ERROR                   ;ELSE, REPORT IT
  (3)  032242  104460                                                                    TRAP    C$ERROR
 8092  032244                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032244  104410                                                                    TRAP    C$ESCAPE
  (3)  032246  003640                                                                    .WORD   L10073-.
 8093  032250                                  GEDF    EM50F,ERR50     ;NO,  BAD NEWS!  REPORT THE FAILURE
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 55
  (6)  032250  104455                                                                    TRAP    C$ERDF
```

```
  (7)  032252  000067                                                    .WORD   55
  (7)  032254  016353                                                    .WORD   EM50F
  (7)  032256  010774                                                    .WORD   ERR50
8094   032260                        ESCAPE  SUB             ;  AND GET OUT OF SUBTEST
  (3)  032260  104410                                                    TRAP    C$ESCAPE
  (3)  032262  001116                                                    .WORD   L10074-.
8095   032264  004737  036326  20$:  JSR     PC,GETPB7       ;GET "PB7".  IS IT CLEARED?
8096   032270  102002                BVC     .+6             ;IF NO ERROR, PROCEED
8097   032272                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  032272  104410                                                    TRAP    C$ESCAPE
  (3)  032274  001104                                                    .WORD   L10074-.
8098   032276  103024                BCC     40$             ;IF CLEARED, DDRB IS STILL IN CONTROL OF IT
8099   032300  004537  004076        JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8100   032304  120006                T1LL
8101   032306  002454                TMP6
8102   032310  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8103   032312                        ERROR                   ;ELSE, REPORT IT
  (3)  032312  104460                                                    TRAP    C$ERROR
8104   032314                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032314  104410                                                    TRAP    C$ESCAPE
  (3)  032316  003570                                                    .WORD   L10073-.
8105   032320  004537  004076        JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8106   032324  120007                T1LH
8107   032326  002456                TMP7
8108   032330  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8109   032332                        ERROR                   ;ELSE, REPORT IT
  (3)  032332  104460                                                    TRAP    C$ERROR
8110   032334                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032334  104410                                                    TRAP    C$ESCAPE
  (3)  032336  003550                                                    .WORD   L10073-.
8111   032340                        GEDF    EM50W,ERR50     ;ELSE, IT'S BEING SET BY TIMER 1 IN MODE 0!
  (2)                                                       ;       "DEVICE FATAL" ERROR # 56
  (6)  032340  104455                                                    TRAP    C$ERDF
  (7)  032342  000070                                                    .WORD   56
  (7)  032344  017317                                                    .WORD   EM50W
  (7)  032346  010774                                                    .WORD   ERR50
8112   032350  004537  004076  40$:  JSR     R5,READ         ;READ T1C-H (ADDR 05) TO SEE IF THIS CLEARS "T1"
8113   032354  120005                T1CH                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
8114   032356  002452                TMP5                    ; ALMOST ANYTHING)
8115   032360  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8116   032362                        ERROR                   ;ELSE, REPORT IT
  (3)  032362  104460                                                    TRAP    C$ERROR
8117   032364                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032364  104410                                                    TRAP    C$ESCAPE
  (3)  032366  003520                                                    .WORD   L10073-.
8118   032370  004737  036142        JSR     PC,GETT1        ;PUT THE CURRENT "T1" VALUE INTO THE CARRY BIT
8119   032374  102002                BVC     .+6             ;IF NO ERROR, PROCEED
8120   032376                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  032376  104410                                                    TRAP    C$ESCAPE
  (3)  032400  001000                                                    .WORD   L10074-.
8121   032402  103425                BCS     21$             ;IF SET, READING T1CH DIDN'T CLEAR IT -- OK!
8122   032404  004537  004076        JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8123   032410  120006                T1LL
8124   032412  002454                TMP6
8125   032414  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8126   032416                        ERROR                   ;ELSE, REPORT IT
```

```
  (3)  032416  104460                                                    TRAP    C$ERROR
8127   032420                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032420  104410                                                    TRAP    C$ESCAPE
  (3)  032422  003464                                                    .WORD   L10073-.
8128   032424  004537  004076        JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8129   032430  120007                T1LH
8130   032432  002456                TMP7
8131   032434  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8132   032436                        ERROR                   ;ELSE, REPORT IT
  (3)  032436  104460                                                    TRAP    C$ERROR
8133   032440                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032440  104410                                                    TRAP    C$ESCAPE
  (3)  032442  003444                                                    .WORD   L10073-.
8134   032444                        GEDF    EM50G,ERR50     ;IF CLEARED!  BAD VIA CHIP!
  (2)                                                       ;       "DEVICE FATAL" ERROR # 57
  (6)  032444  104455                                                    TRAP    C$ERDF
  (7)  032446  000071                                                    .WORD   57
  (7)  032450  016420                                                    .WORD   EM50G
  (7)  032452  010774                                                    .WORD   ERR50
8135   032454  000507                BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
8136
8137   032456  004537  004076  21$:  JSR     R5,READ         ;READ T1L-L (ADDR 06)
8138   032462  120006                T1LL
8139   032464  002454                TMP6                    ;THIS SHOULD RETURN A 001
8140   032466  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8141   032470                        ERROR                   ;ELSE, REPORT IT
  (3)  032470  104460                                                    TRAP    C$ERROR
8142   032472                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032472  104410                                                    TRAP    C$ESCAPE
  (3)  032474  003412                                                    .WORD   L10073-.
8143   032476  123737  002454  032172  CMPB    TMP6,18$        ;CHECK T1L-L (ADDR 06) AGAINST LOADED VALUE
8144   032504  001415                BEQ     23$             ;IF SAME, PROCEED
8145   032506  004537  004076        JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8146   032512  120007                T1LH
8147   032514  002456                TMP7
8148   032516  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8149   032520                        ERROR                   ;ELSE, REPORT IT
  (3)  032520  104460                                                    TRAP    C$ERROR
8150   032522                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032522  104410                                                    TRAP    C$ESCAPE
  (3)  032524  003362                                                    .WORD   L10073-.
8151   032526                        GEDF    EM50H,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-L (ADDR 06)
  (2)                                                       ;       "DEVICE FATAL" ERROR # 58
  (6)  032526  104455                                                    TRAP    C$ERDF
  (7)  032530  000072                                                    .WORD   58
  (7)  032532  016462                                                    .WORD   EM50H
  (7)  032534  010774                                                    .WORD   ERR50
8152   032536  000456                BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
8153
8154   032540  004737  036142  23$:  JSR     PC,GETT1        ;IS "T1" STILL SET?
8155   032544  102002                BVC     .+6             ;IF NO ERROR, PROCEED
8156   032546                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  032546  104410                                                    TRAP    C$ESCAPE
  (3)  032550  000630                                                    .WORD   L10074-.
8157   032552  103415                BCS     24$             ;YES, ALL'S OK
8158   032554  004537  004076        JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
```

```
 8159  032560  120007                        T1LH
 8160  032562  002456                        TMP7
 8161  032564  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8162  032566                                ERROR                   ;ELSE, REPORT IT
  (3)  032566  104460                                                        TRAP    C$ERROR
 8163  032570                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032570  104410                                                        TRAP    C$ESCAPE
  (3)  032572  003314                                                        .WORD   L10073-.
 8164  032574                                GEDF    EM50I,ERR50     ;NO!  BAD VIA CHIP!
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 59
  (6)  032574  104455                                                        TRAP    C$ERDF
  (7)  032576  000073                                                        .WORD   59
  (7)  032600  016550                                                        .WORD   EM50I
  (7)  032602  010774                                                        .WORD   ERR50
 8165  032604  000433                        BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 8166
 8167  032606  004537  004076        24$:    JSR     R5,READ         ;READ T1L-H (ADDR 07)
 8168  032612  120007                        T1LH
 8169  032614  002456                        TMP7                    ;THIS SHOULD RETURN A 000
 8170  032616  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8171  032620                                ERROR                   ;ELSE, REPORT IT
  (3)  032620  104460                                                        TRAP    C$ERROR
 8172  032622                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  032622  104410                                                        TRAP    C$ESCAPE
  (3)  032624  003262                                                        .WORD   L10073-.
 8173  032626  123737  002456  032173        CMPB    TMP7,19$        ;CHECK T1L-H (ADDR 07) AGAINST LOADED VALUE
 8174  032634  001405                        BEQ     26$             ;IF SAME, PROCEED
 8175  032636                                GEDF    EM50J,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-H (ADDR 07)
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 60
  (6)  032636  104455                                                        TRAP    C$ERDF
  (7)  032640  000074                                                        .WORD   60
  (7)  032642  016612                                                        .WORD   EM50J
  (7)  032644  010774                                                        .WORD   ERR50
 8176  032646  000412                        BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 8177
 8178  032650  004737  036142        26$:    JSR     PC,GETT1        ;IS "T1" STILL SET?
 8179  032654  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8180  032656                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  032656  104410                                                        TRAP    C$ESCAPE
  (3)  032660  000520                                                        .WORD   L10074-.
 8181  032662  103404                        BCS     28$             ;YES, ALL'S OK
 8182  032664                                GEDF    EM50K,ERR50     ;NO!  BAD VIA CHIP!
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 61
  (6)  032664  104455                                                        TRAP    C$ERDF
  (7)  032666  000075                                                        .WORD   61
  (7)  032670  016700                                                        .WORD   EM50K
  (7)  032672  010774                                                        .WORD   ERR50
 8183
 8184                           ;-------------------------------------------------------------------------
 8185
 8186  032674  004537  004076        28$:    JSR     R5,READ         ;READ T1C-L (ADDR 04)
 8187  032700  120004                        T1CL                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
 8188  032702  002450                        TMP4                    ; ALMOST ANYTHING)
 8189  032704  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8190  032706                                ERROR                   ;ELSE, REPORT IT
  (3)  032706  104460                                                        TRAP    C$ERROR
```

```
8191  032710                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  032710  104410                                                                TRAP    C$ESCAPE
 (3)  032712  003174                                                                .WORD   L10073-.
8192  032714  004737  036142                JSR     PC,GETT1        ;IS "T1" CLEARED NOW
8193  032720  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
8194  032722                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
 (3)  032722  104410                                                                TRAP    C$ESCAPE
 (3)  032724  000454                                                                .WORD   L10074-.
8195  032726  103024                        BCC     29$             ;YES, ALL'S OK
8196  032730  004537  004076                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8197  032734  120006                        T1LL
8198  032736  002454                        TMP6
8199  032740  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8200  032742                                ERROR                   ;ELSE, REPORT IT
 (3)  032742  104460                                                                TRAP    C$ERROR
8201  032744                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  032744  104410                                                                TRAP    C$ESCAPE
 (3)  032746  003140                                                                .WORD   L10073-.
8202  032750  004537  004076                JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8203  032754  120007                        T1LH
8204  032756  002456                        TMP7
8205  032760  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8206  032762                                ERROR                   ;ELSE, REPORT IT
 (3)  032762  104460                                                                TRAP    C$ERROR
8207  032764                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  032764  104410                                                                TRAP    C$ESCAPE
 (3)  032766  003120                                                                .WORD   L10073-.
8208  032770                                GEDF    EM50C,ERR50     ;NO!  BAD VIA CHIP!
 (2)                                                                ;       "DEVICE FATAL" ERROR # 62
 (6)  032770  104455                                                                TRAP    C$ERDF
 (7)  032772  000076                                                                .WORD   62
 (7)  032774  016215                                                                .WORD   EM50C
 (7)  032776  010774                                                                .WORD   ERR50
8209
8210                                  ;-------------------------------------------------------------------------------
8211
8212  033000  004537  004322          29$:    JSR     R5,WRITE        ;RE-WRITE INTO T1C-H (ADDR 05) TO SET T1 AGAIN
8213  033004  120005                          T1CH
8214  033006  002453                          TMP5+1
8215  033010  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8216  033012                                  ERROR                   ;ELSE, REPORT IT
 (3)  033012  104460                                                                TRAP    C$ERROR
8217  033014                                  ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  033014  104410                                                                TRAP    C$ESCAPE
 (3)  033016  003070                                                                .WORD   L10073-.
8218  033020  004737  036142                  JSR     PC,GETT1        ;IS "T1" SET AGAIN
8219  033024  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
8220  033026                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
 (3)  033026  104410                                                                TRAP    C$ESCAPE
 (3)  033030  000350                                                                .WORD   L10074-.
8221  033032  103426                          BCS     32$             ;YES, ALL'S WELL (AGAIN?)
8222  033034  004537  004076                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8223  033040  120006                          T1LL
8224  033042  002454                          TMP6
8225  033044  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8226  033046                                  ERROR                   ;ELSE, REPORT IT
```

```
  (3)  033046  104460                                                          TRAP    C$ERROR
8227   033050                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033050  104410                                                          TRAP    C$ESCAPE
  (3)  033052  003034                                                          .WORD   L10073-.
8228   033054  004537  004076        JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8229   033060  120007                T1LH
8230   033062  002456                TMP7
8231   033064  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8232   033066                        ERROR                   ;ELSE, REPORT IT
  (3)  033066  104460                                                          TRAP    C$ERROR
8233   033070                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033070  104410                                                          TRAP    C$ESCAPE
  (3)  033072  003014                                                          .WORD   L10073-.
8234   033074                        GEDF    EM50L,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
  (2)                                                       ;       "DEVICE FATAL" ERROR # 63
  (6)  033074  104455                                                          TRAP    C$ERDF
  (7)  033076  000077                                                          .WORD   63
  (7)  033100  016742                                                          .WORD   EM50L
  (7)  033102  010774                                                          .WORD   ERR50
8235   033104                        ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
  (3)  033104  104410                                                          TRAP    C$ESCAPE
  (3)  033106  000272                                                          .WORD   L10074-.
8236
8237                        ;-------------------------------------------------------------------------
8238
8239   033110  112737  000125  002455  32$:    MOVB    #125,TMP6+1     ;USING A DIFFERENT VALUE -- 55 HEX.,
8240   033116  004537  004322                JSR     R5,WRITE        ;RE-LOAD T1L-L (ADDR 06)
8241   033122  120006                        T1LL
8242   033124  002455                        TMP6+1
8243   033126  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8244   033130                                ERROR                   ;ELSE, REPORT IT
  (3)  033130  104460                                                          TRAP    C$ERROR
8245   033132                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033132  104410                                                          TRAP    C$ESCAPE
  (3)  033134  002752                                                          .WORD   L10073-.
8246   033136  004737  036142                JSR     PC,GETT1        ;IS "T1" STILL SET?
8247   033142  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
8248   033144                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  033144  104410                                                          TRAP    C$ESCAPE
  (3)  033146  000232                                                          .WORD   L10074-.
8249   033150  103426                        BCS     33$             ;YES, ALL'S STILL OK
8250   033152  004537  004076                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8251   033156  120006                        T1LL
8252   033160  002454                        TMP6
8253   033162  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8254   033164                                ERROR                   ;ELSE, REPORT IT
  (3)  033164  104460                                                          TRAP    C$ERROR
8255   033166                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033166  104410                                                          TRAP    C$ESCAPE
  (3)  033170  002716                                                          .WORD   L10073-.
8256   033172  004537  004076                JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8257   033176  120007                        T1LH
8258   033200  002456                        TMP7
8259   033202  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8260   033204                                ERROR                   ;ELSE, REPORT IT
  (3)  033204  104460                                                          TRAP    C$ERROR
```

```
 8261  033206                                 ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033206  104410                                                                    TRAP    C$ESCAPE
  (3)  033210  002676                                                                    .WORD   L10073-.
 8262  033212                                 GEDF    EM50M,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 64
  (6)  033212  104455                                                                    TRAP    C$ERDF
  (7)  033214  000100                                                                    .WORD   64
  (7)  033216  017024                                                                    .WORD   EM50M
  (7)  033220  010774                                                                    .WORD   ERR50
 8263  033222                                 ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
  (3)  033222  104410                                                                    TRAP    C$ESCAPE
  (3)  033224  000154                                                                    .WORD   L10074-.
 8264
 8265                                ;-------------------------------------------------------------------------
 8266
 8267  033226  112737  000125  002453  33$:    MOVB    #125,TMP5+1     ;AND USING THE SAME VALUE AGAIN (55 HEX),
 8268  033234  004537  004322                  JSR     R5,WRITE        ;NOW LOAD T1C-H (ADDR 05)
 8269  033240  120005                          T1CH
 8270  033242  002453                          TMP5+1
 8271  033244  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8272  033246                                  ERROR                   ;ELSE, REPORT IT
  (3)  033246  104460                                                                    TRAP    C$ERROR
 8273  033250                                 ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033250  104410                                                                    TRAP    C$ESCAPE
  (3)  033252  002634                                                                    .WORD   L10073-.
 8274  033254  004737  036142                  JSR     PC,GETT1        ;"T1" SHOULD NOW BE CLEARED
 8275  033260  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
 8276  033262                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  033262  104410                                                                    TRAP    C$ESCAPE
  (3)  033264  000114                                                                    .WORD   L10074-.
 8277  033266  103044                          BCC     34$             ;IT WAS, ALL'S WELL THAT END'S WELL (I THINK!?)
 8278  033270  004537  004076                  JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
 8279  033274  120004                          T1CL
 8280  033276  002450                          TMP4
 8281  033300  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8282  033302                                  ERROR                   ;ELSE, REPORT IT
  (3)  033302  104460                                                                    TRAP    C$ERROR
 8283  033304                                 ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033304  104410                                                                    TRAP    C$ESCAPE
  (3)  033306  002600                                                                    .WORD   L10073-.
 8284  033310  004537  004076                  JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
 8285  033314  120005                          T1CH
 8286  033316  002452                          TMP5
 8287  033320  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8288  033322                                  ERROR                   ;ELSE, REPORT IT
  (3)  033322  104460                                                                    TRAP    C$ERROR
 8289  033324                                 ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033324  104410                                                                    TRAP    C$ESCAPE
  (3)  033326  002560                                                                    .WORD   L10073-.
 8290  033330  004537  004076                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8291  033334  120006                          T1LL
 8292  033336  002454                          TMP6
 8293  033340  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8294  033342                                  ERROR                   ;ELSE, REPORT IT
  (3)  033342  104460                                                                    TRAP    C$ERROR
 8295  033344                                 ESCAPE  TST             ;       AND EXIT THIS TEST
```

```
  (3)  033344  104410                                                          TRAP    C$ESCAPE
  (3)  033346  002540                                                          .WORD   L10073-.
8296   033350  004537  004076          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8297   033354  120007                  T1LH
8298   033356  002456                  TMP7
8299   033360  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8300   033362                          ERROR                   ;ELSE, REPORT IT
  (3)  033362  104460                                                          TRAP    C$ERROR
8301   033364                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033364  104410                                                          TRAP    C$ESCAPE
  (3)  033366  002520                                                          .WORD   L10073-.
8302   033370                          GEDF    EM5ON,ERR50     ;IT WASN'T!  SOMETHING WENT WRONG!  REPORT IT
  (2)                                                         ;       "DEVICE FATAL" ERROR # 65
  (6)  033370  104455                                                          TRAP    C$ERDF
  (7)  033372  000101                                                          .WORD   65
  (7)  033374  017066                                                          .WORD   EM5ON
  (7)  033376  010774                                                          .WORD   ERR50
8303
8304   033400                  34$:    ENDSUB
  (3)  033400                                                                  L10074:
  (3)  033400  104403                                                          TRAP    C$ESUB
8305                            ;*************************************************************************
8306
8307                            ; TEST TIMER # 1 USING ONE-SHOT MODE WITH OUTPUT ON PB7 ENABLED.
8308
8309   033402                          BGNSUB
  (3)  033402                                                                  T27.2:
  (3)  033402  104402                                                          TRAP    C$BSUB
8310   033404  004737  003774          JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
8311   033410  103003                  BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
8312   033412                          ERROR                   ;ELSE, REPORT ERROR
  (3)  033412  104460                                                          TRAP    C$ERROR
8313   033414                          ESCAPE  TST             ;   & EXIT TEST
  (3)  033414  104410                                                          TRAP    C$ESCAPE
  (3)  033416  002470                                                          .WORD   L10073-.
8314   033420  004537  004672  1$:     JSR     R5,INITT1       ;INITIALIZE TIMER # 1
8315   033424  000000                  0                       ;       0 ==> LATCHES
8316   033426  000200                  BIT7                    ;       MODE 2 & "T1" INT. ENABLE FLAG CLEARED
8317   033430  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8318   033432                          ERROR                   ;ELSE, REPORT IT
  (3)  033432  104460                                                          TRAP    C$ERROR
8319   033434                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033434  104410                                                          TRAP    C$ESCAPE
  (3)  033436  002450                                                          .WORD   L10073-.
8320
8321                            ; MODE 2 IS ONE-SHOT MODE WITH OUTPUT ON PB7 CONTROLED BY TIMER 1
8322
8323   033440  004737  036142          JSR     PC,GETT1        ;IS "T1" SET?
8324   033444  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
8325   033446                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  033446  104410                                                          TRAP    C$ESCAPE
  (3)  033450  002434                                                          .WORD   L10075-.
8326   033452  103123                  BCC     6$              ;NO, GOOD.
8327                                                           ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
8328   033454  004537  004076          JSR     R5,READ         ;GET ACR FOR ERROR MESSAGE
8329   033460  120013                  ACR
```

```
 8330  033462  002466                      TMPB
 8331  033464  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
 8332  033466                              ERROR                   ;ELSE, REPORT IT
  (3)  033466  104460                                                      TRAP    C$ERROR
 8333  033470                              ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033470  104410                                                      TRAP    C$ESCAPE
  (3)  033472  002414                                                      .WORD   L10073-.
 8334  033474  004537  004076              JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
 8335  033500  120004                      T1CL
 8336  033502  002450                      TMP4
 8337  033504  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
 8338  033506                              ERROR                   ;ELSE, REPORT IT
  (3)  033506  104460                                                      TRAP    C$ERROR
 8339  033510                              ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033510  104410                                                      TRAP    C$ESCAPE
  (3)  033512  002374                                                      .WORD   L10073-.
 8340  033514  004537  004076              JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
 8341  033520  120005                      T1CH
 8342  033522  002452                      TMP5
 8343  033524  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
 8344  033526                              ERROR                   ;ELSE, REPORT IT
  (3)  033526  104460                                                      TRAP    C$ERROR
 8345  033530                              ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033530  104410                                                      TRAP    C$ESCAPE
  (3)  033532  002354                                                      .WORD   L10073-.
 8346  033534  004537  004076              JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8347  033540  120006                      T1LL
 8348  033542  002454                      TMP6
 8349  033544  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
 8350  033546                              ERROR                   ;ELSE, REPORT IT
  (3)  033546  104460                                                      TRAP    C$ERROR
 8351  033550                              ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033550  104410                                                      TRAP    C$ESCAPE
  (3)  033552  002334                                                      .WORD   L10073-.
 8352  033554  004537  004076              JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8353  033560  120007                      T1LH
 8354  033562  002456                      TMP7
 8355  033564  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
 8356  033566                              ERROR                   ;ELSE, REPORT IT
  (3)  033566  104460                                                      TRAP    C$ERROR
 8357  033570                              ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033570  104410                                                      TRAP    C$ESCAPE
  (3)  033572  002314                                                      .WORD   L10073-.
 8358  033574                              GEDF    EM50A,ERR50     ;REPORT "T1" NOT CLEARED @ INIT.
  (2)                                                             ;       "DEVICE FATAL" ERROR # 66
  (6)  033574  104455                                                      TRAP    C$ERDF
  (7)  033576  000102                                                      .WORD   66
  (7)  033600  016101                                                      .WORD   EM50A
  (7)  033602  010774                                                      .WORD   ERR50
 8359
 8360                           ;-------------------------------------------------------------------------
 8361
 8362  033604  112737  000002  002453      MOVB    #2,TMP5+1
 8363  033612  004537  004322              JSR     R5,WRITE        ;INIT TIMER # 1 BY WRITING INTO
 8364  033616  120005                      T1CH                    ;T1C-H (ADDR 05)
 8365  033620  002453                      TMP5+1
```

```
 8366  033622  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8367  033624                                ERROR                   ;ELSE, REPORT IT
  (3)  033624  104460                                                                   TRAP    C$ERROR
 8368  033626                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033626  104410                                                                   TRAP    C$ESCAPE
  (3)  033630  002256                                                                   .WORD   L10073-.
 8369  033632  004737  036142                JSR     PC,GETT1        ;IS "T1" SET?
 8370  033636  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8371  033640                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  033640  104410                                                                   TRAP    C$ESCAPE
  (3)  033642  002242                                                                   .WORD   L10075-.
 8372  033644  103026                        BCC     6$              ;NO, GOOD.
 8373                                                                ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
 8374  033646  004537  004076                JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
 8375  033652  120005                        T1CH
 8376  033654  002452                        TMP5
 8377  033656  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8378  033660                                ERROR                   ;ELSE, REPORT IT
  (3)  033660  104460                                                                   TRAP    C$ERROR
 8379  033662                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033662  104410                                                                   TRAP    C$ESCAPE
  (3)  033664  002222                                                                   .WORD   L10073-.
 8380  033666  004537  004076                JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8381  033672  120007                        T1LH
 8382  033674  002456                        TMP7
 8383  033676  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8384  033700                                ERROR                   ;ELSE, REPORT IT
  (3)  033700  104460                                                                   TRAP    C$ERROR
 8385  033702                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033702  104410                                                                   TRAP    C$ESCAPE
  (3)  033704  002202                                                                   .WORD   L10073-.
 8386  033706                                GEDF    EM50B,ERR50     ;REPORT "T1" NOT CLEARED @ INIT.
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 67
  (6)  033706  104455                                                                   TRAP    C$ERDF
  (7)  033710  000103                                                                   .WORD   67
  (7)  033712  016147                                                                   .WORD   EM50B
  (7)  033714  010774                                                                   .WORD   ERR50
 8387  033716                                ESCAPE  SUB             ;AND EXIT SUBTEST
  (3)  033716  104410                                                                   TRAP    C$ESCAPE
  (3)  033720  002164                                                                   .WORD   L10075-.
 8388
 8389                                  ;-------------------------------------------------------------------------
 8390
 8391  033722  004737  003774          6$:     JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP AGAIN
 8392  033726  112737  000377  002445          MOVB    #377,TMP2+1     ;INITIAL VALUE FOR DDRB
 8393  033734  004537  004322                JSR     R5,WRITE        ;LOAD IT
 8394  033740  120002                        DDRB
 8395  033742  002445                        TMP2+1
 8396  033744  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8397  033746                                ERROR                   ;ELSE, REPORT IT
  (3)  033746  104460                                                                   TRAP    C$ERROR
 8398  033750                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  033750  104410                                                                   TRAP    C$ESCAPE
  (3)  033752  002134                                                                   .WORD   L10073-.
 8399  033754  004537  004672                JSR     R5,INITT1       ;RE-INITIALIZE THE TIMER
 8400  033760  000000                        0                       ;       FOR MAXIMUM TIMEOUT
```

```
8401  033762  000200                        BIT7                    ;       MODE 2 & CLEARED "T1" INT. FLAG
8402  033764  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8403  033766                                ERROR                   ;ELSE, REPORT IT
 (3)  033766  104460                                                                    TRAP    C$ERROR
8404  033770                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  033770  104410                                                                    TRAP    C$ESCAPE
 (3)  033772  002114                                                                    .WORD   L10073-.
8405  033774  004537  004076                JSR     R5,READ         ;GET ACR FOR FUTURE ERROR MESSAGES
8406  034000  120013                        ACR
8407  034002  002466                        TMP8
8408  034004  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8409  034006                                ERROR                   ;ELSE, REPORT IT
 (3)  034006  104460                                                                    TRAP    C$ERROR
8410  034010                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  034010  104410                                                                    TRAP    C$ESCAPE
 (3)  034012  002074                                                                    .WORD   L10073-.
8411  034014  004537  036110                JSR     R5,LODT1C       ;LOAD TIMER # 1
8412  034020     252                7$:     .BYTE   252
8413  034021     252                8$:     .BYTE   252
8414
8415                                        ;-------------------------------------------------------------------------------
8416
8417  034022  004737  036326                JSR     PC,GETP87       ;GET "P87".  IS IT CLEARED?
8418  034026  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
8419  034030                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
 (3)  034030  104410                                                                    TRAP    C$ESCAPE
 (3)  034032  002052                                                                    .WORD   L10075-.
8420  034034  103070                        BCC     9$              ;IT IS, GOOD
8421  034036  004537  004076                JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
8422  034042  120015                        IFR
8423  034044  002472                        TMPD
8424  034046  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8425  034050                                ERROR                   ;ELSE, REPORT IT
 (3)  034050  104460                                                                    TRAP    C$ERROR
8426  034052                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  034052  104410                                                                    TRAP    C$ESCAPE
 (3)  034054  002032                                                                    .WORD   L10073-.
8427  034056  004537  004076                JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
8428  034062  120004                        T1CL
8429  034064  002450                        TMP4
8430  034066  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8431  034070                                ERROR                   ;ELSE, REPORT IT
 (3)  034070  104460                                                                    TRAP    C$ERROR
8432  034072                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  034072  104410                                                                    TRAP    C$ESCAPE
 (3)  034074  002012                                                                    .WORD   L10073-.
8433  034076  004537  004076                JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
8434  034102  120005                        T1CH
8435  034104  002452                        TMP5
8436  034106  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
8437  034110                                ERROR                   ;ELSE, REPORT IT
 (3)  034110  104460                                                                    TRAP    C$ERROR
8438  034112                                ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  034112  104410                                                                    TRAP    C$ESCAPE
 (3)  034114  001772                                                                    .WORD   L10073-.
8439  034116  004537  004076                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
```

```
 8440  034122  120006                        T1LL
 8441  034124  002454                        TMP6
 8442  034126  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8443  034130                                ERROR                   ;ELSE, REPORT IT
  (3)  034130  104460                                                                   TRAP    C$ERROR
 8444  034132                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034132  104410                                                                   TRAP    C$ESCAPE
  (3)  034134  001752                                                                   .WORD   L10073-.
 8445  034136  004537  004076                JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8446  034142  120007                        T1LH
 8447  034144  002456                        TMP7
 8448  034146  103003                        BCC     .+10            ;IF NO ERROR. PROCEED
 8449  034150                                ERROR                   ;ELSE, REPORT IT
  (3)  034150  104460                                                                   TRAP    C$ERROR
 8450  034152                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034152  104410                                                                   TRAP    C$ESCAPE
  (3)  034154  001732                                                                   .WORD   L10073-.
 8451  034156                                GEDF    EM50V,ERR50     ;NO, STILL(?) SET!
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 68
  (6)  034156  104455                                                                   TRAP    C$ERDF
  (7)  034160  000104                                                                   .WORD   68
  (7)  034162  017252                                                                   .WORD   EM50V
  (7)  034164  010774                                                                   .WORD   ERR50
 8452  034166  004737  036200                JSR     PC,KICKT1       ;BECAUSE THE ERROR MESSAGE TAKES SO LONG TO
 8453  034172  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8454  034174                                ERROR                   ;ELSE, REPORT IT
  (3)  034174  104460                                                                   TRAP    C$ERROR
 8455  034176                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034176  104410                                                                   TRAP    C$ESCAPE
  (3)  034200  001706                                                                   .WORD   L10073-.
 8456  034202  004737  005044                JSR     PC,STALL        ;  PROCESS & PRINT, RE-START THE TIMER AND THEN
 8457  034206  004737  005044                JSR     PC,STALL        ;  DELAY FOR A LITTLE WHILE SO IT CAN DECREMENT
 8458  034212  012703  000100        10$:    MOV     #100,R3         ;# INIT. "REPEAT" VALUE
 8459  034216  004537  004076         9$:    JSR     R5,READ         ;READ THE LOW COUNTER
 8460  034222  120004                        T1CL
 8461  034224  002450                        TMP4
 8462  034226  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8463  034230                                ERROR                   ;ELSE, REPORT IT
  (3)  034230  104460                                                                   TRAP    C$ERROR
 8464  034232                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034232  104410                                                                   TRAP    C$ESCAPE
  (3)  034234  001652                                                                   .WORD   L10073-.
 8465  034236  123737  002450  034020        CMPB    TMP4,7$         ;MAKE SURE THE COUNTER IS DECREMENTING
 8466  034244  001013                        BNE     12$             ;IT IS, NOW SEE IF THE HIGH COUNTER IS TOO
 8467  034246  077315                        SOB     R3,9$           ;# NO: IF NOT 64. ATTEMPTS, TRY AGAIN
 8468  034250                                GEDF    EM50D,ERR50     ;IT WASN'T -- REPORT THE ERROR
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 69
  (6)  034250  104455                                                                   TRAP    C$ERDF
  (7)  034252  000105                                                                   .WORD   69
  (7)  034254  016263                                                                   .WORD   EM50D
  (7)  034256  010774                                                                   .WORD   ERR50
 8469  034260  004737  036200                JSR     PC,KICKT1       ;RESTART TIMER AGAIN IF ERROR MESSAGE PRINTED
 8470  034264  103003                        BCC     12$             ;IF NO ERROR, PROCEED
 8471  034266                                ERROR                   ;ELSE, REPORT IT
  (3)  034266  104460                                                                   TRAP    C$ERROR
 8472  034270                                ESCAPE  TST             ;       AND EXIT THIS TEST
```

```
  (3)  034270  104410                                                                  TRAP    C$ESCAPE
  (3)  034272  001614                                                                  .WORD   L10073-.
8473   034274  012703  000100          12$:    MOV     #100,R3         ;INIT. TIMEOUT VALUE
8474   034300  004537  004076          13$:    JSR     R5,READ         ;READ THE HIGH COUNTER
8475   034304  120005                          T1CH
8476   034306  002452                          TMP5
8477   034310  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8478   034312                                  ERROR                   ;ELSE, REPORT IT
  (3)  034312  104460                                                                  TRAP    C$ERROR
8479   034314                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034314  104410                                                                  TRAP    C$ESCAPE
  (3)  034316  001570                                                                  .WORD   L10073-.
8480   034320  123737  002452  034021          CMPB    TMP5,8$         ;DID IT CHANGE FROM THE LOADED VALUE?
8481   034326  001027                          BNE     17$             ;YES, PROCEED WITH TESTING
8482   034330  077315                          SOB     R3,13$          ;NO,  IF NO TIMEOUT, TRY AGAIN
8483   034332  004537  004076                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8484   034336  120006                          T1LL
8485   034340  002454                          TMP6
8486   034342  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8487   034344                                  ERROR                   ;ELSE, REPORT IT
  (3)  034344  104460                                                                  TRAP    C$ERROR
8488   034346                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034346  104410                                                                  TRAP    C$ESCAPE
  (3)  034350  001536                                                                  .WORD   L10073-.
8489   034352  004537  004076                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8490   034356  120007                          T1LH
8491   034360  002456                          TMP7
8492   034362  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8493   034364                                  ERROR                   ;ELSE, REPORT IT
  (3)  034364  104460                                                                  TRAP    C$ERROR
8494   034366                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034366  104410                                                                  TRAP    C$ESCAPE
  (3)  034370  001516                                                                  .WORD   L10073-.
8495   034372                                  GEDF    EM50E,ERR50     ;ELSE, REPORT THAT HIGH COUNTER ISN'T RUNNING
  (2)                                                                  ;       "DEVICE FATAL" ERROR # 70
  (6)  034372  104455                                                                  TRAP    C$ERDF
  (7)  034374  000106                                                                  .WORD   70
  (7)  034376  016317                                                                  .WORD   EM50E
  (7)  034400  010774                                                                  .WORD   ERR50
8496   034402                                  ESCAPE  SUB             ;IN THAT CASE, WE CAN'T PROCEED WITH TESTING EITHER
  (3)  034402  104410                                                                  TRAP    C$ESCAPE
  (3)  034404  001500                                                                  .WORD   L10075-.
8497                                    ;-------------------------------------------------------------------------------
8498
8499   034406  112737  000377  002445  17$:    MOVB    #377,TMP2+1     ;SETUP DDRB FOR DESIRED DIRECTION OF ORB
8500   034414  004537  004322                  JSR     R5,WRITE
8501   034420  120002                          DDRB
8502   034422  002445                          TMP2+1
8503   034424  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8504   034426                                  ERROR                   ;ELSE, REPORT IT
  (3)  034426  104460                                                                  TRAP    C$ERROR
8505   034430                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034430  104410                                                                  TRAP    C$ESCAPE
  (3)  034432  001454                                                                  .WORD   L10073-.
8506   034434  004537  036110                  JSR     R5,LODT1C       ;RE-LOAD TIMER # 1 WITH A VALUE WHICH WILL
8507   034440     001          18$:    .BYTE   1               ;   CAUSE AN ALMOST IMMEDIATE TIMEOUT
```

```
8508  034441  000                     19$:    .BYTE   0               ; (ADDRESS OF HIGH BYTE FOR T1C-H (ADDR 05))
8509                                  ;-------------------------------------------------------------------------------
8510
8511  034442  004737  036142                  JSR     PC,GETT1        ;WAS "T1" SET BY THE ABOVE OPERATION?
8512  034446  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
8513  034450                          ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
 (3)  034450  104410                                                                     TRAP    C$ESCAPE
 (3)  034452  001432                                                                     .WORD   L10075-.
8514  034454  103446                          BCS     20$             ;YES, OK -- CONTINUE ERROR CHECKING
8515  034456  004537  004076                  JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
8516  034462  120004                          T1CL
8517  034464  002450                          TMP4
8518  034466  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8519  034470                                  ERROR                   ;ELSE, REPORT IT
 (3)  034470  104460                                                                     TRAP    C$ERROR
8520  034472                          ESCAPE  TST                     ;       AND EXIT THIS TEST
 (3)  034472  104410                                                                     TRAP    C$ESCAPE
 (3)  034474  001412                                                                     .WORD   L10073-.
8521  034476  004537  004076                  JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
8522  034502  120005                          T1CH
8523  034504  002452                          TMP5
8524  034506  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8525  034510                                  ERROR                   ;ELSE, REPORT IT
 (3)  034510  104460                                                                     TRAP    C$ERROR
8526  034512                          ESCAPE  TST                     ;       AND EXIT THIS TEST
 (3)  034512  104410                                                                     TRAP    C$ESCAPE
 (3)  034514  001372                                                                     .WORD   L10073-.
8527  034516  004537  004076                  JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8528  034522  120006                          T1LL
8529  034524  002454                          TMP6
8530  034526  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8531  034530                                  ERROR                   ;ELSE, REPORT IT
 (3)  034530  104460                                                                     TRAP    C$ERROR
8532  034532                          ESCAPE  TST                     ;       AND EXIT THIS TEST
 (3)  034532  104410                                                                     TRAP    C$ESCAPE
 (3)  034534  001352                                                                     .WORD   L10073-.
8533  034536  004537  004076                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8534  034542  120007                          T1LH
8535  034544  002456                          TMP7
8536  034546  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
8537  034550                                  ERROR                   ;ELSE, REPORT IT
 (3)  034550  104460                                                                     TRAP    C$ERROR
8538  034552                          ESCAPE  TST                     ;       AND EXIT THIS TEST
 (3)  034552  104410                                                                     TRAP    C$ESCAPE
 (3)  034554  001332                                                                     .WORD   L10073-.
8539  034556                          GEDF    EM50F,ERR50     ;NO,  BAD NEWS!  REPORT THE FAILURE
 (2)                                      ;       "DEVICE FATAL" ERROR # 71
 (6)  034556  104155                                                                     TRAP    C$ERDF
 (7)  034560  000107                                                                     .WORD   71
 (7)  034562  016353                                                                     .WORD   EM50F
 (7)  034564  010774                                                                     .WORD   ERR50
8540  034566                          ESCAPE  SUB                     ;  AND GET OUT OF SUBTEST
 (3)  034566  104410                                                                     TRAP    C$ESCAPE
 (3)  034570  001314                                                                     .WORD   L10075-.
8541  034572  004737  036326          20$:    JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
8542  034576  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
```

```
 8543  034600                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  034600  104410                                                            TRAP    C$ESCAPE
  (3)  034602  001302                                                            .WORD   L10075-.
 8544  034604  103445                  BCS     41$             ;YES, CONTINUE CHECKING "T1"
 8545  034606  004537  004076          JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
 8546  034612  120004                  T1CL
 8547  034614  002450                  TMP4
 8548  034616  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 8549  034620                          ERROR                   ;ELSE, REPORT IT
  (3)  034620  104460                                                            TRAP    C$ERROR
 8550  034622                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034622  104410                                                            TRAP    C$ESCAPE
  (3)  034624  001262                                                            .WORD   L10073-.
 8551  034626  004537  004076          JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
 8552  034632  120005                  T1CH
 8553  034634  002452                  TMP5
 8554  034636  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 8555  034640                          ERROR                   ;ELSE, REPORT IT
  (3)  034640  104460                                                            TRAP    C$ERROR
 8556  034642                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034642  104410                                                            TRAP    C$ESCAPE
  (3)  034644  001242                                                            .WORD   L10073-.
 8557  034646  004537  004076          JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8558  034652  120006                  T1LL
 8559  034654  002454                  TMP6
 8560  034656  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 8561  034660                          ERROR                   ;ELSE, REPORT IT
  (3)  034660  104460                                                            TRAP    C$ERROR
 8562  034662                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034662  104410                                                            TRAP    C$ESCAPE
  (3)  034664  001222                                                            .WORD   L10073-.
 8563  034666  004537  004076          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8564  034672  120007                  T1LH
 8565  034674  002456                  TMP7
 8566  034676  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 8567  034700                          ERROR                   ;ELSE, REPORT IT
  (3)  034700  104460                                                            TRAP    C$ERROR
 8568  034702                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034702  104410                                                            TRAP    C$ESCAPE
  (3)  034704  001202                                                            .WORD   L10073-.
 8569  034706                          GEDF    EM50S,ERR50     ;NO!  REPORT THAT PB7 DIDN'T GET SET!
  (2)                                                             ;       "DEVICE FATAL" ERROR # 72
  (6)  034706  104455                                                            TRAP    C$ERDF
  (7)  034710  000110                                                            .WORD   72
  (7)  034712  017134                                                            .WORD   EM50S
  (7)  034714  010774                                                            .WORD   ERR50
 8570  034716  000562                  BR      28$             ;   & EXIT THIS SECTION OF SUBTEST
 8571  034720  004537  004076    41$:  JSR     R5,READ         ;READ T1C-H (ADDR 05) TO SEE IF IT CLEARS "T1"
 8572  034724  120005                  T1CH                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
 8573  034726  002452                  TMP5                    ; ALMOST ANYTHING)
 8574  034730  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
 8575  034732                          ERROR                   ;ELSE, REPORT IT
  (3)  034732  104460                                                            TRAP    C$ERROR
 8576  034734                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  034734  104410                                                            TRAP    C$ESCAPE
  (3)  034736  001150                                                            .WORD   L10073-.
```

```
8577  034740  004737  036142              JSR     PC,GETT1        ;PUT THE CURRENT "T1" VALUE INTO THE CARRY BIT
8578  034744  102002                      BVC     11$             ;IF NO ERROR, PROCEED
8579  034746                              ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
 (3)  034746  104410                                                      TRAP    C$ESCAPE
 (3)  034750  001134                                                      .WORD   L10075-.
8580  034752  103435              11$:    BCS     21$             ;IF SET, ALL'S OK
8581                                                                    ;IF CLEARED!  BAD VIA CHIP!
8582  034754  004537  004076              JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
8583  034760  120004                      T1CL
8584  034762  002450                      TMP4
8585  034764  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
8586  034766                              ERROR                   ;ELSE, REPORT IT
 (3)  034766  104460                                                      TRAP    C$ERROR
8587  034770                              ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  034770  104410                                                      TRAP    C$ESCAPE
 (3)  034772  001114                                                      .WORD   L10073-.
8588  034774  004537  004076              JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8589  035000  120006                      T1LL
8590  035002  002454                      TMP6
8591  035004  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
8592  035006                              ERROR                   ;ELSE, REPORT IT
 (3)  035006  104460                                                      TRAP    C$ERROR
8593  035010                              ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  035010  104410                                                      TRAP    C$ESCAPE
 (3)  035012  001074                                                      .WORD   L10073-.
8594  035014  004537  004076              JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8595  035020  120007                      T1LH
8596  035022  002456                      TMP7
8597  035024  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
8598  035026                              ERROR                   ;ELSE, REPORT IT
 (3)  035026  104460                                                      TRAP    C$ERROR
8599  035030                              ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  035030  104410                                                      TRAP    C$ESCAPE
 (3)  035032  001054                                                      .WORD   L10073-.
8600  035034                              GEDF    EM50G,ERR50     ;REPORT BAD VIA CHIP!
 (2)                                                            ;       "DEVICE FATAL" ERROR # 73
 (6)  035034  104455                                                      TRAP    C$ERDF
 (7)  035036  000111                                                      .WORD   73
 (7)  035040  016420                                                      .WORD   EM50G
 (7)  035042  010774                                                      .WORD   ERR50
8601  035044  000507                      BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
8602
8603  035046  004537  004076      21$:    JSR     R5,READ         ;READ T1L-L (ADDR 06)
8604  035052  120006                      T1LL
8605  035054  002454                      TMP6                    ;THIS SHOULD RETURN A 001
8606  035056  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
8607  035060                              ERROR                   ;ELSE, REPORT IT
 (3)  035060  104460                                                      TRAP    C$ERROR
8608  035062                              ESCAPE  TST             ;       AND EXIT THIS TEST
 (3)  035062  104410                                                      TRAP    C$ESCAPE
 (3)  035064  001022                                                      .WORD   L10073-.
8609  035066  123737  002454  034440      CMPB    TMP6,18$        ;CHECK T1L-L (ADDR 06) AGAINST LOADED VALUE
8610  035074  001415                      BEQ     23$             ;IF SAME, PROCEED
8611                                                                    ;ELSE, REPORT BAD LOAD OF T1L-L (ADDR 06)
8612  035076  004537  004076              JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8613  035102  120007                      T1LH
```

```
 8614  035104  002456                          TMP7
 8615  035106  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8616  035110                                  ERROR                   ;ELSE, REPORT IT
  (3)  035110  104460                                                                    TRAP    C$ERROR
 8617  035112                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035112  104410                                                                    TRAP    C$ESCAPE
  (3)  035114  000772                                                                    .WORD   L10073-.
 8618  035116                                  GEDF    EM50H,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-L (ADDR 06)
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 74
  (6)  035116  104455                                                                    TRAP    C$ERDF
  (7)  035120  000112                                                                    .WORD   74
  (7)  035122  016462                                                                    .WORD   EM50H
  (7)  035124  010774                                                                    .WORD   ERR50
 8619  035126  000456                          BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 8620
 8621  035130  004737  036142          23$:    JSR     PC,GETT1        ;IS "T1" STILL SET?
 8622  035134  102002                          BVC     .+6             ;IF NO ERROR, PROCEED
 8623  035136                                  ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035136  104410                                                                    TRAP    C$ESCAPE
  (3)  035140  000744                                                                    .WORD   L10075-.
 8624  035142  103415                          BCS     24$             ;YES, ALL'S OK
 8625                                                                   ;NO!  BAD VIA CHIP!
 8626  035144  004537  004076                  JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 8627  035150  120007                          T1LH
 8628  035152  002456                          TMP7
 8629  035154  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8630  035156                                  ERROR                   ;ELSE, REPORT IT
  (3)  035156  104460                                                                    TRAP    C$ERROR
 8631  035160                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035160  104410                                                                    TRAP    C$ESCAPE
  (3)  035162  000724                                                                    .WORD   L10073-.
 8632  035164                                  GEDF    EM50I,ERR50     ;REPORT BAD VIA CHIP!
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 75
  (6)  035164  104455                                                                    TRAP    C$ERDF
  (7)  035166  000113                                                                    .WORD   75
  (7)  035170  016550                                                                    .WORD   EM50I
  (7)  035172  010774                                                                    .WORD   ERR50
 8633  035174  000433                          BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 8634
 8635  035176  004537  004076          24$:    JSR     R5,READ         ;READ T1L-H (ADDR 07)
 8636  035202  120007                          T1LH
 8637  035204  002456                          TMP7                    ;THIS SHOULD RETURN A 000
 8638  035206  103003                          BCC     .+10            ;IF NO ERROR, PROCEED
 8639  035210                                  ERROR                   ;ELSE, REPORT IT
  (3)  035210  104460                                                                    TRAP    C$ERROR
 8640  035212                                  ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035212  104410                                                                    TRAP    C$ESCAPE
  (3)  035214  000672                                                                    .WORD   L10073-.
 8641  035216  123737  002456  034441          CMPB    TMP7,19$        ;CHECK T1L-H (ADDR 07) AGAINST LOADED VALUE
 8642  035224  001405                          BEQ     26$             ;IF SAME, PROCEED
 8643  035226                                  GEDF    EM50J,ERR50     ;ELSE, REPORT BAD LOAD OF T1L-H (ADDR 07)
  (2)                                                                   ;       "DEVICE FATAL" ERROR # 76
  (6)  035226  104455                                                                    TRAP    C$ERDF
  (7)  035230  000114                                                                    .WORD   76
  (7)  035232  016612                                                                    .WORD   EM50J
  (7)  035234  010774                                                                    .WORD   ERR50
```

```
 8644  035236  000412                        BR      28$             ;BYPASS THE REST OF THIS SECTION OF TESTING
 8645
 8646  035240  004737  036142        26$:    JSR     PC,GETT1        ;IS "T1" STILL SET?
 8647  035244  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8648  035246                        ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035246  104410                                                                    TRAP    C$ESCAPE
  (3)  035250  000634                                                                    .WORD   L10075-.
 8649  035252  103404                        BCS     28$             ;YES, ALL'S OK
 8650  035254                        GEDF    EM50K,ERR50     ;NO!  BAD VIA CHIP!
  (2)                                                   ;       "DEVICE FATAL" ERROR # 77
  (6)  035254  104455                                                                    TRAP    C$ERDF
  (7)  035256  000115                                                                    .WORD   77
  (7)  035260  016700                                                                    .WORD   EM50K
  (7)  035262  010774                                                                    .WORD   ERR50
 8651
 8652                           ;-------------------------------------------------------------------------------
 8653
 8654  035264  004537  004076        28$:    JSR     R5,READ         ;READ T1C-L (ADDR 04) TO CLEAR "T1"
 8655  035270  120004                        T1CL                    ;(THIS VALUE ISN'T CHECKED BECAUSE IT CAN BE
 8656  035272  002450                        TMP4                    ; ALMOST ANYTHING)
 8657  035274  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8658  035276                                ERROR                   ;ELSE, REPORT IT
  (3)  035276  104460                                                                    TRAP    C$ERROR
 8659  035300                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035300  104410                                                                    TRAP    C$ESCAPE
  (3)  035302  000604                                                                    .WORD   L10073-.
 8660  035304  004737  036142                JSR     PC,GETT1        ;IS "T1" CLEARED NOW
 8661  035310  102002                        BVC     16$             ;IF NO ERROR, PROCEED
 8662  035312                        ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035312  104410                                                                    TRAP    C$ESCAPE
  (3)  035314  000570                                                                    .WORD   L10075-.
 8663  035316  103004        16$:    BCC     29$             ;YES, ALL'S OK
 8664  035320                        GEDF    EM50C,ERR50     ;NO!  BAD VIA CHIP!
  (2)                                                   ;       "DEVICE FATAL" ERROR # 78
  (6)  035320  104455                                                                    TRAP    C$ERDF
  (7)  035322  000116                                                                    .WORD   78
  (7)  035324  016215                                                                    .WORD   EM50C
  (7)  035326  010774                                                                    .WORD   ERR50
 8665
 8666                           ;-------------------------------------------------------------------------------
 8667
 8668  035330  105037  002445        29$:    CLRB    TMP2+1          ;CHANGE THE DIRECTION OF ORB -- IT SHOULDN'T
 8669  035334  004537  004322                JSR     R5,WRITE        ;   HAVE ANY EFFECT ON "PB7"
 8670  035340  120002                        DDRB
 8671  035342  002445                        TMP2+1
 8672  035344  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8673  035346                                ERROR                   ;ELSE, REPORT IT
  (3)  035346  104460                                                                    TRAP    C$ERROR
 8674  035350                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035350  104410                                                                    TRAP    C$ESCAPE
  (3)  035352  000534                                                                    .WORD   L10073-.
 8675  035354  004537  004322                JSR     R5,WRITE        ;RE-WRITE INTO T1C-H (ADDR 05) TO SET T1 AGAIN
 8676  035360  120005                        T1CH
 8677  035362  002453                        TMP5+1
 8678  035364  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8679  035366                                ERROR                   ;ELSE, REPORT IT
```

```
  (3)  035366  104460                                                          TRAP    C$ERROR
8680   035370                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035370  104410                                                          TRAP    C$ESCAPE
  (3)  035372  000514                                                          .WORD   L10073-.
8681   035374  004737  036142        JSR     PC,GETT1        ;IS "T1" SET AGAIN
8682   035400  102002                BVC     .+6             ;IF NO ERROR, PROCEED
8683   035402                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035402  104410                                                          TRAP    C$ESCAPE
  (3)  035404  000500                                                          .WORD   L10075-.
8684   035406  103426                BCS     32$             ;YES, ALL'S WELL (AGAIN?)
8685   035410  004537  004076        JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
8686   035414  120005                T1CH
8687   035416  002452                TMP5
8688   035420  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8689   035422                        ERROR                   ;ELSE, REPORT IT
  (3)  035422  104460                                                          TRAP    C$ERROR
8690   035424                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035424  104410                                                          TRAP    C$ESCAPE
  (3)  035426  000460                                                          .WORD   L10073-.
8691   035430  004537  004076        JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8692   035434  120007                T1LH
8693   035436  002456                TMP7
8694   035440  103003                BCC     .+10            ;IF NO ERROR, PROCEED
8695   035442                        ERROR                   ;ELSE, REPORT IT
  (3)  035442  104460                                                          TRAP    C$ERROR
8696   035444                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035444  104410                                                          TRAP    C$ESCAPE
  (3)  035446  000440                                                          .WORD   L10073-.
8697   035450                        GEDF    EM50L,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
  (2)                                                       ;       "DEVICE FATAL" ERROR # 79
  (6)  035450  104455                                                          TRAP    C$ERDF
  (7)  035452  000117                                                          .WORD   79
  (7)  035454  016742                                                          .WORD   EM50L
  (7)  035456  010774                                                          .WORD   ERR50
8698   035460                        ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
  (3)  035460  104410                                                          TRAP    C$ESCAPE
  (3)  035462  000422                                                          .WORD   L10075-.
8699
8700                            ;-------------------------------------------------------------------------
8701
8702   035464  004737  036326  32$:   JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
8703   035470  102002                BVC     .+6             ;IF NO ERROR, PROCEED
8704   035472                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035472  104410                                                          TRAP    C$ESCAPE
  (3)  035474  000410                                                          .WORD   L10075-.
8705   035476  103404                BCS     44$             ;YES,  GOOD.
8706   035500                        GEDF    EM50U,ERR50     ;NO,  BAD!  REPORT IT:  NOT SET AFTER TIMEOUT
  (2)                                                       ;       "DEVICE FATAL" ERROR # 80
  (6)  035500  104455                                                          TRAP    C$ERDF
  (7)  035502  000120                                                          .WORD   80
  (7)  035504  017206                                                          .WORD   EM50U
  (7)  035506  010774                                                          .WORD   ERR50
8707   035510  112737  000125  002455  44$:   MOVB    #125,TMP6+1     ;USING A DIFFERENT VALUE -- 55 HEX..
8708   035516  004537  004322        JSR     R5,WRITE        ;RE-LOAD T1L-L (ADDR 06)
8709   035522  120006                T1LL
8710   035524  002455                TMP6+1
```

```
 8711  035526  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8712  035530                                ERROR                   ;ELSE, REPORT IT
  (3)  035530  104460                                                                   TRAP    C$ERROR
 8713  035532                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035532  104410                                                                   TRAP    C$ESCAPE
  (3)  035534  000352                                                                   .WORD   L10073-.
 8714  035536  004737  036142                JSR     PC,GETT1        ;IS "T1" STILL SET?
 8715  035542  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8716  035544                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035544  104410                                                                   TRAP    C$ESCAPE
  (3)  035546  000336                                                                   .WORD   L10075-.
 8717  035550  103416                        BCS     33$             ;YES, ALL'S STILL OK
 8718  035552  004537  004076                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 8719  035556  120006                        T1LL
 8720  035560  002454                        TMP6
 8721  035562  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8722  035564                                ERROR                   ;ELSE, REPORT IT
  (3)  035564  104460                                                                   TRAP    C$ERROR
 8723  035566                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035566  104410                                                                   TRAP    C$ESCAPE
  (3)  035570  000316                                                                   .WORD   L10073-.
 8724  035572                                GEDF    EM50M,ERR50     ;NO!  SOMETHING WENT WRONG!  REPORT IT
  (2)                                                   ;       "DEVICE FATAL" ERROR # 81
  (6)  035572  104455                                                                   TRAP    C$ERDF
  (7)  035574  000121                                                                   .WORD   81
  (7)  035576  017024                                                                   .WORD   EM50M
  (7)  035600  010774                                                                   .WORD   ERR50
 8725  035602                                ESCAPE  SUB             ;       AND EXIT FROM THIS SUBTEST
  (3)  035602  104410                                                                   TRAP    C$ESCAPE
  (3)  035604  000300                                                                   .WORD   L10075-.
 8726
 8727                                   ;-------------------------------------------------------------------------------
 8728
 8729  035606  112737  000125  002453  33$:   MOVB    #125,TMP5+1     ;AND USING THE SAME VALUE AGAIN (55 HEX),
 8730  035614  004537  004322                JSR     R5,WRITE        ;NOW LOAD T1C-H (ADDR 05)
 8731  035620  120005                        T1CH
 8732  035622  002453                        TMP5+1
 8733  035624  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8734  035626                                ERROR                   ;ELSE, REPORT IT
  (3)  035626  104460                                                                   TRAP    C$ERROR
 8735  035630                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035630  104410                                                                   TRAP    C$ESCAPE
  (3)  035632  000254                                                                   .WORD   L10073-.
 8736  035634  004737  036142                JSR     PC,GETT1        ;"T1" SHOULD NOW BE CLEARED
 8737  035640  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8738  035642                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035642  104410                                                                   TRAP    C$ESCAPE
  (3)  035644  000240                                                                   .WORD   L10075-.
 8739  035646  103024                        BCC     34$             ;IT WAS, ALL'S WELL THAT END'S WELL (I THINK!?)
 8740  035650  004537  004076                JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE.
 8741  035654  120006                        T1LL
 8742  035656  002454                        TMP6
 8743  035660  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8744  035662                                ERROR                   ;ELSE, REPORT IT
  (3)  035662  104460                                                                   TRAP    C$ERROR
 8745  035664                                ESCAPE  TST             ;       AND EXIT THIS TEST
```

```
  (3)  035664  104410                                                          TRAP    C$ESCAPE
  (3)  035666  000220                                                          .WORD   L10073-.
8746   035670  004537  004076          JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8747   035674  120007                  T1LH
8748   035676  002456                  TMP7
8749   035700  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8750   035702                          ERROR                   ;ELSE, REPORT IT
  (3)  035702  104460                                                          TRAP    C$ERROR
8751   035704                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035704  104410                                                          TRAP    C$ESCAPE
  (3)  035706  000200                                                          .WORD   L10073-.
8752   035710                          GEDF    EM5ON,ERR50     ;IT WASN'T!  SOMETHING WENT WRONG!  REPORT IT
  (2)                                                             ;       "DEVICE FATAL" ERROR # 82
  (6)  035710  104455                                                          TRAP    C$ERDF
  (7)  035712  000122                                                          .WORD   82
  (7)  035714  017066                                                          .WORD   EM5ON
  (7)  035716  010774                                                          .WORD   ERR50
8753
8754   035720  004537  004322  34$:    JSR     R5,WRITE        ;RE-LOAD T1C-H (ADDR 5) TO START IT AGAIN
8755   035724  120005                  T1CH
8756   035726  002453                  TMP5+1
8757   035730  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8758   035732                          ERROR                   ;ELSE, REPORT IT
  (3)  035732  104460                                                          TRAP    C$ERROR
8759   035734                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035734  104410                                                          TRAP    C$ESCAPE
  (3)  035736  000150                                                          .WORD   L10073-.
8760   035740  004737  036326          JSR     PC,GETPB7       ;GET "PB7".  IS IT CLEARED?
8761   035744  102002                  BVC     .+6             ;IF NO ERROR, PROCEED
8762   035746                          ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  035746  104410                                                          TRAP    C$ESCAPE
  (3)  035750  000134                                                          .WORD   L10075-.
8763   035752  103054                  BCC     48$             ;YES. GOOD.
8764   035754  004537  004076          JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
8765   035760  120015                  IFR
8766   035762  002472                  TMPD
8767   035764  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8768   035766                          ERROR                   ;ELSE, REPORT IT
  (3)  035766  104460                                                          TRAP    C$ERROR
8769   035770                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  035770  104410                                                          TRAP    C$ESCAPE
  (3)  035772  000114                                                          .WORD   L10073-.
8770   035774  004537  004076          JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
8771   036000  120004                  T1CL
8772   036002  002450                  TMP4
8773   036004  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8774   036006                          ERROR                   ;ELSE, REPORT IT
  (3)  036006  104460                                                          TRAP    C$ERROR
8775   036010                          ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036010  104410                                                          TRAP    C$ESCAPE
  (3)  036012  000074                                                          .WORD   L10073-.
8776   036014  004537  004076          JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
8777   036020  120005                  T1CH
8778   036022  002452                  TMP5
8779   036024  103003                  BCC     .+10            ;IF NO ERROR, PROCEED
8780   036026                          ERROR                   ;ELSE, REPORT IT
```

```
  (3)  036026  104460                                                                  TRAP    C$ERROR
8781   036030                       ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036030  104410                                                                  TRAP    C$ESCAPE
  (3)  036032  000054                                                                  .WORD   L10073-.
8782   036034  004537  004076       JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
8783   036040  120006               T1LL
8784   036042  002454               TMP6
8785   036044  103003               BCC     .+10            ;IF NO ERROR, PROCEED
8786   036046                       ERROR                   ;ELSE, REPORT IT
  (3)  036046  104460                                                                  TRAP    C$ERROR
8787   036050                       ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036050  104410                                                                  TRAP    C$ESCAPE
  (3)  036052  000034                                                                  .WORD   L10073-.
8788   036054  004537  004076       JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
8789   036060  120007               T1LH
8790   036062  002456               TMP7
8791   036064  103003               BCC     .+10            ;IF NO ERROR, PROCEED
8792   036066                       ERROR                   ;ELSE, REPORT IT
  (3)  036066  104460                                                                  TRAP    C$ERROR
8793   036070                       ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036070  104410                                                                  TRAP    C$ESCAPE
  (3)  036072  000014                                                                  .WORD   L10073-.
8794   036074                       GEDF    EM50V,ERR50     ;NO,  BAD!  RPT. PB7 NOT DRIVEN LOW
  (2)                                                      ;       "DEVICE FATAL" ERROR # 83
  (6)  036074  104455                                                                  TRAP    C$ERDF
  (7)  036076  000123                                                                  .WORD   83
  (7)  036100  017252                                                                  .WORD   EM50V
  (7)  036102  010774                                                                  .WORD   ERR50
8795   036104               48$:    ENDSUB
  (3)  036104                                                                  L10075:
  (3)  036104  104403                                                                  TRAP    C$ESUB
8796   036106                       ENDTST
  (3)  036106                                                                  L10073:
  (3)  036106  104401                                                                  TRAP    C$ETST
8797
8798                        ;-------------------------------------------------------------------------------
8799                        ; LODT1C -- LOAD TIMER ONE AT ADDRESSES 04 & 05
8800                        ;
8801                        ; CALLING SEQUENCE:
8802                        ;
8803                        ;       JSR     R5,LODT1C
8804                        ;       .BYTE   <VALUE FOR T1L-L (ADDRESS 04)>
8805                        ;       .BYTE   <VALUE FOR T1C-H (ADDRESS 05)>
8806                        ;       <NEXT SEQUENCIAL INSTRUCTION
8807                        ;
8808                        ;-------------------------------------------------------------------------------
8809
8810   036110  112537  002451  LODT1C: MOVB    (R5)+,TMP4+1    ;SETUP TO LOAD T1CL
8811   036114  112537  002453          MOVB    (R5)+,TMP5+1    ;  AND T1CH
8812   036120  004537  004322          JSR     R5,WRITE        ;LOAD T1C-L (ADDR 04) WITH PASSED PARAMETER
8813   036124  120004                  T1CL
8814   036126  002451                  TMP4+1
8815   036130  004537  004322          JSR     R5,WRITE        ;LOAD T1C-H (ADDR 05) WITH PASSED PARAMETER
8816   036134  120005                  T1CH                    ;  (THIS WILL ALSO RESET "T1" & THE COUNTER)
8817   036136  002453                  TMP5+1
8818   036140  000205                  RTS     R5
```

```
8819
8820                            ;-------------------------------------------------------------------------------
8821                            ; GETT1 -- GET THE "T1" FLAG FROM THE VIA'S IFR REGISTER AND PUT IT
8822                            ;          INTO THE "CARRY" BIT
8823                            ;
8824                            ;-------------------------------------------------------------------------------
8825
8826  036142  004537  004076    GETT1:  JSR     R5,READ         ;GET VIA'S IFR REG.
8827  036146  120015                    IFR
8828  036150  002472                    TMPD
8829  036152  103003                    BCC     1$              ;IF NO ERROR, PROCEED
8830  036154                             ERROR                   ;ELSE, REPORT IT
 (3)  036154  104460                                                                TRAP    C$ERROR
8831  036156  000262                    SEV                     ;FLAG AN ERROR TO MAINLINE ROUTINE
8832  036160  000207                    RTS     PC              ;  AND TAKE AN ABNORMAL RETURN
8833
8834  036162  010046             1$:    MOV     R0,-(SP)        ;PRESERVE R0
8835  036164  113700  002472            MOVB    TMPD,R0         ;PUT VALUE HERE TO PRESERVE TMPO
8836  036170  106100                    ROLB    R0              ;"IRQ" GOES INTO CARRY BIT
8837  036172  106100                    ROLB    R0              ;"T1" GOES INTO CARRY BIT
8838  036174  012600                    MOV     (SP)+,R0        ;RESTORE R0
8839  036176  000207                    RTS     PC
8840
8841                            ;-------------------------------------------------------------------------------
8842                            ; KICKT1 -- INIT. TIMER # 1 BY THE FOLLOWING PROCEDURE:
8843                            ;
8844                            ;       READ T1L-H (ADDR 07) TO GET THE LAST VALUE LOADED INTO IT
8845                            ;
8846                            ;       WRITE THAT VALUE INTO T1C-H (ADDR 05) TO RESET THE "T1" INTERRUPT FLAG
8847                            ;          AND CAUSE THE RE-LOADING OF BOTH COUNTERS.
8848                            ;
8849                            ;-------------------------------------------------------------------------------
8850
8851
8852  036200  010346    KICKT1: MOV     R3,-(SP)        ;SAVE CALLER'S REGISTER CONTENTS
8853  036202  004537  004076    JSR     R5,READ         ;GET THE CURRENT SETTING OF THE HIGH LATCH
8854  036206  120007                    T1LH
8855  036210  002456                    TMP7
8856  036212  103443                    BCS     10$             ;IF ERROR, EXIT
8857
8858  036214  012777  120005  144140    MOV     #T1CH,@SEL4     ;SETUP ADDRESS FOR M-LOOP WRITE
8859  036222  113777  002456  144136    MOVB    TMP7,@SEL6      ;SETUP DATA FOR SAME
8860  036230  113737  002456  002453    MOVB    TMP7,TMP5+1     ;PUT HERE TOO. BECAUSE WE'RE GOING TO WRITE IT.
8861  036236  142777  000100  144114    BICB    #IFRT1,@BSEL3   ;CLEAR THE INTERRUPT BIT -- JUST IN CASE
8862  036244  112777  000002  144104    MOVB    #WRILOC,@BSEL2  ;TELL THE M-LOOP TO WRITE THE BYTE FOR US
8863  036252  012703  000074            MOV     #60.,R3         ;SETUP TIMEOUT COUNTER
8864  036256  132777  000200  144072  5$:       BITB    #MRDY,@BSEL2    ;WAIT FOR M-READY TO BE SET
8865  036264  001016                    BNE     10$             ;AS SOON AS "MRDY" IS SET, EXIT!
8866  036266  077305                    SOB     R3,5$           ;IF NO TIMEOUT, CHECK AGAIN FOR M-READY
8867  036270                            GTDF    EM4,ERR4        ;ELSE, "MRDY" TIMEOUT
 (2)                                                            ;       QUEUE "DEVICE FATAL" ERROR # 84
 (5)  036270  012737  000001  002236                                                   MOV     #T.EDF,ERRTYP
 (5)  036276  012737  000124  002240                                                   MOV     #84,ERRNBR
 (5)  036304  012737  014512  002242                                                   MOV     #EM4,ERRMSG
 (5)  036312  012737  005440  002244                                                   MOV     #ERR4,ERRBLK
8868  036320  000261                    SEC                     ;INDICATE THE FAILURE & EXIT
```

```
8869
8870  036322  012603                  10$:    MOV     (SP)+,R3        ;RESTORE REGISTER
8871  036324  000207                          RTS     PC              ;IMMEDIATE RETURN
8872
8873                                  ;-------------------------------------------------------------------------------
8874                                  ; GETPB7 -- PUT THE CURRENT SETTING OF "PB7" (BIT 7 OF ORB W/IN THE VIA CHIP)
8875                                  ;           INTO THE CARRY BIT SO IT CAN BE TESTED UPON RETURN.
8876                                  ;
8877                                  ;       CALLING SEQUENCE:
8878                                  ;
8879                                  ;       JSR     PC,GETPB7
8880                                  ;       <TEST FOR PB7 SET OR CLEARED WITH "BCS" OR "BCC" INSTR'S>
8881                                  ;
8882                                  ;-------------------------------------------------------------------------------
8883
8884  036326  004537  004076          GETPB7: JSR     R5,READ         ;GET THE REGISTER THAT CONTAINS "PB7"
8885  036332  120000                          ORB
8886  036334  002440                          TMP0
8887  036336  103003                          BCC     1$              ;IF NO ERROR, PROCEED
8888  036340                                  ERROR                   ;ELSE, REPORT IT
 (3)  036340  104460                                                                  TRAP    C$ERROR
8889  036342  000262                          SEV                     ;FLAG AN ERROR TO MAINLINE ROUTINE
8890  036344  000207                          RTS     PC              ;  AND TAKE AN ABNORMAL RETURN
8891
8892  036346  010046                  1$:     MOV     R0,-(SP)        ;PRESERVE THIS REGISTER FOR THE CALLER
8893  036350  113700  002440                  MOVB    TMP0,R0         ;PUT ITS CONTENTS HERE SO WE CAN MANIPULATE IT
8894  036354  106100                          ROLB    R0              ;PUT "PB7" INTO THE CARRY BIT
8895  036356  012600                          MOV     (SP)+,R0        ;RESTORE R0 FOR THE CALLER
8896  036360  000207                          RTS     PC              ;RETURN WITH "PB7" IN THE CARRY BIT
8897
```

```
                        .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
                                                                                T28::
                        ;       BGNSUB
                                                                                T28.1:
                                                                                        TRAP    C$BSUB
8944  036364  004737  003774          ;       JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
8945  036370  103003                  ;       BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
```

```
 8946  036372                                 ERROR                   ;ELSE, REPORT ERROR
  (3)  036372  104460                                                                TRAP    C$ERROR
 8947  036374                                 ESCAPE  TST             ;   & EXIT TEST
  (3)  036374  104410                                                                TRAP    C$ESCAPE
  (3)  036376  001514                                                                .WORD   L10076-.
 8948  036400  004537  004672        1$:     JSR     R5,INITT1       ;INITIALIZE TIMER # 1
 8949  036404  000000                 0                               ;       0 ==> LATCHES
 8950  036406  000100                 BIT6                            ;       MODE 1 & "T1" INT. ENABLE FLAG CLEARED
 8951  036410  103003                 BCC     .+10                    ;IF NO ERROR, PROCEED
 8952  036412                         ERROR                           ;ELSE, REPORT IT
  (3)  036412  104460                                                                TRAP    C$ERROR
 8953  036414                         ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036414  104410                                                                TRAP    C$ESCAPE
  (3)  036416  001474                                                                .WORD   L10076-.
 8954  036420  004737  036142        JSR     PC,GETT1        ;IS "T1" SET?
 8955  036424  102002                 BVC     .+6             ;IF NO ERROR, PROCEED
 8956  036426                         ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036426  104410                                                                TRAP    C$ESCAPE
  (3)  036430  000414                                                                .WORD   L10077-.
 8957  036432  103006                 BCC     2$              ;NO, GOOD.
 8958  036434                         GEDF    EM50A,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
  (2)                                                            ;       "DEVICE FATAL" ERROR # 85
  (6)  036434  104455                                                                TRAP    C$ERDF
  (7)  036436  000125                                                                .WORD   85
  (7)  036440  016101                                                                .WORD   EM50A
  (7)  036442  010774                                                                .WORD   ERR50
 8959  036444                         ESCAPE  SUB             ;   & EXIT TEST
  (3)  036444  104410                                                                TRAP    C$ESCAPE
  (3)  036446  000376                                                                .WORD   L10077-.
 8960
 8961                          ;-------------------------------------------------------------------------
 8962
 8963  036450  004537  036110        2$:     JSR     R5,LODT1C       ;RELOAD TIMER 1'S COUNTERS WITH NEW VALUES:
 8964  036454     125     125                .BYTE   125,125
 8965
 8966                          ;-------------------------------------------------------------------------
 8967
 8968  036456  005003                         CLR     R3              ;INITIALIZE TIMEOUT COUNTER
 8969  036460  004737  036142        3$:     JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
 8970  036464  102002                 BVC     .+6             ;IF NO ERROR, PROCEED
 8971  036466                         ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036466  104410                                                                TRAP    C$ESCAPE
  (3)  036470  000354                                                                .WORD   L10077-.
 8972  036472  103407                 BCS     4$              ;YES, GOOD.
 8973  036474  077307                 SOB     R3,3$           ;NO.  IF NO TIMEOUT, LOOK AGAIN
 8974  036476                         GEDF    EM50F,ERR50     ;ELSE, SAY IT WASN'T SET BY T1 TIMEOUT
  (2)                                                            ;       "DEVICE FATAL" ERROR # 86
  (6)  036476  104455                                                                TRAP    C$ERDF
  (7)  036500  000126                                                                .WORD   86
  (7)  036502  016353                                                                .WORD   EM50F
  (7)  036504  010774                                                                .WORD   ERR50
 8975  036506                         ESCAPE  SUB             ;IF ERROR, THE REST OF THIS TEST IS UN-DOABLE!
  (3)  036506  104410                                                                TRAP    C$ESCAPE
  (3)  036510  000334                                                                .WORD   L10077-.
 8976
 8977  036512  004537  004076        4$:     JSR     R5,READ         ;READING T1CH SHOULDN'T CLEAR "T1"
```

```
 8978  036516  120005                        T1CH
 8979  036520  002452                        TMP5                    ; (WE DON'T CARE WHAT THIS IS)
 8980  036522  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8981  036524                                ERROR                   ;ELSE, REPORT IT
  (3)  036524  104460                                                                   TRAP    C$ERROR
 8982  036526                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036526  104410                                                                   TRAP    C$ESCAPE
  (3)  036530  001362                                                                   .WORD   L10076-.
 8983  036532  004737  036142                JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD STILL BE SET
 8984  036536  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8985  036540                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036540  104410                                                                   TRAP    C$ESCAPE
  (3)  036542  000302                                                                   .WORD   L10077-.
 8986  036544  103404                        BCS     6$              ;IT IS, GOOD.
 8987  036546                                GEDF    EM50G,ERR50     ;CLEARED BY READING T1CH!!
  (2)                                                   ;       "DEVICE FATAL" ERROR # 87
  (6)  036546  104455                                                                   TRAP    C$ERDF
  (7)  036550  000127                                                                   .WORD   87
  (7)  036552  016420                                                                   .WORD   EM50G
  (7)  036554  010774                                                                   .WORD   ERR50
 8988  036556  004737  036200          6$:     JSR     PC,KICKT1       ;KICK IT OFF AGAIN SO WE CAN PRESERVE TI.  NG
 8989  036562  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 8990  036564                                ERROR                   ;ELSE, REPORT IT
  (3)  036564  104460                                                                   TRAP    C$ERROR
 8991  036566                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036566  104410                                                                   TRAP    C$ESCAPE
  (3)  036570  001322                                                                   .WORD   L10076-.
 8992
 8993                                                   ;WAIT FOR IT TO FINISH:
 8994  036572  005003                        CLR     R3              ;INITIALIZE TIMEOUT COUNTER
 8995  036574  004737  036142          7$:     JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
 8996  036600  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 8997  036602                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036602  104410                                                                   TRAP    C$ESCAPE
  (3)  036604  000240                                                                   .WORD   L10077-.
 8998  036606  103402                        BCS     8$              ;YES, GOOD.
 8999  036610  077307                        SOB     R3,7$           ;NO.  IF NO TIMEOUT, LOOK AGAIN
 9000  036612  000422                        BR      10$             ;IF TIMEOUT, BYPASS NEXT CHECK (THIS DONE ABOVE)
 9001  036614  004537  004076          8$:     JSR     R5,READ         ;READING T1CL SHOULD CLEAR "T1"
 9002  036620  120004                        T1CL
 9003  036622  002450                        TMP4                    ; (WE DON'T CARE WHAT THIS IS EITHER)
 9004  036624  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9005  036626                                ERROR                   ;ELSE, REPORT IT
  (3)  036626  104460                                                                   TRAP    C$ERROR
 9006  036630                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036630  104410                                                                   TRAP    C$ESCAPE
  (3)  036632  001260                                                                   .WORD   L10076-.
 9007  036634  004737  036142                JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD BE CLEARED NOW
 9008  036640  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9009  036642                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036642  104410                                                                   TRAP    C$ESCAPE
  (3)  036644  000200                                                                   .WORD   L10077-.
 9010  036646  103004                        BCC     10$             ;IT IS, GOOD.
 9011  036650                                GEDF    EM50C,ERR50     ;NOT CLEARED!  REPORT IT.
  (2)                                                   ;       "DEVICE FATAL" ERROR # 88
  (6)  036650  104455                                                                   TRAP    C$ERDF
```

```
  (7)  036652  000130                                                          .WORD   88
  (7)  036654  016215                                                          .WORD   EM50C
  (7)  036656  010774                                                          .WORD   ERR50
 9012  036660  005003                10$:    CLR     R3              ;RE-INITIALIZE THE TIMEOUT COUNTER
 9013  036662  004737  036142        12$:    JSR     PC,GETT1        ;WAIT FOR "T1" TO GET SET AGAIN
 9014  036666  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9015  036670                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036670  104410                                                          TRAP    C$ESCAPE
  (3)  036672  000152                                                          .WORD   L10077-.
 9016  036674  103407                        BCS     14$             ;GOT IT -- GOOD.
 9017  036676  077307                        SOB     R3,12$          ;NOT YET.  IF NO TIMEOUT, TRY AGAIN.
 9018  036700                                GEDF    EM50X,ERR50     ;ELSE, REPORT "T1" NOT RESET
  (2)                                                                 ;       "DEVICE FATAL" ERROR # 89
  (6)  036700  104455                                                          TRAP    C$ERDF
  (7)  036702  000131                                                          .WORD   89
  (7)  036704  017366                                                          .WORD   EM50X
  (7)  036706  010774                                                          .WORD   ERR50
 9019  036710                                ESCAPE  SUB             ;IF ERROR, CAN'T CONTINUE THIS TEST
  (3)  036710  104410                                                          TRAP    C$ESCAPE
  (3)  036712  000132                                                          .WORD   L10077-.
 9020  036714  112737  000252  002455  14$:    MOVB    #252,TMP6+1     ;SETUP FOR AND
 9021  036722  004537  004322                JSR     R5,WRITE        ;  LOAD T1LL (ADDR 6)
 9022  036726  120006                        T1LL
 9023  036730  002455                        TMP6+1                  ;  WITH 252 OCTAL
 9024  036732  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9025  036734                                ERROR                   ;ELSE, REPORT IT
  (3)  036734  104460                                                          TRAP    C$ERROR
 9026  036736                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  036736  104410                                                          TRAP    C$ESCAPE
  (3)  036740  001152                                                          .WORD   L10076-.
 9027  036742  004737  036142                JSR     PC,GETT1        ;THIS SHOULDN'T CLEAR "T1"
 9028  036746  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9029  036750                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  036750  104410                                                          TRAP    C$ESCAPE
  (3)  036752  000072                                                          .WORD   L10077-.
 9030  036754  103406                        BCS     16$             ;IT DIDN'T -- GOOD.
 9031  036756                                GEDF    EM50M,ERR50     ;WOOPS, IT DID!!  REPORT FAILURE
  (2)                                                                 ;       "DEVICE FATAL" ERROR # 90
  (6)  036756  104455                                                          TRAP    C$ERDF
  (7)  036760  000132                                                          .WORD   90
  (7)  036762  017024                                                          .WORD   EM50M
  (7)  036764  010774                                                          .WORD   ERR50
 9032  036766                                ESCAPE  SUB             ;       THE REST OF THIS TEST IS INVALID TOO!
  (3)  036766  104410                                                          TRAP    C$ESCAPE
  (3)  036770  000054                                                          .WORD   L10077-.
 9033  036772  112737  000252  002457  16$:    MOVB    #252,TMP7+1     ;SETUP FOR AND
 9034  037000  004537  004322                JSR     R5,WRITE        ;  LOAD T1LH (ADDR 7)
 9035  037004  120007                        T1LH
 9036  037006  002457                        TMP7+1                  ;  WITH 252 OCTAL
 9037  037010  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9038  037012                                ERROR                   ;ELSE, REPORT IT
  (3)  037012  104460                                                          TRAP    C$ERROR
 9039  037014                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037014  104410                                                          TRAP    C$ESCAPE
  (3)  037016  001074                                                          .WORD   L10076-.
 9040  037020  004737  036142                JSR     PC,GETT1        ;THIS SHOULD CLEAR "T1"
```

```
 9041  037024  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9042  037026                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037026  104410                                                                TRAP    C$ESCAPE
  (3)  037030  000014                                                                .WORD   L10077-.
 9043  037032  103004                        BCC     18$             ;IT DID -- GOOD.
 9044  037034                                GEDF    EM50A,ERR50     ;NOP!  REPORT:  "T1" NOT CLEARED BY LOADING T1LH
  (2)                                                                ;       "DEVICE FATAL" ERROR # 91
  (6)  037034  104455                                                                TRAP    C$ERDF
  (7)  037036  000133                                                                .WORD   91
  (7)  037040  016101                                                                .WORD   EM50A
  (7)  037042  010774                                                                .WORD   ERR50
 9045  037044                        18$:    ;THAT'S ALL FOLKS!
 9046  037044                                ENDSUB
  (3)  037044                                                                    L10077:
  (3)  037044  104403                                                                TRAP    C$ESUB
 9047                                ;*******************************************************************************
 9048  037046                                BGNSUB
  (3)  037046                                                                    T28.2:
  (3)  037046  104402                                                                TRAP    C$BSUB
 9049  037050  004737  003774                JSR     PC,MSTCLR       ;INIT DMV & ENTER M-LOOP
 9050  037054  103003                        BCC     1$              ;IF NO ERROR, PROCEED WITH TESTING
 9051  037056                                ERROR                   ;ELSE, REPORT ERROR
  (3)  037056  104460                                                                TRAP    C$ERROR
 9052  037060                                ESCAPE  TST             ;   & EXIT TEST
  (3)  037060  104410                                                                TRAP    C$ESCAPE
  (3)  037062  001030                                                                .WORD   L10076-.
 9053  037064  112737  000377  002445  1$:    MOVB    #377,TMP2+1     ;SETUP DDRB SUCH THAT ORB IS AN INPUT/OUTPUT REG
 9054  037072  004537  004322                JSR     R5,WRITE
 9055  037076  120002                        DDRB
 9056  037100  002445                        TMP2+1
 9057  037102  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9058  037104                                ERROR                   ;ELSE, REPORT IT
  (3)  037104  104460                                                                TRAP    C$ERROR
 9059  037106                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037106  104410                                                                TRAP    C$ESCAPE
  (3)  037110  001002                                                                .WORD   L10076-.
 9060  037112  112737  000030  002441        MOVB    #30,TMP0+1      ;CLEAR ALL BITS IN ORB EXCEPT DTR L & RTS L
 9061  037120  004537  004322                JSR     R5,WRITE        ;  BY DOING THIS, WE SHOULD EXPECT PB7 TO BE
 9062  037124  120000                        ORB                     ;  CLEARED IF MODE 3 DOESN'T WORK PROPERLY.
 9063  037126  002441                        TMP0+1
 9064  037130  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9065  037132                                ERROR                   ;ELSE, REPORT IT
  (3)  037132  104460                                                                TRAP    C$ERROR
 9066  037134                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037134  104410                                                                TRAP    C$ESCAPE
  (3)  037136  000754                                                                .WORD   L10076-.
 9067  037140  004537  004672                JSR     R5,INITT1       ;INITIALIZE TIMER # 1
 9068  037144  000000                        0                       ;       0 ==> LATCHES
 9069  037146  000300                        BIT7+BIT6               ;       MODE 3 & "T1" INT. ENABLE FLAG CLEARED
 9070  037150  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9071  037152                                ERROR                   ;ELSE, REPORT IT
  (3)  037152  104460                                                                TRAP    C$ERROR
 9072  037154                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037154  104410                                                                TRAP    C$ESCAPE
  (3)  037156  000734                                                                .WORD   L10076-.
 9073  037160  004737  036142                JSR     PC,GETT1        ;IS "T1" SET?
```

```
 9074  037164  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 9075  037166                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037166  104410                                                            TRAP    C$ESCAPE
  (3)  037170  000720                                                            .WORD   L10100-.
 9076  037172  103006                    BCC     2$              ;NO, GOOD.
 9077  037174                            GEDF    EM50A,ERR50     ;YES, REPORT IT'S NOT BEING CLEARED @ INIT.
  (2)                                                           ;       "DEVICE FATAL" ERROR # 92
  (6)  037174  104455                                                            TRAP    C$ERDF
  (7)  037176  000134                                                            .WORD   92
  (7)  037200  016101                                                            .WORD   EM50A
  (7)  037202  010774                                                            .WORD   ERR50
 9078  037204                            ESCAPE  SUB             ;   & EXIT TEST
  (3)  037204  104410                                                            TRAP    C$ESCAPE
  (3)  037206  000702                                                            .WORD   L10100-.
 9079
 9080                            ;-------------------------------------------------------------------------------
 9081
 9082  037210  004537  036110    2$:     JSR     R5,LODT1C       ;RELOAD TIMER 1'S COUNTERS WITH NEW VALUES:
 9083  037214     125     125            .BYTE   125,125
 9084
 9085                            ;-------------------------------------------------------------------------------
 9086
 9087  037216  005003                    CLR     R3              ;INITIALIZE TIMEOUT COUNTER
 9088  037220  004737  036142    4$:     JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
 9089  037224  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 9090  037226                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037226  104410                                                            TRAP    C$ESCAPE
  (3)  037230  000660                                                            .WORD   L10100-.
 9091  037232  103407                    BCS     5$              ;YES, GOOD.
 9092  037234  077307                    SOB     R3,4$           ;NO,  IF NO TIMEOUT, LOOK AGAIN
 9093  037236                            GEDF    EM50F,ERR50     ;ELSE, SAY IT WASN'T SET BY T1 TIMEOUT
  (2)                                                           ;       "DEVICE FATAL" ERROR # 93
  (6)  037236  104455                                                            TRAP    C$ERDF
  (7)  037240  000135                                                            .WORD   93
  (7)  037242  016353                                                            .WORD   EM50F
  (7)  037244  010774                                                            .WORD   ERR50
 9094  037246                            ESCAPE  SUB             ;IF ERROR, THE REST OF THIS TEST IS UN-DOABLE!
  (3)  037246  104410                                                            TRAP    C$ESCAPE
  (3)  037250  000640                                                            .WORD   L10100-.
 9095
 9096                            ;-------------------------------------------------------------------------------
 9097
 9098  037252                    5$:
 9099  037252  004737  036326            JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
 9100  037256  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 9101  037260                            ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037260  104410                                                            TRAP    C$ESCAPE
  (3)  037262  000626                                                            .WORD   L10100-.
 9102  037264  103406                    BCS     36$             ;YES, GOOD.
 9103  037266                            GEDF    EM50U,ERR50     ;NO,  REPORT IT NOT SET.
  (2)                                                           ;       "DEVICE FATAL" ERROR # 94
  (6)  037266  104455                                                            TRAP    C$ERDF
  (7)  037270  000136                                                            .WORD   94
  (7)  037272  017206                                                            .WORD   EM50U
  (7)  037274  010774                                                            .WORD   ERR50
 9104  037276                            ESCAPE  SUB             ;       & ALLOW RESTART OF THIS SUBTEST
```

```
  (3)  037276  104410                                                    TRAP    C$ESCAPE
  (3)  037300  000610                                                    .WORD   L10100-.
 9105
 9106                          ;-------------------------------------------------------------------------
 9107
 9108  037302  004537  004076  36$:    JSR     R5,READ         ;READING T1CH SHOULDN'T CLEAR "T1"
 9109  037306  120005                   T1CH
 9110  037310  002452                   TMP5                    ; (WE DON'T CARE WHAT THIS IS)
 9111  037312  103003                   BCC     .+10            ;IF NO ERROR, PROCEED
 9112  037314                           ERROR                   ;ELSE, REPORT IT
  (3)  037314  104460                                                    TRAP    C$ERROR
 9113  037316                           ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037316  104410                                                    TRAP    C$ESCAPE
  (3)  037320  000572                                                    .WORD   L10076-.
 9114  037322  004737  036142          JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD STILL BE SET
 9115  037326  102002                   BVC     .+6             ;IF NO ERROR, PROCEED
 9116  037330                           ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037330  104410                                                    TRAP    C$ESCAPE
  (3)  037332  000556                                                    .WORD   L10100-.
 9117  037334  103406                   BCS     37$             ;IT IS, GOOD.
 9118  037336                           GEDF    EM50G,ERR50     ;CLEARED BY READING T1CH!!
  (2)                                                     ;       "DEVICE FATAL" ERROR # 95
  (6)  037336  104455                                                    TRAP    C$ERDF
  (7)  037340  000137                                                    .WORD   95
  (7)  037342  016420                                                    .WORD   EM50G
  (7)  037344  010774                                                    .WORD   ERR50
 9119  037346                           ESCAPE  SUB             ;       ALLOW RESTART OF THIS SUBTEST
  (3)  037346  104410                                                    TRAP    C$ESCAPE
  (3)  037350  000540                                                    .WORD   L10100-.
 9120
 9121                          ;-------------------------------------------------------------------------
 9122
 9123  037352  005003          37$:    CLR     R3              ;INITIALIZE TIMEOUT COUNTER AGAIN
 9124  037354  004737  036142  38$:    JSR     PC,GETT1        ;WAIT FOR "T1" TO BE SET AGAIN
 9125  037360  102002                   BVC     .+6             ;IF NO ERROR, PROCEED
 9126  037362                           ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037362  104410                                                    TRAP    C$ESCAPE
  (3)  037364  000524                                                    .WORD   L10100-.
 9127  037366  103407                   BCS     39$             ;GOT IT -- NO CHECK PB7
 9128  037370  077307                   SOB     R3,38$          ;NOT YET.  IF NO TIMEOUT, LOOK AGAIN.
 9129  037372                           GEDF    EM50L,ERR50     ;ELSE, TIMER NOT REALLY WORKING RIGHT!
  (2)                                                     ;       "DEVICE FATAL" ERROR # 96
  (6)  037372  104455                                                    TRAP    C$ERDF
  (7)  037374  000140                                                    .WORD   96
  (7)  037376  016742                                                    .WORD   EM50L
  (7)  037400  010774                                                    .WORD   ERR50
 9130  037402                           ESCAPE  SUB
  (3)  037402  104410                                                    TRAP    C$ESCAPE
  (3)  037404  000504                                                    .WORD   L10100-.
 9131
 9132                          ;-------------------------------------------------------------------------
 9133
 9134  037406                  39$:
 9135  037406  004737  036326          JSR     PC,GETPB7       ;GET "PB7".  IS IT SET?
 9136  037412  102002                   BVC     .+6             ;IF NO ERROR, PROCEED
 9137  037414                           ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
```

```
  (3)  037414  104410                                                    TRAP    C$ESCAPE
  (3)  037416  000472                                                    .WORD   L10100-.
 9138  037420  103404                BCS     6$              ;YES, GOOD.
 9139  037422                        GEDF    EM50Z,ERR50     ;NO,  REPORT "PB7" NOT SET AFTER SECOND CYCLE
  (2)                                                       ;       "DEVICE FATAL" ERROR # 97
  (6)  037422  104455                                                    TRAP    C$ERDF
  (7)  037424  000141                                                    .WORD   97
  (7)  037426  017503                                                    .WORD   EM50Z
  (7)  037430  010774                                                    .WORD   ERR50
 9140
 9141                           ;-------------------------------------------------------------------------
 9142
 9143  037432  004737  036200  6$:   JSR     PC,KICKT1       ;KICK IT OFF AGAIN SO WE CAN PRESERVE TIMING
 9144  037436  103003                BCC     .+10            ;IF NO ERROR, PROCEED
 9145  037440                        ERROR                   ;ELSE, REPORT IT
  (3)  037440  104460                                                    TRAP    C$ERROR
 9146  037442                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037442  104410                                                    TRAP    C$ESCAPE
  (3)  037444  000446                                                    .WORD   L10076-.
 9147
 9148                                           ;WAIT FOR IT TO FINISH:
 9149  037446  005003                CLR     R3              ;INITIALIZE TIMEOUT COUNTER
 9150  037450  004737  036142  7$:   JSR     PC,GETT1        ;"T1" SHOULD BE SET.  IS IT?
 9151  037454  102002                BVC     .+6             ;IF NO ERROR, PROCEED
 9152  037456                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037456  104410                                                    TRAP    C$ESCAPE
  (3)  037460  000430                                                    .WORD   L10100-.
 9153  037462  103402                BCS     8$              ;YES, GOOD.
 9154  037464  077307                SOB     R3,7$           ;NO,  IF NO TIMEOUT, LOOK AGAIN
 9155  037466  000442                BR      14$             ;IF TIMEOUT, BYPASS NEXT CHECK (THIS DONE ABOVE)
 9156  037470  004537  004076  8$:   JSR     R5,READ         ;READING T1CL SHOULD CLEAR "T1"
 9157  037474  120004                T1CL
 9158  037476  002450                TMP4                    ; (WE DON'T CARE WHAT THIS IS EITHER)
 9159  037500  103003                BCC     .+10            ;IF NO ERROR, PROCEED
 9160  037502                        ERROR                   ;ELSE, REPORT IT
  (3)  037502  104460                                                    TRAP    C$ERROR
 9161  037504                        ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037504  104410                                                    TRAP    C$ESCAPE
  (3)  037506  000404                                                    .WORD   L10076-.
 9162  037510  004737  036142        JSR     PC,GETT1        ;CHECK "T1" -- IT SHOULD BE CLEARED NOW
 9163  037514  102002                BVC     .+6             ;IF NO ERROR, PROCEED
 9164  037516                        ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037516  104410                                                    TRAP    C$ESCAPE
  (3)  037520  000370                                                    .WORD   L10100-.
 9165  037522  103006                BCC     9$              ;IT IS, GOOD.
 9166  037524                        GEDF    EM50C,ERR50     ;NOT CLEARED!  REPORT IT.
  (2)                                                       ;       "DEVICE FATAL" ERROR # 98
  (6)  037524  104455                                                    TRAP    C$ERDF
  (7)  037526  000142                                                    .WORD   98
  (7)  037530  016215                                                    .WORD   EM50C
  (7)  037532  010774                                                    .WORD   ERR50
 9167  037534                        ESCAPE  SUB             ;IF THIS ERROR OCCURED, EXIT SUBTEST
  (3)  037534  104410                                                    TRAP    C$ESCAPE
  (3)  037536  000352                                                    .WORD   L10100-.
 9168  037540  005003        9$:     CLR     R3              ;RE-INITIALIZE THE TIMEOUT COUNTER
 9169  037542  004737  036142  12$:   JSR     PC,GETT1        ;WAIT FOR "T1" TO GET SET AGAIN
```

```
 9170  037546  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9171  037550                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037550  104410                                                                    TRAP    C$ESCAPE
  (3)  037552  000336                                                                    .WORD   L10100-.
 9172  037554  103407                        BCS     14$             ;GOT IT -- GOOD.
 9173  037556  077307                        SOB     R3,12$          ;NOT YET.  IF NO TIMEOUT, TRY AGAIN.
 9174  037560                                GEDF    EM50X,ERR50     ;ELSE, REPORT "T1" NOT RESET
  (2)                                                               ;       "DEVICE FATAL" ERROR # 99
  (6)  037560  104455                                                                    TRAP    C$ERDF
  (7)  037562  000143                                                                    .WORD   99
  (7)  037564  017366                                                                    .WORD   EM50X
  (7)  037566  010774                                                                    .WORD   ERR50
 9175  037570                                ESCAPE  SUB             ;IF ERROR, CAN'T CONTINUE THIS TEST
  (3)  037570  104410                                                                    TRAP    C$ESCAPE
  (3)  037572  000316                                                                    .WORD   L10100-.
 9176  037574  112737  000252  002455  14$:  MOVB    #252,TMP6+1     ;SETUP FOR AND
 9177  037602  004537  004322                JSR     R5,WRITE        ;  LOAD T1LL (ADDR 6)
 9178  037606  120006                        T1LL
 9179  037610  002455                        TMP6+1                  ;  WITH 252 OCTAL
 9180  037612  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9181  037614                                ERROR                   ;ELSE, REPORT IT
  (3)  037614  104460                                                                    TRAP    C$ERROR
 9182  037616                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037616  104410                                                                    TRAP    C$ESCAPE
  (3)  037620  000272                                                                    .WORD   L10076-.
 9183  037622  004737  036142                JSR     PC,GETT1        ;THIS SHOULDN'T CLEAR "T1"
 9184  037626  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9185  037630                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037630  104410                                                                    TRAP    C$ESCAPE
  (3)  037632  000256                                                                    .WORD   L10100-.
 9186  037634  103406                        BCS     16$             ;IT DIDN'T -- GOOD.
 9187  037636                                GEDF    EM50M,ERR50     ;WOOPS, IT DID!!  REPORT FAILURE
  (2)                                                               ;       "DEVICE FATAL" ERROR # 100
  (6)  037636  104455                                                                    TRAP    C$ERDF
  (7)  037640  000144                                                                    .WORD   100
  (7)  037642  017024                                                                    .WORD   EM50M
  (7)  037644  010774                                                                    .WORD   ERR50
 9188  037646                                ESCAPE  SUB             ;       THE REST OF THIS TEST IS INVALID TOO!
  (3)  037646  104410                                                                    TRAP    C$ESCAPE
  (3)  037650  000240                                                                    .WORD   L10100-.
 9189  037652  004737  036326          16$:  JSR     PC,GETP87       ;"P87" SHOULD BE LOW HERE
 9190  037656  102002                        BVC     .+6             ;IF NO ERROR, PROCEED
 9191  037660                                ESCAPE  SUB             ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
  (3)  037660  104410                                                                    TRAP    C$ESCAPE
  (3)  037662  000226                                                                    .WORD   L10100-.
 9192  037664  103054                        BCC     17$             ;IT WASN'T, GOOD.
 9193  037666  004537  004076                JSR     R5,READ         ;GET IFR FOR ERROR MESSAGE
 9194  037672  120015                        IFR
 9195  037674  002472                        TMPD
 9196  037676  103003                        BCC     .+10            ;IF NO ERROR, PROCEED
 9197  037700                                ERROR                   ;ELSE, REPORT IT
  (3)  037700  104460                                                                    TRAP    C$ERROR
 9198  037702                                ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037702  104410                                                                    TRAP    C$ESCAPE
  (3)  037704  000206                                                                    .WORD   L10076-.
 9199  037706  004537  004076                JSR     R5,READ         ;GET T1CL FOR ERROR MESSAGE
```

```
 9200  037712  120004                    T1CL
 9201  037714  002450                    TMP4
 9202  037716  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 9203  037720                            ERROR                   ;ELSE, REPORT IT
  (3)  037720  104460                                                            TRAP    C$ERROR
 9204  037722                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037722  104410                                                            TRAP    C$ESCAPE
  (3)  037724  000166                                                            .WORD   L10076-.
 9205  037726  004537  004076            JSR     R5,READ         ;GET T1CH FOR ERROR MESSAGE
 9206  037732  120005                    T1CH
 9207  037734  002452                    TMP5
 9208  037736  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 9209  037740                            ERROR                   ;ELSE, REPORT IT
  (3)  037740  104460                                                            TRAP    C$ERROR
 9210  037742                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037742  104410                                                            TRAP    C$ESCAPE
  (3)  037744  000146                                                            .WORD   L10076-.
 9211  037746  004537  004076            JSR     R5,READ         ;GET T1LL FOR ERROR MESSAGE
 9212  037752  120006                    T1LL
 9213  037754  002454                    TMP6
 9214  037756  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 9215  037760                            ERROR                   ;ELSE, REPORT IT
  (3)  037760  104460                                                            TRAP    C$ERROR
 9216  037762                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  037762  104410                                                            TRAP    C$ESCAPE
  (3)  037764  000126                                                            .WORD   L10076-.
 9217  037766  004537  004076            JSR     R5,READ         ;GET T1LH FOR ERROR MESSAGE
 9218  037772  120007                    T1LH
 9219  037774  002456                    TMP7
 9220  037776  103003                    BCC     .+10            ;IF NO ERROR, PROCEED
 9221  040000                            ERROR                   ;ELSE, REPORT IT
  (3)  040000  104460                                                            TRAP    C$ERROR
 9222  040002                            ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  040002  104410                                                            TRAP    C$ESCAPE
  (3)  040004  000106                                                            .WORD   L10076-.
 9223  040006                            GEDF    EM50Y,ERR50     ;IT WAS!  REPORT IT BEING RESET BY WRITTING T1LL
  (2)                                                           ;       "DEVICE FATAL" ERROR # 101
  (6)  040006  104455                                                            TRAP    C$ERDF
  (7)  040010  000145                                                            .WORD   101
  (7)  040012  017431                                                            .WORD   EM50Y
  (7)  040014  010774                                                            .WORD   ERR50
 9224
 9225                           ; AT THE ABOVE "PB7" TEST, IT SHOULD BE LOW.  NOT BECAUSE OF ANY READ/WRITE
 9226                           ; OPERATION, BUT BECAUSE OF WHERE WE ARE IN THE CYCLING OF TIMER # 1.  "PB7"
 9227                           ; SHOULD BE LOW HERE UNTIL T1 TIMES OUT.
 9228
 9229  040016  112737  000252  002457  17$:  MOVB    #252,TMP7+1     ;SETUP FOR AND
 9230  040024  004537  004322              JSR     R5,WRITE        ;  LOAD T1LH (ADDR 7)
 9231  040030  120007                      T1LH
 9232  040032  002457                      TMP7+1                  ;  WITH 252 OCTAL
 9233  040034  103003                      BCC     .+10            ;IF NO ERROR, PROCEED
 9234  040036                              ERROR                   ;ELSE, REPORT IT
  (3)  040036  104460                                                            TRAP    C$ERROR
 9235  040040                              ESCAPE  TST             ;       AND EXIT THIS TEST
  (3)  040040  104410                                                            TRAP    C$ESCAPE
  (3)  040042  000050                                                            .WORD   L10076-.
```

```
 9236  040044  004737  036142            JSR     PC,GETT1        ;THIS SHOULD CLEAR "T1"
 9237  040050  102002                    BVC     .+6             ;IF NO ERROR, PROCEED
 9238  040052                    ESCAPE  SUB                     ;ELSE, IT'S ALREADY BEEN REPORTED -- EXIT
   (3) 040052  104410                                                        TRAP    C$ESCAPE
   (3) 040054  000034                                                        .WORD   L10100-.
 9239  040056  103006                    BCC     18$             ;IT DID -- GOOD.
 9240  040060                            GEDF    EM50A,ERR50     ;NOP!  REPORT:  "T1" NOT CLEARED BY LOADING T1LH
   (2)                                                          ;       "DEVICE FATAL" ERROR # 102
   (6) 040060  104455                                                        TRAP    C$ERDF
   (7) 040062  000146                                                        .WORD   102
   (7) 040064  016101                                                        .WORD   EM50A
   (7) 040066  010774                                                        .WORD   ERR50
 9241  040070                    ESCAPE  SUB
   (3) 040070  104410                                                        TRAP    C$ESCAPE
   (3) 040072  000016                                                        .WORD   L10100-.
 9242  040074  004537  004672    18$:    JSR     R5,INITT1       ;RE-INITIALIZE IT TO STOP ITS FUNCTIONING
 9243  040100  000001                    1
 9244  040102  000000                    0
 9245  040104  103001                    BCC     .+4             ;IF NO ERROR, EXIT
 9246  040106                            ERROR                   ;ELSE, REPORT IT
   (3) 040106  104460                                                        TRAP    C$ERROR
 9247                                    ;THAT'S ALL FOLKS!
 9248  040110                    ENDSUB
   (3) 040110                                                        L10100:
   (3) 040110  104403                                                        TRAP    C$ESUB
 9249  040112                    ENDTST
   (3) 040112                                                        L10076:
   (3) 040112  104401                                                        TRAP    C$ETST
 9250
 9251
 9252
```

```
                        .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.
                        ;////////////////////////////////////////////////////////////////////////

040114                          BGNHRD
 (3) 040114  000015                                                     .WORD L10101-L$HARD/2
 (3) 040116                                                          L$HARD::
040116
040116                          GPRMA   ADDRES,0,0,160020,177776,YES
 (4) 040116  000031                                                     .WORD   T$CODE
 (4) 040120  040150                                                     .WORD   ADDRES
 (4) 040122  160020                                                     .WORD   T$LOLIM
 (4) 040124  177776                                                     .WORD   T$HILIM
040126                          GPRMA   VECTOR,2,0,0,674,YES
 (4) 040126  001031                                                     .WORD   T$CODE
 (4) 040130  040176                                                     .WORD   VECTOR
 (4) 040132  000000                                                     .WORD   T$LOLIM
 (4) 040134  000674                                                     .WORD   T$HILIM
040136                          GPRMD   PRIRTY,4,0,7000,0,7,YES
 (4) 040136  002032                                                     .WORD   T$CODE
 (4) 040140  040227                                                     .WORD   PRIRTY
 (4) 040142  007000                                                     .WORD   7000
 (4) 040144  000000                                                     .WORD   T$LOLIM
 (4) 040146  000007                                                     .WORD   T$HILIM

040150                          ENDHRD
 (2)                                                                    .EVEN
 (3) 040150                                                          L10101:

                                .NLIST  BEX
040150  042504  044526  042503  ADDRES: .ASCIZ  /DEVICE CSR ADDRESS : /
040176  042504  044526  042503  VECTOR: .ASCIZ  /DEVICE VECTOR ADDRESS : /
040227     104  053105  041511  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.
                        ;//////////////////////////////////////////////////////////////////////

040260                          BGNSFT
(3)  040260  000000                                             .WORD L10102-L$SOFT/2
(3)  040262                                             L$SOFT::
040262                          ENDSFT
(2)                                                             .EVEN
(3)  040262                                             L10102:
```

```
 9297                                   .SBTTL PATCH AREA FOR DEBUG
 9298  040262                           PATCH:
 9299          040362                           .=.+100
 9300  040362  000240                           NOP
 9301  040364  000240                           NOP
 9302  040366  000240                           NOP
 9303
 9304                                   ;*****************************************
 9305
 9306                                   .SBTTL "ENDMOD" & "LASTAD"
 9307  040370                                    ENDMOD
 9308  040370                                    LASTAD
  (2)                                                                  .EVEN
  (4)  040370  000000                                                  .WORD   0
  (4)  040372  000000                                                  .WORD   0
  (3)  040374                           L$LAST::
 9309          000001                   .END
```

```
ACR    = 120013            3700#  4771   4780   7382   7669   7716   7732   7737   7921   7966   8329   8406
ADDRES  040150             9268   9275#
ADR    = 000020 G          3563#
AD.HIT  020334             5514   5536#
AD.OK   020330             5532   5534#
ASSEMB= 000010             3454
BDATA   002312             4014#  4836   4839   4922   4961   5002   5200   5682*  5776*  5838*  5890*  5947*  5955*
                           5998*  6005*  6012*  6019*  6035*  6051*  6060*  6069*  6076*  6116*  6166*  6168   6176*
                           6178   6186*  6818   6822   6832   6836   6857   6858   6867   6871   7106   7107   7116
                           7117   7121   7122   7140   7141   7161   7162   7171   7175   7191   7192   7235   7236
                           7245   7246   7290   7291   7300   7301   7524   7529   7549   7554   7599   7601   7643
                           7645   7689   7691   7733   7735   7777   7779   7823   7825
BIT0   = 000001 G          3563#  3596   3614   3634   3645   3715   5124   5442   5906   6541
BIT00  = 000001 G          3563#
BIT01  = 000002 G          3563#
BIT02  = 000004 G          3563#
BIT03  = 000010 G          3563#
BIT04  = 000020 G          3563#
BIT05  = 000040 G          3563#
BIT06  = 000100 G          3563#
BIT07  = 000200 G          3563#
BIT08  = 000400 G          3563#
BIT09  = 001000 G          3563#
BIT1   = 000002 G          3563#  3595   3609   3714   5109   6295   6297   6562   6564   6567   6596
BIT10  = 002000 G          3563#
BIT11  = 004000 G          3563#
BIT12  = 010000 G          3563#
BIT13  = 020000 G          3563#
BIT14  = 040000 G          3563#
BIT15  = 100000 G          3563#
BIT2   = 000004 G          3563#  3594   3608   3713   5078   5088   5120   6332   6334   6562   6596   6598   6602
BIT3   = 000010 G          3563#  3577   3593   3712
BIT4   = 000020 G          3563#  3592   3635   3711
BIT5   = 000040 G          3563#  3591   3710
BIT6   = 000100 G          3563#  3590   3644   3709   4749   4759   4762   4776   5161   8950   9069
BIT7   = 000200 G          3563#  3589   3643   3659   3708   4749   4776   5161   8316   8401   9069
BIT8   = 000400 G          3563#
BIT9   = 001000 G          3563#
BOE    = 000400 G          3563#
BSEL    002352             4077#  5672   5682   5720   5731   5758*  5764   5776
BSELRS  003042             4349#  4479   4483
BSEL0   002352             4076#  4686   5517   5523   5593   5603   5831*  5832   5838   5870*  5871   5885   5890
                           5892*  5895*  5919*  5920   5941   5947   5949*  5955   5957*  5961*  6114   6123*  6140
                           6186   7802*
BSEL1   002354             4079#  4460*  4473   4687   5815*  6125*  6151*
BSEL10  002372             4089#  4694
BSEL11  002374             4091#  4695
BSEL12  002376             4092#  4696
BSEL13  002400             4094#  4697
BSEL14  002402             4095#  4698
BSEL15  002404             4097#  4699
BSEL16  002406             4098#  4700
BSEL17  002410             4100#  4701
BSEL2   002356             4080#  4523   4551*  4558   4590*  4597   4651*  4658   4688   6031*  6033   6035   6042
                           6126*  6136   6176   8862*  8864
BSEL3   002360             4082#  4689   4760*  8861*
```

```
BSEL4   002362            4083#   4483    4690
BSEL5   002364            4085#   4691
BSEL6   002366            4086#   4479    4568    4692
BSEL7   002370            4088#   4693
BSLT0 = 000020            3673#
BSLT1 = 000021            3674#
BSLT2 = 000022            3676#
BSLT3 = 000023            3677#
BSLT4 = 000024            3679#
BSLT5 = 000025            3680#
BSLT6 = 000026            3682#
BSLT7 = 000027            3683#
BSR0    002246            3985#   4686*   5212
BSR1    002250            3987#   4687*   5212
BSR10   002266            4000#   4694*   5216
BSR11   002270            4001#   4695*   5216
BSR12   002272            4002#   4696*   5216
BSR13   002274            4003#   4697*   5216
BSR14   002276            4004#   4698*   5218
BSR15   002300            4005#   4699*   5218
BSR16   002302            4006#   4700*   5218
BSR17   002304            4007#   4701*   5218
BSR2    002252            3989#   4688*   5212
BSR3    002254            3991#   4689*   5212
BSR4    002256            3993#   4690*   5214
BSR5    002260            3995#   4691*   5214
BSR6    002262            3997#   4692*   5214
BSR7    002264            3999#   4693*   5214
BT1   = 003122            4396#   4974    4985    6767    6783
BT2   = 003206            4397#   4977    4988    6784
BUFARE  003122            4373#   4379    4396    4397
CONSOL  002346            4030#   5428*   5493*
CONTIN  020106            5422    5478#
CONTST  020206            5429    5493#
CSREGS= 000020            3566#   5736    5740    5762    5847
C$AU  = 000052            3454#   5572
C$AUTO= 000061            3454#   5535
C$BRK = 000022            3454#   6230    6243    6547
C$BSEG= 000004            3454#   7093    7223    7278
C$BSUB= 000002            3454#   5986    6029    6900    6938    6984    7085    7208    7263    7340    7378    7416    7460
                          7879    8309    8943    9048
C$CEFG= 000045            3454#
C$CLCK= 000062            3454#
C$CLEA= 000012            3454#   5549
C$CLOS= 000035            3454#
C$CLP1= 000006            3454#
C$CVEC= 000036            3454#   5431    5530    5547    5548    5610
C$DCLN= 000044            3454#
C$DODU= 000051            3454#   5533
C$DRPT= 000024            3454#
C$DU  = 000053            3454#   5561
C$EDIT= 000003            3454#   3491
C$ERDF= 000055            3454#   4864    4891    5615    5687    5780    5840    5894    5952    5960    6026    6039    6082
                          6119    6171    6181    6190    6565    6599    6799    6826    6839    6862    6875    7110    7126
                          7144    7165    7177    7195    7239    7250    7294    7305    7532    7557    7604    7648    7694
                          7738    7782    7828    7926    7960    7995    8025    8054    8093    8111    8134    8151    8164
```

```
                    8175  8182  8208  8234  8262  8302  8358  8386  8451  8468  8495  8539  8569
                    8600  8618  8632  8643  8650  8664  8697  8706  8724  8752  8794  8958  8974
                    8987  9011  9018  9031  9044  9077  9093  9103  9118  9129  9139  9166  9174
                    9187  9223  9240
C$ERHR= 000056       3454#
C$ERRO= 000060       3454#  5664  5801  5867  5882  5916  5989  6103  6112  6213  6225  6239  6254
                    6488  6512  6528  6553  6577  6587  6697  6729  6736  6742  6759  6773  6808
                    6814  6820  6834  6846  6852  6869  6893  6907  6931  6945  6970  6977  6991
                    7066  7076  7333  7347  7371  7385  7409  7423  7452  7467  7492  7504  7512
                    7517  7526  7543  7551  7577  7588  7593  7621  7632  7637  7665  7679  7684
                    7711  7722  7727  7755  7766  7771  7799  7812  7817  7884  7890  7900  7906
                    7912  7918  7924  7936  7946  7952  7958  7969  7976  7983  8000  8009  8017
                    8023  8031  8040  8046  8052  8063  8070  8085  8091  8103  8109  8116  8126
                    8132  8141  8149  8162  8171  8190  8200  8206  8216  8226  8232  8244  8254
                    8260  8272  8282  8288  8294  8300  8312  8318  8332  8338  8344  8350  8356
                    8367  8378  8384  8397  8403  8409  8425  8431  8437  8443  8449  8454  8463
                    8471  8478  8487  8493  8504  8519  8525  8531  8537  8549  8555  8561  8567
                    8575  8586  8592  8598  8607  8616  8630  8639  8658  8673  8679  8689  8695
                    8712  8722  8734  8744  8750  8758  8768  8774  8780  8786  8792  8830  8888
                    8946  8952  8981  8990  9005  9025  9038  9051  9058  9065  9071  9112  9145
                    9160  9181  9197  9203  9209  9215  9221  9234  9246
C$ERSF= 000054       3454#
C$ERSO= 000057       3454#
C$ESCA= 000010       3454#  6040  6120  6172  6182  6191  6214  6226  6489  6513  6529  6554  6578
                    6588  6800  6827  6840  6863  6876  6894  6908  6932  6946  6971  6978  6992
                    7067  7077  7334  7348  7372  7386  7410  7424  7453  7468  7493  7505  7513
                    7518  7527  7544  7552  7578  7589  7594  7622  7633  7638  7666  7680  7685
                    7712  7723  7728  7756  7767  7772  7800  7813  7818  7885  7891  7894  7901
                    7907  7913  7919  7925  7937  7940  7947  7953  7959  7961  7970  7977  7984
                    7993  8001  8010  8018  8024  8032  8041  8047  8053  8055  8064  8071  8079
                    8086  8092  8094  8097  8104  8110  8117  8120  8127  8133  8142  8150  8156
                    8163  8172  8180  8191  8194  8201  8207  8217  8220  8227  8233  8235  8245
                    8248  8255  8261  8263  8273  8276  8283  8289  8295  8301  8313  8319  8325
                    8333  8339  8345  8351  8357  8368  8371  8379  8385  8387  8398  8404  8410
                    8419  8426  8432  8438  8444  8450  8455  8464  8472  8479  8488  8494  8496
                    8505  8513  8520  8526  8532  8538  8540  8543  8550  8556  8562  8568  8576
                    8579  8587  8593  8599  8608  8617  8623  8631  8640  8648  8659  8662  8674
                    8680  8683  8690  8696  8698  8704  8713  8716  8723  8725  8735  8738  8745
                    8751  8759  8762  8769  8775  8781  8787  8793  8947  8953  8956  8959  8971
                    8975  8982  8985  8991  8997  9006  9009  9015  9019  9026  9029  9032  9039
                    9042  9052  9059  9066  9072  9075  9078  9090  9094  9101  9104  9113  9116
                    9119  9126  9130  9137  9146  9152  9161  9164  9167  9171  9175  9182  9185
                    9188  9191  9198  9204  9210  9216  9222  9235  9238  9241
C$ESEG= 000005       3454#  7199  7254  7309
C$ESUB= 000003       3454#  6027  6083  6910  6948  6994  7205  7260  7315  7350  7388  7426  7470
                    8304  8795  9046  9248
C$ETST= 000001       3454#  5616  5688  5781  5851  5896  5963  6084  6195  6255  6698  6878  6915
                    6953  6999  7317  7355  7393  7430  7475  7559  7606  7650  7696  7740  7784
                    7830  8796  9249
C$EXIT= 000032       3454#
C$GETB= 000026       3454#
C$GETW= 000027       3454#
C$GMAN= 000043       3454#
C$GPHR= 000042       3454#  5447
C$GPLO= 000030       3454#
C$GPRI= 000040       3454#
```

```
C$INIT= 000011            3454#  5487
C$INLP= 000020            3454#
C$MANI= 000050            3454#
C$MEM = 000031            3454#
C$MSG = 000023            3454#  4915  4925  4932  4954  4963  4993  5004  5033  5096  5183  5632
C$OPEN= 000034            3454#
C$PNTB= 000014            3454#  4920  4922  4959  4961  5000  5002  5236  5628
C$PNTF= 000017            3454#
C$PNTS= 000016            3454#
C$PNTX= 000015            3454#  4941  4950  4971  4972  4973  4975  4976  4978  4979  4982  4983  4984
                          4986   4987  4989  4990  5018  5021  5024  5027  5030  5047  5050  5077  5080
                          5083   5087  5090  5093  5119  5130  5133  5168  5171  5174  5175  5178  5179
                          5211   5212  5213  5214  5215  5216  5217  5218  5226  5227  5228  5229  5629
                          5630   5631  7927
C$QIO = 000377            3454#
C$RDBU= 000007            3454#
C$REFG= 000047            3454#  5409  5412  5415  5418
C$RESE= 000033            3454#  5560  5923
C$REVI= 000003            3454#  3491
C$RFLA= 000021            3454#
C$RPT = 000025            3454#
C$SEFG= 000046            3454#
C$SPRI= 000041            3454#
C$SVEC= 000037            3454#  5429  5480  5482  5514  5594
C$TPRI= 000013            3454#
DDRA  = 120003            3690#  6805  6831  6849  6856  6942  7626  7642  7647
DDRB  = 120002            3689#  6811  6817  6843  6866  6904  6974  7501  7523  7531  7540  7582  7598
                          7603   7973  8060  8394  8501  8670  9055
DELAY1  002316            4016#  4467  5935
DELAY2  002320            4017#  6135  6157
DEVMAP  002342            4028#  5436* 5452*
DEVPTR  002344            4029#  5442* 5449*  5452  5453*
DFPTBL  002216 G          3524#
DIAGMC= 000000            3454
DMVDAI= 000001            3596#
DMVPU = 000004            3594#  3600  3601  3602
EF.CON= 000036 G          3563#  5418
EF.NEW= 000035 G          3563#  5415
EF.PWR= 000034 G          3563#
EF.RES= 000037 G          3563#  5412
EF.STA= 000040 G          3563#  5409
EM14    014701            5331#  5687
EM15    014745            5332#  6039
EM16    015025            5333#  6119
EM17    015122            5334#  6171
EM17A   015202            5335#  6181  6190
EM20    015255            5336#  6799  7110  7144  7165  7195  7239  7294
EM20A   015307            5337#  7126  7177
EM20B   015367            5338#  7250  7305
EM21    015454            5339#  6826  6862
EM22    015511            5340#  6839
EM22A   015544            5341#  6875
EM25    015577            4845   5342#
EM3     014466            4527   5324#
EM34    015625            4864   5343#
EM34B   015656            4891   5344#
```

```
EM4     014512            4563    4602    4662    5325#   8867
EM47A   015707            5345#   6298
EM47B   015747            5346#   6335
EM48A   016030            5347#   6565    6599
EM5     014527            5326#   5894    7532    7557    7604    7648    7694    7738    7782    7828
EM50A   016101            5348#   7926    8358    8958    9044    9077    9240
EM50B   016147            5349#   7960    8386
EM50C   016215            5350#   8208    8664    9011    9166
EM50D   016263            5351#   8025    8468
EM50E   016317            5352#   8054    8495
EM50F   016353            5353#   8093    8539    8974    9093
EM50G   016420            5354#   8134    8600    8987    9118
EM50H   016462            5355#   8151    8618
EM50I   016550            5356#   8164    8632
EM50J   016612            5357#   8175    8643
EM50K   016700            5358#   8182    8650
EM50L   016742            5359#   8234    8697    9129
EM50M   017024            5360#   8262    8724    9031    9187
EM50N   017066            5361#   8302    8752
EM50S   017134            5362#   8569
EM50U   017206            5363#   8706    9103
EM50V   017252            5364#   8451    8794
EM50W   017317            5365#   7995    8111
EM50X   017366            5366#   9018    9174
EM50Y   017431            5367#   9223
EM50Z   017503            5368#   9139
EM6     014552            5327#   5780
EM7     014576            5328#   5840    6026    6082
EM8     014623            5329#   5960
EM9     014646            5330#   5952
ENDEMB  012126            5236    5245#
ENDT7   022636            5990    6074    6083#
ERRBLK  002244  G         3979#   4488*   4527*   4563*   4602*   4662*   4845*   6298*   6335*   8867*
ERRFLG  002332            4024#   6787*   6794*   6797
ERRMSG  002242  G         3979#   4488*   4527*   4563*   4602*   4662*   4845*   6298*   6335*   8867*
ERRNBR  002240  G         3979#   4488*   4527*   4563*   4602*   4662*   4845*   6298*   6335*   8867*
ERRTYP  002236  G         3979#   4488*   4527*   4563*   4602*   4662*   4845*   6298*   6335*   8867*
ERR1    005310  G         4913#   7995
ERR2    005316  G         4919#   5687    5780    5840    5894    5952    5960    6039    6171    6181    6190
ERR3    005426  G         4488    4864    4891    4929#
ERR4    005440  G         4527    4563    4602    4662    4936#   8867
ERR4$   011334            4923    4930    5211#
ERR47   006736  G         5008#   6298    6335
ERR47.  007122            5032    5038#   6301    6338
ERR48   007644  G         5074#   6565    6599
ERR48.  010042            5095    5101#   6568    6603
ERR5    005564  G         4958#   6026    6082    6119
ERR5$   011722            4953    4962    5225#
ERR50   010774  G         5156#   7926    7960    8025    8054    8093    8111    8134    8151    8164    8175    8182    8208
                          8234    8262    8302    8358    8386    8451    8468    8495    8539    8569    8600    8618    8632
                          8643    8650    8664    8697    8706    8724    8752    8794    8958    8974    8987    9011    9018
                          9031    9044    9077    9093    9103    9118    9129    9139    9166    9174    9187    9223    9240
ERR6    005662  G         4967#   6799
ERR7    006624  G         4845    4997#   6826    6839    6862    6875    7110    7126    7144    7165    7177    7195    7239
                          7250    7294    7305    7532    7557    7604    7648    7694    7738    7782    7828
ER47CT  007116            5031*   5035#   5040    5042*   5048    6246*
```

```
ER47MX  007120            5036#  5040   5048
ER48CT  010036            5094*  5098#  5103   5105*  5131   6631*  6670*
ER48MX  010040            5099#  5103   5131
EVL   = 000004 G          3563#
EXECUT= 000005            3657#
E$END = 002100            3454#
E$LOAD= 000035            3454#  3491
FMT02   012136            4920   4959   5248#
FMT02A  012173            4922   5002   5249#
FMT06   012574            4971   4982   5257#
FMT06A  012603            4972   4975   4978   4983   4986   4989   5258#
FMT06B  012651            4973   4976   4979   4984   4987   4990   5259#
FMT07   012542            5000   5256#
FMT10   012666            4961   5260#
FMT11   012742            5227   5229   5261#
FMT4    012257            5211   5226   5250#
FMT4A   012317            5212   5216   5251#
FMT4B   012352            5213   5215   5217   5228   5252#
FMT4C   012357            5214   5218   5253#
FMT47A  007244            5018   5054#
FMT47B  007275            5021   5055#
FMT47C  007334            5024   5056#
FMT47E  007362            5027   5057#
FMT47G  007421            5047   5058#
FMT48A  010312            5077   5137#
FMT48B  010361            5080   5138#
FMT48C  010414            5083   5139#
FMT48E  010451            5087   5140#
FMT48F  010520            5090   5141#
FMT48G  010563            5119   5142#
FMT48H  010623            5130   5143#
FMT48I  010656            5050   5133   5144#
FMT5    012412            4941   5254#
FMT5A   012455            4950   5255#
FMT50A  012761            5168   5262#
FMT50B  013033            5171   5263#
FMT50C  013114            5174   5178   5264#
FMT50D  013154            5175   5265#
FMT50E  013171            5179   5266#
FMT50M  013206            5267#  7927
FRSPAS  002340            4027#  5441*
FRSTIM  002336            4026#  5486*
F$AU  = 000015            3454#  5571   5572
F$AUTO= 000020            3454#  5513   5535
F$BGN = 000040            3454#  3456   4859   4886   4913   4919   4929   4936   4958   4967   4997   5008   5074
                          5156   5392   5405   5513   5546   5558   5571   5590   5616   5627   5658   5688   5700
                          5781   5795   5851   5859   5896   5905   5963   5985   5986   6027   6029   6040   6083
                          6084   6099   6120   6172   6182   6191   6195   6210   6214   6226   6255   6485   6489
                          6513   6529   6554   6578   6588   6698   6726   6800   6827   6840   6863   6876   6878
                          6890   6894   6900   6908   6910   6915   6928   6932   6938   6946   6948   6953   6967
                          6971   6978   6984   6992   6994   6999   7060   7067   7077   7085   7093   7205   7208
                          7223   7260   7263   7278   7315   7317   7330   7334   7340   7348   7350   7355   7368
                          7372   7378   7386   7388   7393   7406   7410   7416   7424   7426   7430   7449   7453
                          7460   7468   7470   7475   7488   7493   7505   7513   7518   7527   7544   7552   7559
                          7573   7578   7589   7594   7606   7617   7622   7633   7638   7650   7661   7666   7680
                          7685   7696   7707   7712   7723   7728   7740   7751   7756   7767   7772   7784   7795
```

```
                    7800  7813  7818  7830  7878  7879  7885  7891  7894  7901  7907  7913  7919
                    7925  7937  7940  7947  7953  7959  7961  7970  7977  7984  7993  8001  8010
                    8018  8024  8032  8041  8047  8053  8055  8064  8071  8079  8086  8092  8094
                    8097  8104  8110  8117  8120  8127  8133  8142  8150  8156  8163  8172  8180
                    8191  8194  8201  8207  8217  8220  8227  8233  8235  8245  8248  8255  8261
                    8263  8273  8276  8283  8289  8295  8301  8304  8309  8313  8319  8325  8333
                    8339  8345  8351  8357  8368  8371  8379  8385  8387  8398  8404  8410  8419
                    8426  8432  8438  8444  8450  8455  8464  8472  8479  8488  8494  8496  8505
                    8513  8520  8526  8532  8538  8540  8543  8550  8556  8562  8568  8576  8579
                    8587  8593  8599  8608  8617  8623  8631  8640  8648  8659  8662  8674  8680
                    8683  8690  8696  8698  8704  8713  8716  8723  8725  8735  8738  8745  8751
                    8759  8762  8769  8775  8781  8787  8793  8795  8796  8942  8943  8947  8953
                    8956  8959  8971  8975  8982  8985  8991  8997  9006  9009  9015  9019  9026
                    9029  9032  9039  9042  9046  9048  9052  9059  9066  9072  9075  9078  9090
                    9094  9101  9104  9113  9116  9119  9126  9130  9137  9146  9152  9161  9164
                    9167  9171  9175  9182  9185  9188  9191  9198  9204  9210  9216  9222  9235
                    9238  9241  9248  9249  9266  9294  9307
F$CLEA= 000007       34540  5546  5549
F$DU  = 000016       34540  5558  5561
F$END = 000041       34540  3456  4872  4899  4915  4925  4932  4954  4963  4993  5004  5033  5096
                     5183  5487  5535  5549  5561  5572  5590  5616  5632  5658  5688  5700  5781
                     5795  5851  5859  5896  5905  5963  5985  5986  6027  6029  6040  6083  6084
                     6099  6120  6172  6182  6191  6195  6210  6214  6226  6255  6485  6489  6513
                     6529  6554  6578  6588  6698  6726  6800  6827  6840  6863  6876  6878  6890
                     6894  6900  6908  6910  6915  6928  6932  6938  6946  6948  6953  6967  6971
                     6978  6984  6992  6994  6999  7060  7067  7077  7085  7199  7205  7208  7254
                     7260  7263  7309  7315  7317  7330  7334  7340  7348  7350  7355  7368  7372
                     7378  7386  7388  7393  7406  7410  7416  7424  7426  7430  7449  7453  7460
                     7468  7470  7475  7488  7493  7505  7513  7518  7527  7544  7552  7559  7573
                     7578  7589  7594  7606  7617  7622  7633  7638  7650  7661  7666  7680  7685
                     7696  7707  7712  7723  7728  7740  7751  7756  7767  7772  7784  7795  7800
                     7813  7818  7830  7878  7879  7885  7891  7894  7901  7907  7913  7919  7925
                     7937  7940  7947  7953  7959  7961  7970  7977  7984  7993  8001  8010  8018
                     8024  8032  8041  8047  8053  8055  8064  8071  8079  8086  8092  8094  8097
                     8104  8110  8117  8120  8127  8133  8142  8150  8156  8163  8172  8180  8191
                     8194  8201  8207  8217  8220  8227  8233  8235  8245  8248  8255  8261  8263
                     8273  8276  8283  8289  8295  8301  8304  8309  8313  8319  8325  8333  8339
                     8345  8351  8357  8368  8371  8379  8385  8387  8398  8404  8410  8419  8426
                     8432  8438  8444  8450  8455  8464  8472  8479  8488  8494  8496  8505  8513
                     8520  8526  8532  8538  8540  8543  8550  8556  8562  8568  8576  8579  8587
                     8593  8599  8608  8617  8623  8631  8640  8648  8659  8662  8674  8680  8683
                     8690  8696  8698  8704  8713  8716  8723  8725  8735  8738  8745  8751  8759
                     8762  8769  8775  8781  8787  8793  8795  8796  8942  8943  8947  8953  8956
                     8959  8971  8975  8982  8985  8991  8997  9006  9009  9015  9019  9026  9029
                     9032  9039  9042  9046  9048  9052  9059  9066  9072  9075  9078  9090  9094
                     9101  9104  9113  9116  9119  9126  9130  9137  9146  9152  9161  9164  9167
                     9171  9175  9182  9185  9188  9191  9198  9204  9210  9216  9222  9235  9238
                     9241  9248  9249  9272  9295  9307
F$HARD= 000004       34540  9266  9272
F$HW  = 000013       34540  3524  3543
F$INIT= 000006       34540  5405  5487
F$JMP = 000050       34540
F$MOD = 000000       34540  3456  9307
F$MSG = 000011       34540  4913  4915  4919  4925  4929  4932  4936  4954  4958  4963  4967  4993
                     4997  5004  5008  5033  5074  5096  5156  5183  5627  5632
F$PROT= 000021       34540  5392  5396
```

```
F$PWR = 000017          3454#
F$RPT = 000012          3454#
F$SEG = 000003          3454#  7093   7199   7223   7254   7278   7309
F$SOFT= 000005          3454#  9294   9295
F$SRV = 000010          3454#  4859   4872   4886   4899
F$SUB = 000002          3454#  5986   6027   6029   6083   6900   6910   6938   6948   6984   6994   7085   7205
                        7208   7260   7263   7315   7340   7350   7378   7388   7416   7426   7460   7470   7879
                        8304   8309   8795   8943   9046   9048   9248
F$SW  = 000014          3454#  3552   3553
F$TEST= 000001          3454#  5590   5616   5658   5688   5700   5781   5795   5851   5859   5896   5905   5963
                        5985   6084   6099   6195   6210   6255   6485   6698   6726   6878   6890   6915   6928
                        6953   6967   6999   7060   7317   7330   7355   7368   7393   7406   7430   7449   7475
                        7488   7559   7573   7606   7617   7650   7661   7696   7707   7740   7751   7784   7795
                        7830   7878   8796   8942   9249
GDATA   002310          4013#  4526*  4562*  4601*  4661*  4839   4922   4938   4950   4961   5002   5199   5684*
                        5775*  5817*  5829*  5831   5832   5889*  5950*  5958*  5999*  6006*  6013*  6020*  6037*
                        6050*  6059*  6068*  6075*  6117*  6168*  6169*  6178*  6179*  6188*  6824*  6829*  6836
                        6860*  6873*  6903*  6941*  6987*  7091*  7107   7117   7122   7131*  7141   7149*  7162
                        7175   7182*  7192   7214*  7236   7248*  7269*  7291   7303*  7343*  7381*  7419*  7463*
                        7495*  7496   7520*  7529   7534*  7535   7546*  7554   7580*  7581   7596*  7601   7624*
                        7625   7640*  7645   7671*  7672   7691   7714*  7715   7730*  7735   7758*  7759   7774*
                        7779   7804*  7805   7820*  7825
GETBSR  004446          4487   4686#  4863   4890   5683   5777   5839   5891   5948   5956   6036   6167   6177
                        6187
GETPB7  036326          7991   8095   8417   8541   8702   8760   8884#  9099   9135   9189
GETPRM  017776          5420   5445#  5450
GETT1   036142          7892   7938   8077   8118   8154   8178   8192   8218   8246   8274   8323   8369   8511
                        8577   8621   8646   8660   8681   8714   8736   8826#  8954   8969   8983   8995   9007
                        9013   9027   9040   9073   9088   9114   9124   9150   9162   9169   9183   9236
GETWSR  004610          4525   4561   4600   4660   4707#  6045
G$CNTO= 000200          3454#
G$DELM= 000372          3454#
G$DISP= 000003          3454#
G$EXCP= 000400          3454#
G$HILI= 000002          3454#
G$LOLI= 000001          3454#
G$NO  = 000000          3454#
G$OFFS= 000400          3454#  9268   9269   9270
G$OFSI= 000376          3454#  9268   9269   9270
G$PRMA= 000001          3454#  9268   9269
G$PRMD= 000002          3454#  9270
G$PRML= 000000          3454#
G$RADA= 000140          3454#
G$RADB= 000000          3454#
G$RADD= 000040          3454#
G$RADL= 000120          3454#
G$RADO= 000020          3454#  9268   9269   9270
G$XFER= 000004          3454#
G$YES = 000010          3454#  9268   9269   9270
HELP  = 000000          3442#  3474   3493   3509   4420
HOE   = 100000 G        3563#
IBE   = 010000 G        3563#
IDU   = 000040 G        3563#
IENBA = 000001          3634#
IENBB = 000020          3635#
IENR  = 120016          3703#  4766   7464   7806   7822   7827
```

```
IER    = 020000 G          3563#
IFR    = 120015            3702#  8037    8422    8765    8827    9194
IFRCA1= 000002             3714#
IFRCA2= 000001             3715#
IFRCB1= 000020             3711#
IFRCB2= 000010             3712#
IFRIRQ= 000200             3708#
IFRSR  = 000004            3713#
IFRT1  = 000100            3709#  8861
IFRT2  = 000040            3710#
IHILNK  005234             4868   4870    4874#   5481*
IHOLNK  005306             4895   4897    4901#   5483*
INITT1  004672             4745#  7072    7886    8314    8399    8948    9067    9242
INTFLG  002326             4020#  4867*   4894*
INTWCH  002330             4022#  4861    4888    5484*
IRQA   = 000004            3608#
IRQB   = 000002            3609#
IRQREG= 123005             3607#
ISR    = 000100 G          3563#
IXE    = 004000 G          3563#
I$AU   = 000041            3454#  5571#   5572#
I$AUTO= 000041             3454#  5513#   5535#
I$CLN  = 000041            3454#  5546#   5549#
I$DU   = 000041            3454#  5558#   5561#
I$HRD  = 000041            9266#  9272#
I$INIT= 000041             3454#  5405#   5487#
I$MOD  = 000041            3454#  3456#   9307#
I$MSG  = 000041            3454#  4913#   4915#   4919#   4925#   4929#   4932#   4936#   4954#   4958#   4963#   4967#   4993#
                           4997#  5004#   5008#   5033#   5074#   5096#   5156#   5183#   5627#   5632#
I$PROT= 000040             3454#  5392#
I$PTAB= 000041             3454#
I$PWR  = 000041            3454#
I$RPT  = 000041            3454#
I$SEG  = 000041            3454#  5590    5658    5700    5795    5859    5905    5985    5986    6029    6099    6210    6485
                           6726   6890    6900    6928    6938    6967    6984    7060    7085    7093#   7199#   7208    7223#
                           7254#  7263    7278#   7309#   7330    7340    7368    7378    7406    7416    7449    7460    7488
                           7573   7617    7661    7707    7751    7795    7878    7879    8309    8942    8943    9048
I$SETU= 000041             3454#
I$SFT  = 000041            9294#  9295#
I$SRV  = 000041            3454#  4859#   4872#   4886#   4899#
I$SUB  = 000041            3454#  5590    5658    5700    5795    5859    5905    5985    5986#   6027#   6029#   6083#   6099
                           6210   6485    6726    6890    6900#   6910#   6928    6938#   6948#   6967    6984#   6994#   7060
                           7085#  7205#   7208#   7260#   7263#   7315#   7330    7340#   7350#   7368    7378#   7388#   7406
                           7416#  7426#   7449    7460#   7470#   7488    7573    7617    7661    7707    7751    7795    7878
                           7879#  7894    7940    7961    7993    8055    8079    8094    8097    8120    8156    8180    8194
                           8220   8235    8248    8263    8276    8304#   8309#   8325    8371    8387    8419    8496    8513
                           8540   8543    8579    8623    8648    8662    8683    8698    8704    8716    8725    8738    8762
                           8795#  8942    8943#   8956    8959    8971    8975    8985    8997    9009    9015    9019    9029
                           9032   9042    9046#   9048#   9075    9078    9090    9094    9101    9104    9116    9119    9126
                           9130   9137    9152    9164    9167    9171    9175    9185    9188    9191    9238    9241    9248#
I$TST  = 000041            3454#  5590#   5616#   5658#   5688#   5700#   5781#   5795#   5851#   5859#   5896#   5905#   5963#
                           5985#  5986    6029    6040    6084#   6099#   6120    6172    6182    6191    6195#   6210#   6214
                           6226   6255#   6485#   6489    6513    6529    6554    6578    6588    6698#   6726#   6800    6827
                           6840   6863    6876    6878#   6890#   6894    6900    6908    6915#   6928#   6932    6938    6946
                           6953#  6967#   6971    6978    6984    6992    6999#   7060#   7067    7077    7085    7208    7263
                           7317#  7330#   7334    7340    7348    7355#   7368#   7372    7378    7386    7393#   7406#   7410
```

```
                    7416    7424    7430#   7449#   7453    7460    7468    7475#   7488#   7493    7505    7513    7518
                    7527    7544    7552    7559#   7573#   7578    7589    7594    7606#   7617#   7622    7633    7638
                    7650#   7661#   7666    7680    7685    7696#   7707#   7712    7723    7728    7740#   7751#   7756
                    7767    7772    7784#   7795#   7800    7813    7818    7830#   7878#   7879    7885    7891    7901
                    7907    7913    7919    7925    7937    7947    7953    7959    7970    7977    7984    8001    8010
                    8018    8024    8032    8041    8047    8053    8064    8071    8086    8092    8104    8110    8117
                    8127    8133    8142    8150    8163    8172    8191    8201    8207    8217    8227    8233    8245
                    8255    8261    8273    8283    8289    8295    8301    8309    8313    8319    8333    8339    8345
                    8351    8357    8368    8379    8385    8398    8404    8410    8426    8432    8438    8444    8450
                    8455    8464    8472    8479    8488    8494    8505    8520    8526    8532    8538    8550    8556
                    8562    8568    8576    8587    8593    8599    8608    8617    8631    8640    8659    8674    8680
                    8690    8696    8713    8723    8735    8745    8751    8759    8769    8775    8781    8787    8793
                    8796#   8942#   8943    8947    8953    8982    8991    9006    9026    9039    9048    9052    9059
                    9066    9072    9113    9146    9161    9182    9198    9204    9210    9216    9222    9235    9249#
J$JMP = 000167       3454#
KICKT1  036200       7996    8452    8469    8852#   8988    9143
LODT1C  036110       7985    8072    8411    8506    8810#   8963    9082
LOE   = 040000 G     3563#
LOGDEV  002322       4018#   5440*   5446*   5447    5533
LOT   = 000010 G     3563#
LSIDCL= 000002       3595#
LSIHLT= 000020       3592#
LU1MOD  002000 G     3456#
L$ACP   002110 G     3491#
L$APT   002036 G     3491#
L$AU    020364 G     3491    5571#
L$AUT   002070 G     3491#
L$AUTO  020216 G     3491    5513#
L$CCP   002106 G     3491#
L$CLEA  020342 G     3491    5546#
L$CO    002032 G     3491#
L$DEPO  002011 G     3491#
L$DESC  003542 G     3491    4417#
L$DESP  002076 G     3491#
L$DEVP  002060 G     3491#
L$DISP  002124 G     3491    3507#
L$DLY   002116 G     3491#
L$DTP   002040 G     3491#
L$DTYP  002034 G     3491#
L$DU    020360 G     3491    5558#
L$DUT   002072 G     3491#
L$DVTY  003522 G     3491    4410#
L$EF    002052 G     3491#
L$ENVI  002044 G     3491#
L$ERRT  002236 G     3491    3979#
L$ETP   002102 G     3491#
L$EXP1  002046 G     3491#
L$EXP4  002064 G     3491#
L$EXP5  002066 G     3491#
L$HARD  040116 G     3491    9266#
L$HIME  002120 G     3491#
L$HPCP  002016 G     3491#
L$HPTP  002022 G     3491#
L$HW    002216 G     3491    3524#
L$ICP   002104 G     3491#
L$INIT  017634 G     3491    5405#
```

```
L$LADP  002026 G          3491#
L$LAST  040374 G          3491    9308#
L$LOAD  002100 G          3491#
L$LUN   002074 G          3491#
L$MREV  002050 G          3491#
L$NAME  002000 G          3491#
L$PRIO  002042 G          3491#
L$PROT  017626 G          3491    5392#
L$PRT   002112 G          3491#
L$REPP  002062 G          3491#
L$REV   002010 G          3491#
L$SOFT  040262 G          9294#
L$SPC   002056 G          3491#
L$SPCP  002020 G          3491#
L$SPTP  002024 G          3491#
L$STA   002030 G          3491#
L$SW    002236 G          3552#
L$TEST  002114 G          3491#
L$TIML  002014 G          3491#
L$UNIT  002012 G          3491#
L10000  002234            3524    3543#
L10001  002236            3552    3553#
L10002  005232            4872#
L10003  005304            4899#
L10004  005314            4915#
L10005  005424            4925#
L10006  005436            4932#
L10007  005562            4954#
L10010  005660            4963#
L10011  006622            4993#
L10012  006734            5004#
L10013  007114            5033#
L10014  010034            5096#
L10015  011306            5183#
L10017  020204            5487#
L10020  020332            5535#
L10021  020356            5549#
L10022  020362            5561#
L10023  020364            5572#
L10024  020522            5616#
L10025  020652            5632#
L10026  021240            5688#
L10027  021432            5781#
L10030  021574            5851#
L10031  021716            5896#
L10032  022130            5963#
L10033  022640            6040    6084#
L10034  022350            6027#
L10035  022636            6083#
L10036  023206            6120    6172    6182    6191    6195#
L10037  023374            6214    6226    6255#
L10040  025134            6489    6513    6529    6554    6578    6588    6698#
L10041  025756            6800    6827    6840    6863    6876    6878#
L10042  026040            6894    6908    6915#
L10043  026034            6910#
L10044  026122            6932    6946    6953#
```

```
L10045  026116          6948#
L10046  026224          6971    6978    6992    6999#
L10047  026220          6994#
L10050  027270          7067    7077    7317#
L10051  026732          7205#
L10052  027110          7260#
L10053  027266          7315#
L10054  027352          7334    7348    7355#
L10055  027346          7350#
L10056  027434          7372    7386    7393#
L10057  027430          7388#
L10060  027520          7410    7424    7430#
L10061  027514          7426#
L10062  027606          7453    7468    7475#
L10063  027602          7470#
L10064  030074          7493    7505    7513    7518    7527    7544    7552    7559#
L10065  030224          7578    7589    7594    7606#
L10066  030354          7622    7633    7638    7650#
L10067  030510          7666    7680    7685    7696#
L10070  030640          7712    7723    7728    7740#
L10071  030770          7756    7767    7772    7784#
L10072  031126          7800    7813    7818    7830#
L10073  036106          7885    7891    7901    7907    7913    7919    7925    7937    7947    7953    7959    7970    7977
                        7984    8001    8010    8018    8024    8032    8041    8047    8053    8064    8071    8086    8092
                        8104    8110    8117    8127    8133    8142    8150    8163    8172    8191    8201    8207    8217
                        8227    8233    8245    8255    8261    8273    8283    8289    8295    8301    8313    8319    8333
                        8339    8345    8351    8357    8368    8379    8385    8398    8404    8410    8426    8432    8438
                        8444    8450    8455    8464    8472    8479    8488    8494    8505    8520    8526    8532    8538
                        8550    8556    8562    8568    8576    8587    8593    8599    8608    8617    8631    8640    8659
                        8674    8680    8690    8696    8713    8723    8735    8745    8751    8759    8769    8775    8781
                        8787    8793    8796#
L10074  033400          7894    7940    7961    7993    8055    8079    8094    8097    8120    8156    8180    8194    8220
                        8235    8248    8263    8276    8304#
L10075  036104          8325    8371    8387    8419    8496    8513    8540    8543    8579    8623    8648    8662    8683
                        8698    8704    8716    8725    8738    8762    8795#
L10076  040112          8947    8953    8982    8991    9006    9026    9030    9052    9059    9066    9072    9113    9146
                        9161    9182    9198    9204    9210    9216    9222    9235    9249#
L10077  037044          8956    8959    8971    8975    8985    8997    9009    9015    9019    9029    9032    9042    9046#
L10100  040110          9075    9078    9090    9094    9101    9104    9116    9119    9126    9130    9137    9152    9164
                        9167    9171    9175    9185    9188    9191    9238    9241    9248#
L10101  040150          9266    9272#
L10102  040262          9294    9295#
MASCLR  003614          4458#   5662    5863    5878    5912
MCLR  = 000100          3644#   4460    4516    4526    5829
MLWRI   004344          4629    4651#
MPCSR   002352          4075#   5459    5628
MPIHAN  005164 G        4859#   5480
MPIVEC  002412          4102#   5467*   5480    5547
MPOHAN  005236 G        4886#   5482
MPOVEC  002414          4103#   5469*   5482    5548
MPRIOR  002416          4104#   5476*   5480    5482
MRDY  = 000200          3659#   4523    4558    4597    4658    6136    6158    6169    6179    8864
MREQ  = 000001          3645#   4516    4526
MSTCLR  003774          4516#   5796    5987    6100    6211    6486    6727    6891    6929    6968    7064    7331    7369
                        7407    7450    7490    7515    7575    7591    7619    7635    7663    7682    7709    7725    7753
                        7769    7797    7815    7882    8310    8391    8944    9049
```

```
NEWLIN  012133          5030    5093    52460
NEWPC   002500          4136#
NEWST   017756          5416    5438#
NPRABT= 000200          3589#
NPRAIH= 000075          3575#
NPRAIL= 000074          3574#
NPRAIX= 000076          3576#
NPRAOH= 000071          3572#
NPRAOL= 000070          3571#   3572    3573    3574    3575    3576
NPRAOX= 000072          3573#
NPRBS7= 000010          3577#
NPRBYT= 000010          3593#   3602
NPRCTL= 123004          3588#
NPRDL = 000044          3601#
NPRDLB= 000054          3602#
NPRDRH= 123001          3583#
NPRDRL= 123000          3582#   3583    3588
NPRGO = 000100          3590#
NPRIO = 000040          3591#   3601    3602
NPRLD = 000004          3600#
NULERR  012104          4914    4924    4931    4992    5003    5181    5230    52360
OLDSP   002502          4137#
ORA   = 120001          3688#
ORAM  = 120017          3704#
ORB   = 120000          3687#   3688    3689    3690    3691    3692    3693    3694    3695    3696    3698    3699    3700
                        3701    3702    3703    3704    6750    6766    6988    7509    7548    7556    7980    8067    8885
                        9062
O$APTS= 000000          3454#   3491
O$AU  = 000001          3454#   3472#   3491
O$BGNR= 000000          3454#   3491
O$BGNS= 000000          3454#   3491
O$DU  = 000001          3454#   3472#   3491
O$ERRT= 000001          3454#   3472#   3491
O$GNSW= 000000          3454#   3491
O$POIN= 000001          3454#   3472#   3491
O$SETU= 000000          3454#   3491    9308
PATA    002504          4144#   5744    5757    5758
PATB    002526          4144    4165#   5812    5817    6896    6934    6980    7086    7209    7264    7336    7374    7412
                        7413
PATC    002556          4165    4194#   6747    6748
PATCH   040262          9298#
PATCM   002624          4229#   6765    6785
PATCR   002604          4194    4208#   4970    4981    6765    6782
PATD    002644          4249#   7455
PATE    002674          4249    4277#   7457
PATF    002724          4277    4304#
PATG    003040          4304    4343#
PATGEN  023772          6268    6311    6372#
PCR   = 120014          3701#   7420    7760    7776    7781
PFLAG   002350          4031#   5078    5088    5120    5906
PNT   = 001000 G        3563#
PRI   = 002000 G        3563#
PRIRTY  040227          9270    9277#
PRI00 = 000000 G        3563#
PRI01 = 000040 G        3563#
PRI02 = 000100 G        3563#
```

```
PRI03 = 000140 G          3563#
PRI04 = 000200 G          3563#
PRI05 = 000240 G          3563#
PRI06 = 000300 G          3563#
PRI07 = 000340 G          3563#
PSTACK  002324            4019#   5407*
PU24  = 000001            3614#
RCRAM   023612            6237    6309#
READ    004076            4550#   4770    4834    6288    6325    6549    6583    6769    6816    6830    6855    6865    7104
                          7114    7119    7138    7159    7169    7189    7233    7243    7288    7298    7522    7547    7597
                          7641    7687    7731    7775    7821    7896    7902    7908    7914    7920    7942    7948    7954
                          7965    8005    8013    8019    8027    8036    8042    8048    8081    8087    8099    8105    8112
                          8122    8128    8137    8145    8158    8167    8186    8196    8202    8222    8228    8250    8256
                          8278    8284    8290    8296    8328    8334    8340    8346    8352    8374    8380    8405    8421
                          8427    8433    8439    8445    8459    8474    8483    8489    8515    8521    8527    8533    8545
                          8551    8557    8563    8571    8582    8588    8594    8603    8612    8626    8635    8654    8685
                          8691    8718    8740    8746    8764    8770    8776    8782    8788    8826    8853    8884    8977
                          9001    9108    9156    9193    9199    9205    9211    9217
READI   004210            4588#   6804
REDLOC= 000001            3653#   4551    4562    4590    4601
REDPAG= 000003            3655#
REGNUM  002334            4025#   4843*   4844*   4920    4959    4998    5686*   5779*   5837*   5893*   5951*   5959*   6000*
                          6007*   6014*   6021*   6038*   6052*   6061*   6070*   6077*   6118*   6170*   6180*   6189*   6825*
                          6838*   6861*   6874*   7109*   7125*   7143*   7164*   7172*   7194*   7238*   7249*   7293*   7304*
                          7531*   7556*   7603*   7647*   7693*   7737*   7781*   7827*
REG0    002420            4108#
REG1    002422            4109#
REG2    002424            4110#
REG3    002426            4111#
REG4    002430            4112#
REG5    002432            4113#
REG6    002434            4114#
REG7    002436            4115#
RESFMC  003040            4348#   5670    5672    5684
RESFT3  003062            4348    4368#   5721    5757*   5764    5775
RESTRT  017752            5413    5433#
RUN   = 000200            3643#   4460    4473    4516    4526    5829    6125    6151
SEL0    002352            4078#   4516*   4707    5995    5998    6116
SEL10   002372            4090#   4711
SEL12   002376            4093#   4712
SEL14   002402            4096#   4713
SEL16   002406            4099#   4714
SEL2    002356            4081#   4708    6003    6005    6158    6166
SEL4    002362            4084#   4550*   4589*   4627*   4649*   4709    5992*   6010    6012    8858*
SEL6    002366            4087#   4607    4628*   4650*   4710    5993*   6017    6019    8859*
SFPTBL  002236 G          3552#
SLT0  = 000020            3672#   3673    3674    3675    3676    3677    3678    3679    3680    3681    3682    3683    5992
                          6010    6013    6065    6068    6109    6271    6273    6314    6316    6506    6622    6661
SLT2  = 000022            3675#
SLT4  = 000024            3678#
SLT6  = 000026            3681#
SR    = 120012            3699#   7344    7673    7688    7693
STALL   005044            4803#   8456    8457
STARST  017706            5410    5424#
STREG   005046            4826#   6905    6943    6989    7345    7383    7421    7465    7502    7510    7541    7586    7630
                          7677    7720    7764    7810
```

CROSS REFERENCE TABLE -- USER SYMBOLS

SVCGBL= 000000

3454# 3456 3464# 3491 3507 3524 3552 3979 4410 4417 4859 4886 4913
4919 4929 4936 4958 4967 4997 5008 5074 5156 5392 5405 5513 5546
5558 5571 5627 9266 9294 9308#

SVCINS= 000001

3454# 3461# 3491 3507 3524 3552 4410 4417 4488 4527 4563 4602 4662
4845 4864 4872 4891 4899 4915 4920 4922 4925 4932 4941 4950 4954
4959 4961 4963 4971 4972 4973 4975 4976 4978 4979 4982 4983 4984
4986 4987 4989 4990 4993 5000 5002 5004 5018 5021 5024 5027 5030
5033 5047 5050 5077 5080 5083 5087 5090 5093 5096 5119 5130 5133
5168 5171 5174 5175 5178 5179 5183 5211 5212 5213 5214 5215 5216
5217 5218 5226 5227 5228 5229 5236 5409 5410 5412 5413 5415 5416
5418 5419 5429 5431 5447 5448 5480 5482 5487 5514 5530 5533 5535
5547 5548 5549 5560 5561 5572 5594 5610 5615 5616 5628 5629 5630
5631 5632 5664 5687 5688 5780 5781 5801 5840 5851 5867 5882 5894
5896 5916 5923 5952 5960 5963 5986 5989 6026 6027 6029 6039 6040
6082 6083 6084 6103 6112 6119 6120 6171 6172 6181 6182 6190 6191
6195 6213 6214 6225 6226 6230 6239 6243 6254 6255 6298 6335 6488
6489 6512 6513 6528 6529 6547 6553 6554 6565 6577 6578 6587 6588
6599 6697 6698 6729 6736 6742 6759 6773 6799 6800 6808 6814 6820
6826 6827 6834 6839 6840 6846 6852 6862 6863 6869 6875 6876 6878
6893 6894 6900 6907 6908 6910 6915 6931 6932 6938 6945 6946 6948
6953 6970 6971 6977 6978 6984 6991 6992 6994 6999 7066 7067 7076
7077 7085 7093 7110 7126 7144 7165 7177 7195 7199 7205 7208 7223
7239 7250 7254 7260 7263 7278 7294 7305 7309 7315 7317 7333 7334
7340 7347 7348 7350 7355 7371 7372 7378 7385 7386 7388 7393 7409
7410 7416 7423 7424 7426 7430 7452 7453 7460 7467 7468 7470 7475
7492 7493 7504 7505 7512 7513 7517 7518 7526 7527 7532 7543 7544
7551 7552 7557 7559 7577 7578 7588 7589 7593 7594 7604 7606 7621
7622 7632 7633 7637 7638 7648 7650 7665 7666 7679 7680 7684 7685
7694 7696 7711 7712 7722 7723 7727 7728 7738 7740 7755 7756 7766
7767 7771 7772 7782 7784 7799 7800 7812 7813 7817 7818 7828 7830
7879 7884 7885 7890 7891 7894 7900 7901 7906 7907 7912 7913 7918
7919 7924 7925 7926 7927 7936 7937 7940 7946 7947 7952 7953 7958
7959 7960 7961 7969 7970 7976 7977 7983 7984 7993 7995 8000 8001
8009 8010 8017 8018 8023 8024 8025 8031 8032 8040 8041 8046 8047
8052 8053 8054 8055 8063 8064 8070 8071 8079 8085 8086 8091 8092
8093 8094 8097 8103 8104 8109 8110 8111 8116 8117 8120 8126 8127
8132 8133 8134 8141 8142 8149 8150 8151 8156 8162 8163 8164 8171
8172 8175 8180 8182 8190 8191 8194 8200 8201 8206 8207 8208 8216
8217 8220 8226 8227 8232 8233 8234 8235 8244 8245 8248 8254 8255
8260 8261 8262 8263 8272 8273 8276 8282 8283 8288 8289 8294 8295
8300 8301 8302 8304 8309 8312 8313 8318 8319 8325 8332 8333 8338
8339 8344 8345 8350 8351 8356 8357 8358 8367 8368 8371 8378 8379
8384 8385 8386 8387 8397 8398 8403 8404 8409 8410 8419 8425 8426
8431 8432 8437 8438 8443 8444 8449 8450 8451 8454 8455 8463 8464
8468 8471 8472 8478 8479 8487 8488 8493 8494 8495 8496 8504 8505
8513 8519 8520 8525 8526 8531 8532 8537 8538 8539 8540 8543 8549
8550 8555 8556 8561 8562 8567 8568 8569 8575 8576 8579 8586 8587
8592 8593 8598 8599 8600 8607 8608 8616 8617 8618 8623 8630 8631
8632 8639 8640 8643 8648 8650 8658 8659 8662 8664 8673 8674 8679
8680 8683 8689 8690 8695 8696 8697 8698 8704 8706 8712 8713 8716
8722 8723 8724 8725 8734 8735 8738 8744 8745 8750 8751 8752 8758
8759 8762 8768 8769 8774 8775 8780 8781 8786 8787 8792 8793 8794
8795 8796 8830 8867 8888 8943 8946 8947 8952 8953 8956 8958 8959
8971 8974 8975 8981 8982 8985 8987 8990 8991 8997 9005 9006 9009
9011 9015 9018 9019 9025 9026 9029 9031 9032 9038 9039 9042 9044
9046 9048 9051 9052 9058 9059 9065 9066 9071 9072 9075 9077 9078

K1


```
                    9090  9093  9094  9101  9103  9104  9112  9113  9116  9118  9119  9126  9129
                    9130  9137  9139  9145  9146  9152  9160  9161  9164  9166  9167  9171  9174
                    9175  9181  9182  9185  9187  9188  9191  9197  9198  9203  9204  9209  9210
                    9215  9216  9221  9222  9223  9234  9235  9238  9240  9241  9246  9248  9249
                    9266  9268  9269  9270  9272  9294  9295  9308
SVCSUB= 000001       3454#  3463#  5986  6029  6900  6938  6984  7085  7208  7263  7340  7378  7416
                    7460  7879  8309  8943  9048
SVCTAG= 000001       3454#  3465#  3543  3553  4872  4899  4915  4925  4932  4954  4963  4993  5004
                    5033  5096  5183  5487  5535  5549  5561  5572  5616  5632  5688  5781  5851
                    5896  5963  6027  6083  6084  6195  6255  6698  6878  6910  6915  6948  6953
                    6994  6999  7199  7205  7254  7260  7309  7315  7317  7350  7355  7388  7393
                    7426  7430  7470  7475  7559  7606  7650  7696  7740  7784  7830  8304  8795
                    8796  9046  9248  9249  9272  9295
SVCTST= 000001       3454#  3462#  5590  5658  5700  5795  5859  5905  5985  6099  6210  6485  6726
                    6890  6928  6967  7060  7330  7368  7406  7449  7488  7573  7617  7661  7707
                    7751  7795  7878  8942
SWPBOT= 121000       3623#
SWPDDC= 12140C       3624#
S$LSYM= 010000       3454#  3543#  3553#  4872#  4899#  4915#  4925#  4932#  4954#  4963#  4993#  5004#  5033#
                    5096#  5183#  5487#  5535#  5549#  5561#  5572#  5616#  5632#  5688#  5781#  5851#  5896#
                    5963#  6027#  6083#  6084#  6195#  6255#  6698#  6878#  6910#  6915#  6948#  6953#  6994#
                    6999#  7093#  7205#  7223#  7260#  7278#  7315#  7317#  7350#  7355#  7388#  7393#  7426#
                    7430#  7470#  7475#  7559#  7606#  7650#  7696#  7740#  7784#  7830#  8304#  8795#  8796#
                    9046#  9248#  9249#  9272#  9295#
TDATA   002306       4012#  4831  6902*  6940*  6986*  7090*  7091  7099  7130*  7134  7148*  7155  7173
                    7181*  7185  7213*  7214  7229  7268*  7269  7284  7342*  7380*  7418*  7462*  7496*
                    7535*  7581*  7625*  7672*  7715*  7759*  7805*
TMPA    002464       4130#  5047  5119  6227*  6228  6240*  6241  6260*  6270  6313  6404  6540*  6548
                    6572  6582  6615  6617*  6622  6624  6635*  6654  6656*  6661  6663  6678*
TMPB    002466       4131#  4748*  4749*  4772  4775  4777*  4781  5130  5158  5175  5179  6537*  6632
                    6634*  6645*  6671  6673*  6686*  7922  7967  8330  8407
TMPC    002470       4132#  5123  6499*  6637  6646*  6675  6684*
TMPD    002472       4133#  5125  5179  6536*  6608  6648*  8038  8423  8766  8828  8835  9195
TMPE    002474       4134#  4763*  4767  5175  6216*  6228  6241  6496*  6520  6615  6678
TMPF    002476       4135#  5109  6261*  6295  6297*  6332  6334*  6498*  6562  6564*  6567*  6596  6598*
                    6602*
TMP0    002440       4120#  5515*  5531  5536*  6495*  6519  6521  6624  6663  7978*  7981  8065  8886
                    8893  9060*  9063
TMP1    002442       4121#
TMP2    002444       4122#  5011  6215*  6247*  6248  6275  6318  6373  6376  7971*  7974  8058*  8061
                    8392*  8395  8499*  8502  8668*  8671  9053*  9056
TMP3    002446       4123#  6259*  6277*  6320*  6379  6390  6397  6407  6410*
TMP4    002450       4124#  5044  5112  5116  5174  5178  6218*  6285  6293  6330  6384*  6387*  6392*
                    6394*  6399*  6401*  6404*  6407*  6532*  6541*  6560  6575  6594  6636*  6639*  6674*
                    6677*  7898  7944  8007  8011  8188  8280  8336  8429  8461  8465  8517  8547
                    8584  8656  8772  8810*  8814  9003  9158  9201
TMP5    002452       4125#  5045  5047  5117  5119  5174  5178  6219*  6290  6293  6327  6330  6551
                    6560  6585  6594  7904  7931*  7934  7950  8015  8029  8033  8114  8214  8267*
                    8270  8286  8342  8362*  8365  8376  8435  8476  8480  8523  8553  8573  8677
                    8687  8729*  8732  8756  8778  8811*  8817  8860*  8979  9110  9207
TMP6    002454       4126#  4746*  4786  5174  5178  7910  8021  8044  8083  8101  8124  8139  8143
                    8198  8224  8239*  8242  8252  8292  8348  8441  8485  8529  8559  8590  8605
                    8609  8707*  8710  8720  8742  8784  9020*  9023  9176*  9179  9213
TMP7    002456       4127#  4747*  4791  5174  5178  7916  7956  8050  8089  8107  8130  8147  8160
                    8169  8173  8204  8230  8258  8298  8354  8382  8447  8491  8535  8565  8596
                    8614  8628  8637  8641  8693  8748  8790  8855  8859  8860  9033*  9036  9219
```

```
                    9229*   9232
TMP8    002460      4128#
TMP9    002462      4129#   5130    6497*
TXTMLT  017544      4950    5377#
TXTML0  014117      5291#   5377
TXTML1  014123      5292#   5377
TXTML2  014137      5293#   5377
TXTML3  014154      5294#   5377
TXTML4  014176      5295#   5377
TXTML5  014217      5296#   5377
TXTML6  014247      5067    5297#   5377
TXTML7  014261      5298#   5377
TXTVR   014341      5000    5300#   5379
TXTVRA  014437      5311#   5381
TXTVRB  014442      5312#   5381
TXTVRC  014446      5313#   5381
TXTVRD  014452      5314#   5381
TXTVRE  014456      5315#   5381
TXTVRF  014462      5316#   5381
TXTVRT  017566      5000    5380#
TXTVR0  014357      5301#   5380
TXTVR1  014363      5302#   5380
TXTVR2  014367      5303#   5380
TXTVR3  014374      5304#   5380
TXTVR4  014401      5305#   5380
TXTVR5  014406      5306#   5380
TXTVR6  014413      5307#   5380
TXTVR7  014420      5308#   5380
TXTVR8  014425      5309#   5381
TXTVR9  014432      5310#   5381
TXT1    013265      5211    5274#
TXT2    013323      5213    5275#
TXT2A   013365      5215    5276#
TXT2B   013424      5217    5277#
TXT3    013466      5211    5278#
TXT4    013516      5226    5279#
TXT4A   013556      5228    5280#
TXT47C  007454      5059#   5067
TXT47D  007465      5060#   5067
TXT47E  007500      5061#   5067
TXT47F  007522      5062#   5067
TXT47G  007545      5063#   5067
TXT47H  007570      5064#   5067
TXT47P  007626      5017    5067#
TXT48A  010750      5111    5145#
TXT48B  010755      5115    5146#
TXT48C  010762      5127    5147#
TXT48D  010767      5129    5148#
TXT5    013617      4920    4959    5281#
TXT6    013621      5226    5282#
TXT7    013644      4971    5283#
TXT7A   013731      4982    5284#
TXT8A   014016      4972    4983    5285#
TXT8B   014033      4975    4986    5286#
TXT8C   014050      4978    4989    5287#
TXT8D   014065      5174    5288#
```

```
TXT8E   014102          5178    5289#
T$ARGC= 000001          3491#   4920#   4922#   4941#   4950#   4959#   4961#   4971#   4972#   4973#   4975#   4976#   4978#
                        4979#   4982#   4983#   4984#   4986#   4987#   4989#   4990#   5000#   5002#   5018#   5021#   5024#
                        5027#   5030#   5047#   5050#   5077#   5080#   5083#   5087#   5090#   5093#   5119#   5130#   5133#
                        5168#   5171#   5174#   5175#   5178#   5179#   5211#   5212#   5213#   5214#   5215#   5216#   5217#
                        5218#   5226#   5227#   5228#   5229#   5236#   5628#   5629#   5630#   5631#   7927#
T$CODE= 002032          9268#   9269#   9270#
T$ERRN= 000146          3454#   4864#   4891#   5615#   5687#   5780#   5840#   5894#   5952#   5960#   6026#   6039#   6082#
                        6119#   6171#   6181#   6190#   6565#   6599#   6799#   6826#   6839#   6862#   6875#   7110#   7126#
                        7144#   7165#   7177#   7195#   7239#   7250#   7294#   7305#   7532#   7557#   7604#   7648#   7694#
                        7738#   7782#   7828#   7926#   7960#   7995#   8025#   8054#   8093#   8111#   8134#   8151#   8164#
                        8175#   8182#   8208#   8234#   8262#   8302#   8358#   8386#   8451#   8468#   8495#   8539#   8569#
                        8600#   8618#   8632#   8643#   8650#   8664#   8697#   8706#   8724#   8752#   8794#   8958#   8974#
                        8987#   9011#   9018#   9031#   9044#   9077#   9093#   9103#   9118#   9129#   9139#   9166#   9174#
                        9187#   9223#   9240#
T$EXCP= 000000          9268#   9269#   9270#
T$FLAG= 000040          6040#   6120#   6172#   6182#   6191#   6214#   6226#   6489#   6513#   6529#   6554#   6578#   6588#
                        6800#   6827#   6840#   6863#   6876#   6894#   6908#   6932#   6946#   6971#   6978#   6992#   7067#
                        7077#   7334#   7348#   7372#   7386#   7410#   7424#   7453#   7468#   7493#   7505#   7513#   7518#
                        7527#   7544#   7552#   7578#   7589#   7594#   7622#   7633#   7638#   7666#   7680#   7685#   7712#
                        7723#   7728#   7756#   7767#   7772#   7800#   7813#   7818#   7885#   7891#   7894#   7901#   7907#
                        7913#   7919#   7925#   7937#   7940#   7947#   7953#   7959#   7961#   7970#   7977#   7984#   7993#
                        8001#   8010#   8018#   8024#   8032#   8041#   8047#   8053#   8055#   8064#   8071#   8079#   8086#
                        8092#   8094#   8097#   8104#   8110#   8117#   8120#   8127#   8133#   8142#   8150#   8156#   8163#
                        8172#   8180#   8191#   8194#   8201#   8207#   8217#   8220#   8227#   8233#   8235#   8245#   8248#
                        8255#   8261#   8263#   8273#   8276#   8283#   8289#   8295#   8301#   8313#   8319#   8325#   8333#
                        8339#   8345#   8351#   8357#   8368#   8371#   8379#   8385#   8387#   8398#   8404#   8410#   8419#
                        8426#   8432#   8438#   8444#   8450#   8455#   8464#   8472#   8479#   8488#   8494#   8496#   8505#
                        8513#   8520#   8526#   8532#   8538#   8540#   8543#   8550#   8556#   8562#   8568#   8576#   8579#
                        8587#   8593#   8599#   8608#   8617#   8623#   8631#   8640#   8648#   8659#   8662#   8674#   8680#
                        8683#   8690#   8696#   8698#   8704#   8713#   8716#   8723#   8725#   8735#   8738#   8745#   8751#
                        8759#   8762#   8769#   8775#   8781#   8787#   8793#   8947#   8953#   8956#   8959#   8971#   8975#
                        8982#   8985#   8991#   8997#   9006#   9009#   9015#   9019#   9026#   9029#   9032#   9039#   9042#
                        9052#   9059#   9066#   9072#   9075#   9078#   9090#   9094#   9101#   9104#   9113#   9116#   9119#
                        9126#   9130#   9137#   9146#   9152#   9161#   9164#   9167#   9171#   9175#   9182#   9185#   9188#
                        9191#   9198#   9204#   9210#   9216#   9222#   9235#   9238#   9241#
T$GMAN= 000000          3454#
T$HILI= 000007          9268#   9269#   9270#
T$LAST= 000001          3454#   9308#
T$LOLI= 000000          9268#   9269#   9270#
T$LSYM= 010000          3454#   3543    3553    4872    4899    4915    4925    4932    4954    4963    4993    5004    5033
                        5096    5183    5487    5535    5549    5561    5572    5616    5632    5688    5781    5851    5896
                        5963    6027    6083    6084    6195    6255    6698    6878    6910    6915    6948    6953    6994
                        6999    7205    7260    7315    7317    7350    7355    7388    7393    7426    7430    7470    7475
                        7559    7606    7650    7696    7740    7784    7830    8304    8795    8796    9046    9248    9249
                        9272    9295
T$LTNO= 000034          9308#
T$NEST= 177777          3454#   3456#   3524#   3543#   3552#   3553#   4859#   4872#   4886#   4899#   4913#   4915#   4919#
                        4925#   4929#   4932#   4936#   4954#   4958#   4963#   4967#   4993#   4997#   5004#   5008#   5033#
                        5074#   5096#   5156#   5183#   5392#   5396#   5405#   5487#   5513#   5535#   5546#   5549#   5558#
                        5561#   5571#   5572#   5590#   5616#   5627#   5632#   5658#   5688#   5700#   5781#   5795#   5851#
                        5859#   5896#   5905#   5963#   5985#   5986#   6027#   6029#   6083#   6084#   6099#   6195#   6210#
                        6255#   6485#   6698#   6726#   6878#   6890#   6900#   6910#   6915#   6928#   6938#   6948#   6953#
                        6967#   6984#   6994#   6999#   7060#   7085#   7093#   7199#   7205#   7208#   7223#   7254#   7260#
                        7263#   7278#   7309#   7315#   7317#   7330#   7340#   7350#   7355#   7368#   7378#   7388#   7393#
                        7406#   7416#   7426#   7430#   7449#   7460#   7470#   7475#   7488#   7559#   7573#   7606#   7617#
```

T$NS0 = 000000
T$NS1 = 000005
T$NS2 = 000002
T$NS3 = 000003
T$PTNU= 000000
T$SAVL= 177777
T$SEGL= 177777
T$SEKO= 010000
T$SUBN= 000002
T$TAGL= 177777
T$TAGN= 010103
T$TEMP= 000000

T$TEST= 000034

34540 55900 56580 57000 57954 58594 59050 59850 5986 6029 60990 62100 64850
67260 68900 6900 69280 6938 69670 6984 70600 7085 7208 7263 73300 7340
73680 7378 74060 7416 74490 7460 74880 75730 76170 76610 77070 77510 77950
78780 7879 8309 89420 8943 9048 9308

T$TSTM= 177777

34540 4864 4891 4915 4920 4922 4925 4932 4941 4950 4954 4959 4961
4963 4971 4972 4973 4975 4976 4978 4979 4982 4983 4984 4986 4987
4989 4990 4993 5000 5002 5004 5018 5021 5024 5027 5030 5033 5047
5050 5077 5080 5083 5087 5090 5093 5096 5119 5130 5133 5168 5171
5174 5175 5178 5179 5183 5211 5212 5213 5214 5215 5216 5217 5218
5226 5227 5228 5229 5236 5409 5412 5415 5418 5429 5431 5447 5480
5482 5487 5514 5530 5533 5535 5547 5548 5549 5560 5561 5572 5594
5610 5615 5616 5628 5629 5630 5631 5632 5664 5687 5688 5780 5781
5801 5840 5851 5867 5882 5894 5896 5916 5923 5952 5960 5963 5986
5989 6026 6027 6029 6039 6040 6082 6083 6084 6103 6112 6119 6120
6171 6172 6181 6182 6190 6191 6195 6213 6214 6225 6226 6230 6239
6243 6254 6255 6488 6489 6512 6513 6528 6529 6547 6553 6554 6565
6577 6578 6587 6588 6599 6697 6698 6729 6736 6742 6759 6773 6799
6800 6808 6814 6820 6826 6827 6834 6839 6840 6846 6852 6862 6863
6869 6875 6876 6878 6893 6894 6900 6907 6908 6910 6915 6931 6932
6938 6945 6946 6948 6953 6970 6971 6977 6978 6984 6991 6992 6994
6999 7066 7067 7076 7077 7085 7093 7110 7126 7144 7165 7177 7195
7199 7205 7208 7223 7239 7250 7254 7260 7263 7278 7294 7305 7309
7315 7317 7333 7334 7340 7347 7348 7350 7355 7371 7372 7378 7385
7386 7388 7393 7409 7410 7416 7423 7424 7426 7430 7452 7453 7460
7467 7468 7470 7475 7492 7493 7504 7505 7512 7513 7517 7518 7526
7527 7532 7543 7544 7551 7552 7557 7559 7577 7578 7588 7589 7593
7594 7604 7606 7621 7622 7632 7633 7637 7638 7648 7650 7665 7666
7679 7680 7684 7685 7694 7696 7711 7712 7722 7723 7727 7728 7738
7740 7755 7756 7766 7767 7771 7772 7782 7784 7799 7600 7812 7813
7817 7818 7828 7830 7879 7884 7885 7890 7891 7894 7900 7901 7906
7907 7912 7913 7918 7919 7924 7925 7926 7927 7936 7937 7940 7946
7947 7952 7953 7958 7959 7960 7961 7969 7970 7976 7977 7983 7984
7993 7995 8000 8001 8009 8010 8017 8018 8023 8024 8025 8031 8032
8040 8041 8046 8047 8052 8053 8054 8055 8063 8064 8070 8071 8079
8085 8086 8091 8092 8093 8094 8097 8103 8104 8109 8110 8111 8116
8117 8120 8126 8127 8132 8133 8134 8141 8142 8149 8150 8151 8156
8162 8163 8164 8171 8172 8175 8180 8182 8190 8191 8194 8200 8201
8206 8207 8208 8216 8217 8220 8226 8227 8232 8233 8234 8235 8244
8245 8248 8254 8255 8260 8261 8262 8263 8272 8273 8276 8282 8283
8288 8289 8294 8295 8300 8301 8302 8304 8309 8312 8313 8318 8319
8325 8332 8333 8338 8339 8344 8345 8350 8351 8356 8357 8358 8367
8368 8371 8378 8379 8384 8385 8386 8387 8397 8398 8403 8404 8409
8410 8419 8425 8426 8431 8432 8437 8438 8443 8444 8449 8450 8451
8454 8455 8463 8464 8468 8471 8472 8478 8479 8487 8488 8493 8494
8495 8496 8504 8505 8513 8519 8520 8525 8526 8531 8532 8537 8538
8539 8540 8543 8549 8550 8555 8556 8561 8562 8567 8568 8569 8575
8576 8579 8586 8587 8592 8593 8598 8599 8600 8607 8608 8616 8617
8618 8623 8630 8631 8632 8639 8640 8643 8648 8650 8658 8659 8662
8664 8673 8674 8679 8680 8683 8689 8690 8695 8696 8697 8698 8704
8706 8712 8713 8716 8722 8723 8724 8725 8734 8735 8738 8744 8745
8750 8751 8752 8758 8759 8762 8768 8769 8774 8775 8780 8781 8786
8787 8792 8793 8794 8795 8796 8830 8888 8943 8946 8947 8952 8953
8956 8958 8959 8971 8974 8975 8981 8982 8985 8987 8990 8991 8997
9005 9006 9009 9011 9015 9018 9019 9025 9026 9029 9031 9032 9038
9039 9042 9044 9046 9048 9051 9052 9058 9059 9065 9066 9071 9072
9075 9077 9078 9090 9093 9094 9101 9103 9104 9112 9113 9116 9118

```
                    9119    9126    9129    9130    9137    9139    9145    9146    9152    9160    9161    9164    9166
                    9167    9171    9174    9175    9181    9182    9185    9187    9188    9191    9197    9198    9203
                    9204    9209    9210    9215    9216    9221    9222    9223    9234    9235    9238    9240    9241
                    9246    9248    9249
T$TSTS= 000001       3454#   5590#   5658#   5700#   5795#   5859#   5905#   5985#   6099#   6210#   6485#   6726#   6890#
                    6928#   6967#   7060#   7330#   7368#   7406#   7449#   7488#   7573#   7617#   7661#   7707#   7751#
                    7795#   7878#   8942#
T$$AU = 010023       5571#   5572
T$$AUT= 010020       5513#   5535
T$$CLE= 010021       5546#   5549
T$$DU = 010022       5558#   5561
T$$HAR= 010101       9266#   9272
T$$HW = 010000       3524#   3543
T$$INI= 010017       5405#   5487
T$$MSG= 010025       4913#   4915    4919#   4925    4929#   4932    4936#   4954    4958#   4963    4967#   4993    4997#
                    5004    5008#   5033    5074#   5096    5156#   5183    5627#   5632
T$$PRO= 010016       5392#
T$$SEG= 010000       7093#   7199#   7223#   7254#   7278#   7309#
T$$SOF= 010102       9294#   9295
T$$SRV= 010003       4859#   4872    4886#   4899
T$$SUB= 010100       5986#   6027    6029#   6083    6900#   6910    6938#   6948    6984#   6994    7085#   7205    7208#
                    7260    7263#   7315    7340#   7350    7378#   7388    7416#   7426    7460#   7470    7879#   7894
                    7940    7961    7993    8055    8079    8094    8097    8120    8156    8180    8194    8220    8235
                    8248    8263    8276    8304    8309#   8325    8371    8387    8419    8496    8513    8540    8543
                    8579    8623    8648    8662    8683    8698    8704    8716    8725    8738    8762    8795    8943#
                    8956    8959    8971    8975    8985    8997    9009    9015    9019    9029    9032    9042    9046
                    9048#   9075    9078    9090    9094    9101    9104    9116    9119    9126    9130    9137    9152
                    9164    9167    9171    9175    9185    9188    9191    9238    9241    9248
T$$SW = 010001       3552#   3553
T$$TES= 010076       5590#   5616    5658#   5688    5700#   5781    5795#   5851    5859#   5896    5905#   5963    5985#
                    6040    6084    6099#   6120    6172    6182    6191    6195    6210#   6214    6226    6255    6485#
                    6489    6513    6529    6554    6578    6588    6698    6726#   6800    6827    6840    6863    6876
                    6878    6890#   6894    6908    6915    6928#   6932    6946    6953    6967#   6971    6978    6992
                    6999    7060#   7067    7077    7317    7330#   7334    7348    7355    7368#   7372    7386    7393
                    7406#   7410    7424    7430    7449#   7453    7468    7475    7488#   7493    7505    7513    7518
                    7527    7544    7552    7559    7573#   7578    7589    7594    7606    7617#   7622    7633    7638
                    7650    7661#   7666    7680    7685    7696    7707#   7712    7723    7728    7740    7751#   7756
                    7767    7772    7784    7795#   7800    7813    7818    7830    7878#   7885    7891    7901    7907
                    7913    7919    7925    7937    7947    7953    7959    7970    7977    7984    8001    8010    8018
                    8024    8032    8041    8047    8053    8064    8071    8086    8092    8104    8110    8117    8127
                    8133    8142    8150    8163    8172    8191    8201    8207    8217    8227    8233    8245    8255
                    8261    8273    8283    8289    8295    8301    8313    8319    8333    8339    8345    8351    8357
                    8368    8379    8385    8398    8404    8410    8426    8432    8438    8444    8450    8455    8464
                    8472    8479    8488    8494    8505    8520    8526    8532    8538    8550    8556    8562    8568
                    8576    8587    8593    8599    8608    8617    8631    8640    8659    8674    8680    8690    8696
                    8713    8723    8735    8745    8751    8759    8769    8775    8781    8787    8793    8796    8942#
                    8947    8953    8982    8991    9006    9026    9039    9052    9059    9066    9072    9113    9146
                    9161    9182    9198    9204    9210    9216    9222    9235    9249
T.EDF = 000001       3724#   4488    4527    4563    4602    4662    4845    6298    6335    8867
T.EMRD= 000002       3725#
T.ESF = 000000       3723#
T.ESFT= 000003       3726#
T1      020366 G     3507    5590#
T1CH = 120005        3692#   7154    7170    7903    7933    7949    8014    8028    8113    8213    8269    8285    8341
                    8364    8375    8434    8475    8522    8552    8572    8676    8686    8731    8755    8777    8816
                    8858    8978    9109    9206
```

```
T1CL   = 120004          3691#  7098   7115   7120   7275   7897   7943   8006   8187   8279   8335   8428   8460
                         8516   8546   8583   8655   8771   8813   9002   9157   9200
T1LH   = 120007          3695#  4790   6739   7160   7184   7190   7220   7244   7283   7289   7915   7955   8049
                         8088   8106   8129   8146   8159   8168   8203   8229   8257   8297   8353   8381   8446
                         8490   8534   8564   8595   8613   8627   8636   8692   8747   8789   8854   9035   9218
                         9231
T1LHGO= 120005           3693#
T1LL   = 120006          3694#  4785   6733   7105   7133   7139   7151   7228   7234   7299   7909   8020   8043
                         8082   8100   8123   8138   8197   8223   8241   8251   8291   8347   8440   8484   8528
                         8558   8589   8604   8709   8719   8741   8783   9022   9178   9212
T1.EMD  020654           5615   5635#
T1.EM1  020536 G         5615   5627#
T1.HIT  020524           5594   5618#
T1.HSB  020534           5600*  5613   5624#  5631
T1.HSW  020532           5591*  5600   5601*  5611   5618*  5621#  5631
T1.OK   020522           5614   5616#
T1.1    020703           5628   5636#
T1.2    020765           5629   5637#
T1.3    021020           5630   5638#
T1.4    021072           5631   5639#
T10     024156 G         3507   6485#
T11     025136 G         3507   6726#
T12     025760 G         3507   6890#
T12.LP  026002           6899#  6912
T12.1   026002           6900#
T13     026042 G         3507   6928#
T13.LP  026064           6937#  6950
T13.1   026064           6938#
T14     026124 G         3507   6967#
T14.LP  026166           6983#  6996
T14.1   026166           6984#
T15     026226 G         3507   7060#
T15.1   026262           7085#
T15.2   026734           7208#
T15.3   027112           7263#
T16     027272 G         3507   7330#
T16.LP  026272           7089#  7202
T16.L1  026744           7212#  7257
T16.L2  027122           7267#  7312
T16.1   027314           7340#
T17     027354 G         3507   7368#
T17.1   027376           7378#
T18     027436 G         3507   7406#
T18.LP  027314           7339#  7352
T18.1   027462           7416#
T19     027522 G         3507   7449#
T19.LP  027376           7377#  7390
T19.1   027550           7460#
T2      021132 G         3507   5658#
T2CH   = 120011          3698#
T2CL   = 120010          3697#
T2LL   = 120010          3696#  3697
T20     027610 G         3507   7488#
T20.LP  027462           7415#  7428
T21     030076 G         3507   7573#
T21.LP  027550           7459#  7472
```

```
T22      030226 G          3507    7617#
T23      030356 G          3507    7661#
T24      030512 G          3507    7707#
T25      030642 G          3507    7751#
T26      030772 G          3507    7795#
T27      031130 G          3507    7878#
T27.1    031130            7879#
T27.2    033402            8309#
T28      036362 G          3507    8942#
T28.1    036362            8943#
T28.2    037046            9048#
T3       021242 G          3507    5700#
T4       021434 G          3507    5795#
T5       021576 G          3507    5859#
T6       021720 G          3507    5905#
T7       022132 G          3507    5985#
T7.1     022132            5986#
T7.2     022352            6029#
T8       022642 G          3507    6099#
T9       023210 G          3507    6210#
T9.RST   023376            6217    6236    6259#
UAM    = 000200 G          3563#
VECTOR   040176            9269    9276#
WA     = 003346            4389#   4390
WB     = 003350            4390#   4391
WC     = 003352            4391#   4392
WD     = 003354            4392#   4393
WE     = 003356            4393#   4394
WF     = 003360            4394#
WRCRAM   023414            6223    6266#
WRILOC = 000002            3654#   4651    4661    6031    6126    8862
WRIPAG = 000004            3656#
WRITE    004322            4627#   4765    4779    4784    4789    4829    6283    6573    7097    7132    7153    7183    7227
                           7282    7932    7972    7979    8059    8212    8240    8268    8363    8393    8500    8669    8675
                           8708    8730    8754    8812    8815    9021    9034    9054    9061    9177    9230
WRITEI   004334            4648#   6108    6250    6506    6524    6693    6732    6738    6754    6810    6842    6848    6973
                           7150    7219    7274    7668    8056
WSR0     002246            3984#   4707*   5227    6047    6051
WSR10    002256            3992#   4711*   5229
WSR12    002260            3994#   4712*   5229
WSR14    002262            3996#   4713*   5229
WSR16    002264            3998#   4714*   5229
WSR2     002250            3986#   4708*   5227    6055    6060
WSR4     002252            3988#   4709*   5227    6065    6069
WSR6     002254            3990#   4710*   5227    6073    6076
W0     = 003322            4379#   4380
W1     = 003324            4380#   4381
W2     = 003326            4381#   4382
W3     = 003330            4382#   4383
W4     = 003332            4383#   4384
W5     = 003334            4384#   4385
W6     = 003336            4385#   4386
W7     = 003340            4386#   4387
W8     = 003342            4387#   4388
W9     = 003344            4388#   4389
XDATA    002314            4015#   4922    4961    5002    5200*   5201*
```

```
XORGB   011310          4921    4960    5001    5198#
X$ALWA= 000000          3454#
X$FALS= 000040          3454#
X$OFFS= 000400          3454#
X$TRUE= 000020          3454#
$E    = 000146          3721#   4488#   4527#   4563#   4602#   4662#   4845#   4864#   4891#   5615#   5687#   5780#   5840#
                        5894#   5952#   5960#   6026#   6039#   6082#   6119#   6171#   6181#   6190#   6298#   6335#   6565#
                        6599#   6799#   6826#   6839#   6862#   6875#   7110#   7126#   7144#   7165#   7177#   7195#   7239#
                        7250#   7294#   7305#   7532#   7557#   7604#   7648#   7694#   7738#   7782#   7828#   7926#   7960#
                        7995#   8025#   8054#   8093#   8111#   8134#   8151#   8164#   8175#   8182#   8208#   8234#   8262#
                        8302#   8358#   8386#   8451#   8468#   8495#   8539#   8569#   8600#   8618#   8632#   8643#   8650#
                        8664#   8697#   8706#   8724#   8752#   8794#   8867#   8958#   8974#   8987#   9011#   9018#   9031#
                        9044#   9077#   9093#   9103#   9118#   9129#   9139#   9166#   9174#   9187#   9223#   9240#
$LSTIN= 000001          3459#
$LSTTA= 000001          3460#
$MPCSR= 160000 G        4073#   4078    4079    4081    4082    4084    4085    4087    4088    4090    4091    4093    4094
                        4096    4097    4099    4100
$T    = 000034          3722#   5590#   5658#   5700#   5795#   5859#   5905#   5985#   6099#   6210#   6485#   6726#   6890#
                        6928#   6967#   7060#   7330#   7368#   7406#   7449#   7488#   7573#   7617#   7661#   7707#   7751#
                        7795#   7878#   8942#
.     = 040374          3451#   4193#   4368#   4373#   4410#   4417#   4499#   5066#   5641#   6040    6120    6172    6182
                        6191    6214    6226    6253    6489    6511    6513    6527    6529    6552    6554    6576    6578
                        6586    6588    6696    6800    6827    6840    6863    6876    6894    6908    6932    6946    6971
                        6978    6992    7067    7075    7077    7334    7348    7372    7386    7410    7424    7453    7468
                        7493    7505    7513    7518    7527    7544    7552    7578    7589    7594    7622    7633    7638
                        7666    7680    7685    7712    7723    7728    7756    7767    7772    7800    7813    7818    7885
                        7889    7891    7893    7894    7899    7901    7905    7907    7911    7913    7917    7919    7923
                        7925    7935    7937    7939    7940    7945    7947    7951    7953    7957    7959    7961    7968
                        7970    7975    7977    7982    7984    7992    7993    7999    8001    8008    8010    8016    8018
                        8022    8024    8030    8032    8039    8041    8045    8047    8051    8053    8055    8062    8064
                        8069    8071    8078    8079    8084    8086    8090    8092    8094    8096    8097    8102    8104
                        8108    8110    8115    8117    8119    8120    8125    8127    8131    8133    8140    8142    8148
                        8150    8155    8156    8161    8163    8170    8172    8179    8180    8189    8191    8193    8194
                        8199    8201    8205    8207    8215    8217    8219    8220    8225    8227    8231    8233    8235
                        8243    8245    8247    8248    8253    8255    8259    8261    8263    8271    8273    8275    8276
                        8281    8283    8287    8289    8293    8295    8299    8301    8313    8317    8319    8324    8325
                        8331    8333    8337    8339    8343    8345    8349    8351    8355    8357    8366    8368    8370
                        8371    8377    8379    8383    8385    8387    8396    8398    8402    8404    8408    8410    8418
                        8419    8424    8426    8430    8432    8436    8438    8442    8444    8448    8450    8453    8455
                        8462    8464    8472    8477    8479    8486    8488    8492    8494    8496    8503    8505    8512
                        8513    8518    8520    8524    8526    8530    8532    8536    8538    8540    8542    8543    8548
                        8550    8554    8556    8560    8562    8566    8568    8574    8576    8579    8585    8587    8591
                        8593    8597    8599    8606    8608    8615    8617    8622    8623    8629    8631    8638    8640
                        8647    8648    8657    8659    8662    8672    8674    8678    8680    8682    8683    8688    8690
                        8694    8696    8698    8703    8704    8711    8713    8715    8716    8721    8723    8725    8733
                        8735    8737    8738    8743    8745    8749    8751    8757    8759    8761    8762    8767    8769
                        8773    8775    8779    8781    8785    8787    8791    8793    8947    8951    8953    8955    8956
                        8959    8970    8971    8975    8980    8982    8984    8985    8989    8991    8996    8997    9004
                        9006    9008    9009    9014    9015    9019    9024    9026    9028    9029    9032    9037    9039
                        9041    9042    9052    9057    9059    9064    9066    9070    9072    9074    9075    9078    9089
                        9090    9094    9100    9101    9104    9111    9113    9115    9116    9119    9125    9126    9130
                        9136    9137    9144    9146    9151    9152    9159    9161    9163    9164    9167    9170    9171
                        9175    9180    9182    9184    9185    9188    9190    9191    9196    9198    9202    9204    9208
                        9210    9214    9216    9220    9222    9233    9235    9237    9238    9241    9245    9299#
```

```
BCOMPL    15#  3454#  5410  5413  5416  5419  5448
BERROR    19#  3454#
BGNAU     23#  3454#  5571
BGNAUT    31#  3454#  5513
BGNCLN    39#  3454#  5546
BGNDU     47#  3454#  5558
BGNHRD    55#  3454#  9266
BGNHW     66#  3454#  3524
BGNINI    77#  3454#  5405
BGNMOD    85#  3454#  3456
BGNMSG    98#  3454#  4913  4919  4929  4936  4958  4967  4997  5008  5074  5156  5627
BGNPRO   106#  3454#  5392
BGNPTA   114#  3454#
BGNRPT   144#  3454#
BGNSEG   152#  3454#  7093  7223  7278
BGNSET   161#  3454#
BGNSFT   182#  3454#  9294
BGNSRV   193#  3454#  4859  4886
BGNSUB   201#  3454#  5986  6029  6900  6938  6984  7085  7208  7263  7340  7378  7416  7460  7879
        8309   8943   9048
BGNSW    225#  3454#  3552
BGNTST   236#  3454#  5590  5658  5700  5795  5859  5905  5985  6099  6210  6485  6726  6890  6928
        6967   7060   7330  7368  7406  7449  7488  7573  7617  7661  7707  7751  7795  7878  8942
BNCOMP   266#  3454#
BNERRO   270#  3454#
BREAK    274#  3454#  6230  6243  6547
BRESET   278#  3454#  5560  5923
CKLOOP   282#  3454#
CLOCK    286#  3454#
CLOSE    292#  3454#
CLRVEC   296#  3454#  5431  5530  5547  5548  5610
COMMEN   301#  3454#
DELAY    322#  3454#
DESCRI   317#  3454#  4417
DEVTYP   341#  3454#  4410
DISPAT   346#  3454#  3507
DISPLA   360#  3454#
DOCLN    376#  3454#
DODU     380#  3454#  5533
DORPT    385#  3454#
ENDAU    389#  3454#  5572
ENDAUT   401#  3454#  5535
ENDCLN   413#  3454#  5549
ENDCOM   425#  3454#
ENDDU    441#  3454#  5561
ENDHRD   453#  3454#  9272
ENDHW    465#  3454#  3543
ENDINI   475#  3454#  5487
ENDMOD   487#  3454#  9307
ENDMSG   500#  3454#  4915  4925  4932  4954  4963  4993  5004  5033  5096  5183  5632
ENDPRO   512#  3454#  5396
ENDPTA   520#  3454#
ENDRPT   529#  3454#
ENDSEG   541#  3454#  7199  7254  7309
ENDSET   555#  3454#
ENDSFT   568#  3454#  9295
```

H2


```
ENDSRV   580#  3454#  4872  4899
ENDSUB   596#  3454#  6027  6083  6910  6948  6994  7205  7260  7315  7350  7388  7426  7470  8304
        8795   9046   9248
ENDSW    614#  3454#  3553
ENDTST   624#  3454#  5616  5688  5781  5851  5896  5963  6084  6195  6255  6698  6878  6915  6953
        6999   7317   7355  7393  7430  7475  7559  7606  7650  7696  7740  7784  7830  8796  9249
EQUALS   642#  3454#  3563
ERRDF    714#  3454#  4864  4891  5615  5687  5780  5840  5894  5952  5960  6026  6039  6082  6119
        6171   6181   6190  6565  6599  6799  6826  6839  6862  6875  7110  7126  7144  7165  7177
        7195   7239   7250  7294  7305  7532  7557  7604  7648  7694  7738  7782  7828  7926  7960
        7995   8025   8054  8093  8111  8134  8151  8164  8175  8182  8208  8234  8262  8302  8358
        8386   8451   8468  8495  8539  8569  8600  8618  8632  8643  8650  8664  8697  8706  8724
        8752   8794   8958  8974  8987  9011  9018  9031  9044  9077  9093  9103  9118  9129  9139
        9166   9174   9187  9223  9240
ERRHRD   718#  3454#
ERROR    722#  3454#  5664  5801  5867  5882  5916  5989  6103  6112  6213  6225  6239  6254  6488
        6512   6528   6553  6577  6587  6697  6729  6736  6742  6759  6773  6808  6814  6820  6834
        6846   6852   6869  6893  6907  6931  6945  6970  6977  6991  7066  7076  7333  7347  7371
        7385   7409   7423  7452  7467  7492  7504  7512  7517  7526  7543  7551  7577  7588  7593
        7621   7632   7637  7665  7679  7684  7711  7722  7727  7755  7766  7771  7799  7812  7817
        7884   7890   7900  7906  7912  7918  7924  7936  7946  7952  7958  7969  7976  7983  8000
        8009   8017   8023  8031  8040  8046  8052  8063  8070  8085  8091  8103  8109  8116  8126
        8132   8141   8149  8162  8171  8190  8200  8206  8216  8226  8232  8244  8254  8260  8272
        8282   8288   8294  8300  8312  8318  8332  8338  8344  8350  8356  8367  8378  8384  8397
        8403   8409   8425  8431  8437  8443  8449  8454  8463  8471  8478  8487  8493  8504  8519
        8525   8531   8537  8549  8555  8561  8567  8575  8586  8592  8598  8607  8616  8630  8639
        8658   8673   8679  8689  8695  8712  8722  8734  8744  8750  8758  8768  8774  8780  8786
        8792   8830   8888  8946  8952  8981  8990  9005  9025  9038  9051  9058  9065  9071  9112
        9145   9160   9181  9197  9203  9209  9215  9221  9234  9246
ERRSF    726#  3454#
ERRSOF   730#  3454#
ERRTBL   734#  3454#  3979
ESCAPE   744#  3454#  6040  6120  6172  6182  6191  6214  6226  6489  6513  6529  6554  6578  6588
        6800   6827   6840  6863  6876  6894  6908  6932  6946  6971  6978  6992  7067  7077  7334
        7348   7372   7386  7410  7424  7453  7468  7493  7505  7513  7518  7527  7544  7552  7578
        7589   7594   7622  7633  7638  7666  7680  7685  7712  7723  7728  7756  7767  7772  7800
        7813   7818   7885  7891  7894  7901  7907  7913  7919  7925  7937  7940  7947  7953  7959
        7961   7970   7977  7984  7993  8001  8010  8018  8024  8032  8041  8047  8053  8055  8064
        8071   8079   8086  8092  8094  8097  8104  8110  8117  8120  8127  8133  8142  8150  8156
        8163   8172   8180  8191  8194  8201  8207  8217  8220  8227  8233  8235  8245  8248  8255
        8261   8263   8273  8276  8283  8289  8295  8301  8313  8319  8325  8333  8339  8345  8351
        8357   8368   8371  8379  8385  8387  8398  8404  8410  8419  8426  8432  8438  8444  8450
        8455   8464   8472  8479  8488  8494  8496  8505  8513  8520  8526  8532  8538  8540  8543
        8550   8556   8562  8568  8576  8579  8587  8593  8599  8608  8617  8623  8631  8640  8648
        8659   8662   8674  8680  8683  8690  8696  8698  8704  8713  8716  8723  8725  8735  8738
        8745   8751   8759  8762  8769  8775  8781  8787  8793  8947  8953  8956  8959  8971  8975
        8982   8985   8991  8997  9006  9009  9015  9019  9026  9029  9032  9039  9042  9052  9059
        9066   9072   9075  9078  9090  9094  9101  9104  9113  9116  9119  9126  9130  9137  9146
        9152   9161   9164  9167  9171  9175  9182  9185  9188  9191  9198  9204  9210  9216  9222
        9235   9238   9241
EXIT     771#  3454#
FEQUAL   810#  3454#
GEDF    3737#  4864   4891  5615  5687  5780  5840  5894  5952  5960  6026  6039  6082  6119  6171
        6181   6190   6565  6599  6799  6826  6839  6862  6875  7110  7126  7144  7165  7177  7195
        7239   7250   7294  7305  7532  7557  7604  7648  7694  7738  7782  7828  7926  7960  7995
        8025   8054   8093  8111  8134  8151  8164  8175  8182  8208  8234  8262  8302  8358  8386
```

```
        8451    8468    8495    8539    8569    8600    8618    8632    8643    8650    8664    8697    8706    8724    8752
        8794    8958    8974    8987    9011    9018    9031    9044    9077    9093    9103    9118    9129    9139    9166
        9174    9187    9223    9240
GEHRD   3745#
GESF    3729#
GESFT   3753#
GETBYT   824#   3454#
GETPRI   834#   3454#
GETWOR   829#   3454#
GMANIA   839#   3454#
GMANID   848#   3454#
GMANIL   859#   3454#
GPHARD   868#   3454#   5447
GPRMA    874#   3454#   9268    9269
GPRMD    903#   3454#   9270
GPRML    934#   3454#
GTDF    3770#   4488    4527    4563    4602    4662    4845    6298    6335    8867
GTHRD   3778#
GTSF    3762#
GTSFT   3786#
HEADER   954#   3454#   3491
INLOOP   962#   3454#
IOSETU   966#   3454#
IOSTAR   974#   3454#
KT11     982#   3454#
LASTAD  1147#   3454#   9308
MANUAL  1162#   3454#
MEMORY  1166#   3454#
MSG     5576#   5590    5645#   5658    5692#   5700    5785#   5795    5855#   5859    5900#   5905    5967#   5985    6088#
        6099    6199#   6210    6417#   6485    6704#   6726    6882#   6890    6919#   6928    6957#   6967    7003#   7060
        7321#   7330    7359#   7368    7397#   7406    7434#   7449    7479#   7488    7563#   7573    7610#   7617    7654#
        7661    7700#   7707    7744#   7751    7788#   7795    7834#   7878    8900#   8942
M$BYTE  2000#   3454#   3491#
M$CHEC  2118#   3454#
M$CNTO  2182#   3454#   9268#   9269#   9270#
M$COUN  2066#   3454#   4920#   4922#   4941#   4950#   4959#   4961#   4971#   4972#   4973#   4975#   4976#   4978#   4979#
        4982#   4983#   4984#   4986#   4987#   4989#   4990#   5000#   5002#   5018#   5021#   5024#   5027#   5030#   5047#
        5050#   5077#   5080#   5083#   5087#   5090#   5093#   5119#   5130#   5133#   5168#   5171#   5174#   5175#   5178#
        5179#   5211#   5212#   5213#   5214#   5215#   5216#   5217#   5218#   5226#   5227#   5228#   5229#   5236#   5628#
        5629#   5630#   5631#   7927#
M$DATA  1867#   3454#   3491#   4410#   4417#
M$DECR  2029#   3454#   3543#   3553#   4872#   4899#   4915#   4925#   4932#   4954#   4963#   4993#   5004#   5033#   5096#
        5183#   5396#   5487#   5535#   5549#   5561#   5572#   5616#   5632#   5688#   5781#   5851#   5896#   5963#   6027#
        6083#   6084#   6195#   6255#   6698#   6878#   6910#   6915#   6948#   6953#   6994#   6999#   7199#   7205#   7254#
        7260#   7309#   7315#   7317#   7350#   7355#   7388#   7393#   7426#   7430#   7470#   7475#   7559#   7606#   7650#
        7696#   7740#   7784#   7830#   8304#   8795#   8796#   9046#   9248#   9249#   9272#   9295#   9307#
M$DEFA  2170#   3454#   9268#   9269#   9270#
M$ENDE  2074#   3454#   3543#   3553#   4872#   4899#   4915#   4925#   4932#   4954#   4963#   4993#   5004#   5033#   5096#
        5183#   5487#   5535#   5549#   5561#   5572#   5616#   5632#   5688#   5781#   5851#   5896#   5963#   6027#   6083#
        6084#   6195#   6255#   6698#   6878#   6910#   6915#   6948#   6953#   6994#   6999#   7199#   7205#   7254#   7260#
        7309#   7315#   7317#   7350#   7355#   7388#   7393#   7426#   7430#   7470#   7475#   7559#   7606#   7650#   7696#
        7740#   7784#   7830#   8304#   8795#   8796#   9046#   9248#   9249#   9272#   9295#   9307#
M$ERRI  1649#   3454#   4864#   4891#   5615#   5687#   5780#   5840#   5894#   5952#   5960#   6026#   6039#   6082#   6119#
        6171#   6181#   6190#   6565#   6599#   6799#   6826#   6839#   6862#   6875#   7110#   7126#   7144#   7165#   7177#
        7195#   7239#   7250#   7294#   7305#   7532#   7557#   7604#   7648#   7694#   7738#   7782#   7828#   7926#   7960#
        7995#   8025#   8054#   8093#   8111#   8134#   8151#   8164#   8175#   8182#   8208#   8234#   8262#   8302#   8358#
```

```
                8386#  8451#  8468#  8495#  8539#  8569#  8600#  8618#  8632#  8643#  8650#  8664#  8697#  8706#  8724#
                8752#  8794#  8958#  8974#  8987#  9011#  9018#  9031#  9044#  9077#  9093#  9103#  9118#  9129#  9139#
                9166#  9174#  9187#  9223#  9240#
M$ESCA          2006#  3454#  6040#  6120#  6172#  6182#  6191#  6214#  6226#  6489#  6513#  6529#  6554#  6578#  6588#
                6800#  6827#  6840#  6863#  6876#  6894#  6908#  6932#  6946#  6971#  6978#  6992#  7067#  7077#  7334#
                7348#  7372#  7386#  7410#  7424#  7453#  7468#  7493#  7505#  7513#  7518#  7527#  7544#  7552#  7578#
                7589#  7594#  7622#  7633#  7638#  7666#  7680#  7685#  7712#  7723#  7728#  7756#  7767#  7772#  7800#
                7813#  7818#  7885#  7891#  7894#  7901#  7907#  7913#  7919#  7925#  7937#  7940#  7947#  7953#  7959#
                7961#  7970#  7977#  7984#  7993#  8001#  8010#  8018#  8024#  8032#  8041#  8047#  8053#  8055#  8064#
                8071#  8079#  8086#  8092#  8094#  8097#  8104#  8110#  8117#  8120#  8127#  8133#  8142#  8150#  8156#
                8163#  8172#  8180#  8191#  8194#  8201#  8207#  8217#  8220#  8227#  8233#  8235#  8245#  8248#  8255#
                8261#  8263#  8273#  8276#  8283#  8289#  8295#  8301#  8313#  8319#  8325#  8333#  8339#  8345#  8351#
                8357#  8368#  8371#  8379#  8385#  8387#  8398#  8404#  8410#  8419#  8426#  8432#  8438#  8444#  8450#
                8455#  8464#  8472#  8479#  8488#  8494#  8496#  8505#  8513#  8520#  8526#  8532#  8538#  8540#  8543#
                8550#  8556#  8562#  8568#  8576#  8579#  8587#  8593#  8599#  8608#  8617#  8623#  8631#  8640#  8648#
                8659#  8662#  8674#  8680#  8683#  8690#  8696#  8698#  8704#  8713#  8716#  8723#  8725#  8735#  8738#
                8745#  8751#  8759#  8762#  8769#  8775#  8781#  8787#  8793#  8947#  8953#  8956#  8959#  8971#  8975#
                8982#  8985#  8991#  8997#  9006#  9009#  9015#  9019#  9026#  9029#  9032#  9039#  9042#  9052#  9059#
                9066#  9072#  9075#  9078#  9090#  9094#  9101#  9104#  9113#  9116#  9119#  9126#  9130#  9137#  9146#
                9152#  9161#  9164#  9167#  9171#  9175#  9182#  9185#  9188#  9191#  9198#  9204#  9210#  9216#  9222#
                9235#  9238#  9241#
M$ESCS          2010#  3454#  6040#  6120#  6172#  6182#  6191#  6214#  6226#  6489#  6513#  6529#  6554#  6578#  6588#
                6800#  6827#  6840#  6863#  6876#  6894#  6908#  6932#  6946#  6971#  6978#  6992#  7067#  7077#  7334#
                7348#  7372#  7386#  7410#  7424#  7453#  7468#  7493#  7505#  7513#  7518#  7527#  7544#  7552#  7578#
                7589#  7594#  7622#  7633#  7638#  7666#  7680#  7685#  7712#  7723#  7728#  7756#  7767#  7772#  7800#
                7813#  7818#  7885#  7891#  7894#  7901#  7907#  7913#  7919#  7925#  7937#  7940#  7947#  7953#  7959#
                7961#  7970#  7977#  7984#  7993#  8001#  8010#  8018#  8024#  8032#  8041#  8047#  8053#  8055#  8064#
                8071#  8079#  8086#  8092#  8094#  8097#  8104#  8110#  8117#  8120#  8127#  8133#  8142#  8150#  8156#
                8163#  8172#  8180#  8191#  8194#  8201#  8207#  8217#  8220#  8227#  8233#  8235#  8245#  8248#  8255#
                8261#  8263#  8273#  8276#  8283#  8289#  8295#  8301#  8313#  8319#  8325#  8333#  8339#  8345#  8351#
                8357#  8368#  8371#  8379#  8385#  8387#  8398#  8404#  8410#  8419#  8426#  8432#  8438#  8444#  8450#
                8455#  8464#  8472#  8479#  8488#  8494#  8496#  8505#  8513#  8520#  8526#  8532#  8538#  8540#  8543#
                8550#  8556#  8562#  8568#  8576#  8579#  8587#  8593#  8599#  8608#  8617#  8623#  8631#  8640#  8648#
                8659#  8662#  8674#  8680#  8683#  8690#  8696#  8698#  8704#  8713#  8716#  8723#  8725#  8735#  8738#
                8745#  8751#  8759#  8762#  8769#  8775#  8781#  8787#  8793#  8947#  8953#  8956#  8959#  8971#  8975#
                8982#  8985#  8991#  8997#  9006#  9009#  9015#  9019#  9026#  9029#  9032#  9039#  9042#  9052#  9059#
                9066#  9072#  9075#  9078#  9090#  9094#  9101#  9104#  9113#  9116#  9119#  9126#  9130#  9137#  9146#
                9152#  9161#  9164#  9167#  9171#  9175#  9182#  9185#  9188#  9191#  9198#  9204#  9210#  9216#  9222#
                9235#  9238#  9241#
M$EXCP          2101#  3454#  9268#  9269#  9270#
M$EXIT          2014#  3454#
M$EXSE          2022#  3454#
M$EXTJ          2018#  3454#
M$GEN           2038#  3454#  3456#  3491#  3507#  3524#  3543#  3552#  3553#  3979#  4410#  4417#  4859#  4872#  4886#
                4899#  4913#  4915#  4919#  4925#  4929#  4932#  4936#  4954#  4958#  4963#  4967#  4993#  4997#  5004#
                5008#  5033#  5074#  5096#  5156#  5183#  5392#  5405#  5487#  5513#  5535#  5546#  5549#  5558#  5561#
                5571#  5572#  5590#  5616#  5627#  5632#  5658#  5688#  5700#  5781#  5795#  5851#  5859#  5896#  5905#
                5963#  5985#  5986#  6027#  6029#  6083#  6084#  6099#  6195#  6210#  6255#  6485#  6698#  6726#  6878#
                6890#  6900#  6910#  6915#  6928#  6938#  6948#  6953#  6967#  6984#  6994#  6999#  7060#  7085#  7199#
                7205#  7208#  7254#  7260#  7263#  7309#  7315#  7317#  7330#  7340#  7350#  7355#  7368#  7378#  7388#
                7393#  7406#  7416#  7426#  7430#  7449#  7460#  7470#  7475#  7488#  7559#  7573#  7606#  7617#  7650#
                7661#  7696#  7707#  7740#  7751#  7784#  7795#  7830#  7878#  7879#  8304#  8309#  8795#  8796#  8942#
                8943#  9046#  9048#  9248#  9249#  9266#  9272#  9294#  9295#  9308#
M$GENB          1938#  3454#
M$GETS          2035#  3454#  3543#  3553#  4872#  4899#  4915#  4925#  4932#  4954#  4963#  4993#  5004#  5033#  5096#
                5183#  5396#  5487#  5535#  5549#  5561#  5572#  5616#  5632#  5688#  5781#  5851#  5896#  5963#  6027#
```

	6083#	6084#	6195#	6255#	6698#	6878#	6910#	6915#	6948#	6953#	6994#	6999#	7199#	7205#	7254#
	7260#	7309#	7315#	7317#	7350#	7355#	7388#	7393#	7426#	7430#	7470#	7475#	7559#	7606#	7650#
	7696#	7740#	7784#	7830#	8304#	8795#	8796#	9046#	9248#	9249#	9272#	9295#	9307#		
M$GETT	1877#	3454#	6040#	6120#	6172#	6182#	6191#	6214#	6226#	6489#	6513#	6529#	6554#	6578#	6588#
	6800#	6827#	6840#	6863#	6876#	6894#	6908#	6932#	6946#	6971#	6978#	6992#	7067#	7077#	7334#
	7348#	7372#	7386#	7410#	7424#	7453#	7468#	7493#	7505#	7513#	7518#	7527#	7544#	7552#	7578#
	7589#	7594#	7622#	7633#	7638#	7666#	7680#	7685#	7712#	7723#	7728#	7756#	7767#	7772#	7800#
	7813#	7818#	7885#	7891#	7894#	7901#	7907#	7913#	7919#	7925#	7937#	7940#	7947#	7953#	7959#
	7961#	7970#	7977#	7984#	7993#	8001#	8010#	8018#	8024#	8032#	8041#	8047#	8053#	8055#	8064#
	8071#	8079#	8086#	8092#	8094#	8097#	8104#	8110#	8117#	8120#	8127#	8133#	8142#	8150#	8156#
	8163#	8172#	8180#	8191#	8194#	8201#	8207#	8217#	8220#	8227#	8233#	8235#	8245#	8248#	8255#
	8261#	8263#	8273#	8276#	8283#	8289#	8295#	8301#	8313#	8319#	8325#	8333#	8339#	8345#	8351#
	8357#	8368#	8371#	8379#	8385#	8387#	8398#	8404#	8410#	8419#	8426#	8432#	8438#	8444#	8450#
	8455#	8464#	8472#	8479#	8488#	8494#	8496#	8505#	8513#	8520#	8526#	8532#	8538#	8540#	8543#
	8550#	8556#	8562#	8568#	8576#	8579#	8587#	8593#	8599#	8608#	8617#	8623#	8631#	8640#	8648#
	8659#	8662#	8674#	8680#	8683#	8690#	8696#	8698#	8704#	8713#	8716#	8723#	8725#	8735#	8738#
	8745#	8751#	8759#	8762#	8769#	8775#	8781#	8787#	8793#	8947#	8953#	8956#	8959#	8971#	8975#
	8982#	8985#	8991#	8997#	9006#	9009#	9015#	9019#	9026#	9029#	9032#	9039#	9042#	9052#	9059#
	9066#	9072#	9075#	9078#	9090#	9094#	9101#	9104#	9113#	9116#	9119#	9126#	9130#	9137#	9146#
	9152#	9161#	9164#	9167#	9171#	9175#	9182#	9185#	9188#	9191#	9198#	9204#	9210#	9216#	9222#
	9235#	9238#	9241#												
M$GNGB	1902#	3454#	3456#	3491#	3507#	3524#	3552#	3979#	4410#	4417#	4859#	4886#	4913#	4919#	4929#
	4936#	4958#	4967#	4997#	5008#	5074#	5156#	5392#	5405#	5513#	5546#	5558#	5571#	5627#	9266#
	9294#	9308#													
M$GNIN	2049#	3454#	3491#	3507#	3524#	3552#	4410#	4417#	4488	4527	4563	4602	4662	4845	4864#
	4872#	4891#	4899#	4915#	4920#	4922#	4925#	4932#	4941#	4950#	4954#	4959#	4961#	4963#	4971#
	4972#	4973#	4975#	4976#	4978#	4979#	4982#	4983#	4984#	4986#	4987#	4989#	4990#	4993#	5000#
	5002#	5004#	5018#	5021#	5024#	5027#	5030#	5033#	5047#	5050#	5077#	5080#	5083#	5087#	5090#
	5093#	5096#	5119#	5130#	5133#	5168#	5171#	5174#	5175#	5178#	5179#	5183#	5211#	5212#	5213#
	5214#	5215#	5216#	5217#	5218#	5226#	5227#	5228#	5229#	5236#	5409#	5410#	5412#	5413#	5415#
	5416#	5418#	5419#	5429#	5431#	5447#	5448#	5480#	5482#	5487#	5514#	5530#	5533#	5535#	5547#
	5548#	5549#	5560#	5561#	5572#	5594#	5610#	5615#	5616#	5628#	5629#	5630#	5631#	5632#	5664#
	5687#	5688#	5780#	5781#	5801#	5840#	5851#	5867#	5882#	5894#	5896#	5916#	5923#	5952#	5960#
	5963#	5986#	5989#	6026#	6027#	6029#	6039#	6040#	6082#	6083#	6084#	6103#	6112#	6119#	6120#
	6171#	6172#	6181#	6182#	6190#	6191#	6195#	6213#	6214#	6225#	6226#	6230#	6239#	6243#	6254#
	6255#	6298	6335	6488#	6489#	6512#	6513#	6528#	6529#	6547#	6553#	6554#	6565#	6577#	6578#
	6587#	6588#	6599#	6697#	6698#	6729#	6736#	6742#	6759#	6773#	6799#	6800#	6808#	6814#	6820#
	6826#	6827#	6834#	6839#	6840#	6846#	6852#	6862#	6863#	6869#	6875#	6876#	6878#	6893#	6894#
	6900#	6907#	6908#	6910#	6915#	6931#	6932#	6938#	6945#	6946#	6948#	6953#	6970#	6971#	6977#
	6978#	6984#	6991#	6992#	6994#	6999#	7066#	7067#	7076#	7077#	7085#	7093#	7110#	7126#	7144#
	7165#	7177#	7195#	7199#	7205#	7208#	7223#	7239#	7250#	7254#	7260#	7263#	7278#	7294#	7305#
	7309#	7315#	7317#	7333#	7334#	7340#	7347#	7348#	7350#	7355#	7371#	7372#	7378#	7385#	7386#
	7388#	7393#	7409#	7410#	7416#	7423#	7424#	7426#	7430#	7452#	7453#	7460#	7467#	7468#	7470#
	7475#	7492#	7493#	7504#	7505#	7512#	7513#	7517#	7518#	7526#	7527#	7532#	7543#	7544#	7551#
	7552#	7557#	7559#	7577#	7578#	7588#	7589#	7593#	7594#	7604#	7606#	7621#	7622#	7632#	7633#
	7637#	7638#	7648#	7650#	7665#	7666#	7679#	7680#	7684#	7685#	7694#	7696#	7711#	7712#	7722#
	7723#	7727#	7728#	7738#	7740#	7755#	7756#	7766#	7767#	7771#	7772#	7782#	7784#	7799#	7800#
	7812#	7813#	7817#	7818#	7828#	7830#	7879#	7884#	7885#	7890#	7891#	7894#	7900#	7901#	7906#
	7907#	7912#	7913#	7918#	7919#	7924#	7925#	7926#	7927#	7936#	7937#	7940#	7946#	7947#	7952#
	7953#	7958#	7959#	7960#	7961#	7969#	7970#	7976#	7977#	7983#	7984#	7993#	7995#	8000#	8001#
	8009#	8010#	8017#	8018#	8023#	8024#	8025#	8031#	8032#	8040#	8041#	8046#	8047#	8052#	8053#
	8054#	8055#	8063#	8064#	8070#	8071#	8079#	8085#	8086#	8091#	8092#	8093#	8094#	8097#	8103#
	8104#	8109#	8110#	8111#	8116#	8117#	8120#	8126#	8127#	8132#	8133#	8134#	8141#	8142#	8149#
	8150#	8151#	8156#	8162#	8163#	8164#	8171#	8172#	8175#	8180#	8182#	8190#	8191#	8194#	8200#
	8201#	8206#	8207#	8208#	8216#	8217#	8220#	8226#	8227#	8232#	8233#	8234#	8235#	8244#	8245#
	8248#	8254#	8255#	8260#	8261#	8262#	8263#	8272#	8273#	8276#	8282#	8283#	8288#	8289#	8294#

```
                8295#  8300#  8301#  8302#  8304#  8309#  8312#  8313#  8318#  8319#  8325#  8332#  8333#  8338#  8339#
                8344#  8345#  8350#  8351#  8356#  8357#  8358#  8367#  8368#  8371#  8378#  8379#  8384#  8385#  8386#
                8387#  8397#  8398#  8403#  8404#  8409#  8410#  8419#  8425#  8426#  8431#  8432#  8437#  8438#  8443#
                8444#  8449#  8450#  8451#  8454#  8455#  8463#  8464#  8468#  8471#  8472#  8478#  8479#  8487#  8488#
                8493#  8494#  8495#  8496#  8504#  8505#  8513#  8519#  8520#  8525#  8526#  8531#  8532#  8537#  8538#
                8539#  8540#  8543#  8549#  8550#  8555#  8556#  8561#  8562#  8567#  8568#  8569#  8575#  8576#  8579#
                8586#  8587#  8592#  8593#  8598#  8599#  8600#  8607#  8608#  8616#  8617#  8618#  8623#  8630#  8631#
                8632#  8639#  8640#  8643#  8648#  8650#  8658#  8659#  8662#  8664#  8673#  8674#  8679#  8680#  8683#
                8689#  8690#  8695#  8696#  8697#  8698#  8704#  8706#  8712#  8713#  8716#  8722#  8723#  8724#  8725#
                8734#  8735#  8738#  8744#  8745#  8750#  8751#  8752#  8758#  8759#  8762#  8768#  8769#  8774#  8775#
                8780#  8781#  8786#  8787#  8792#  8793#  8794#  8795#  8796#  8830#  8867   8888#  8943#  8946#  8947#
                8952#  8953#  8956#  8958#  8959#  8971#  8974#  8975#  8981#  8982#  8985#  8987#  8990#  8991#  8997#
                9005#  9006#  9009#  9011#  9015#  9018#  9019#  9025#  9026#  9029#  9031#  9032#  9038#  9039#  9042#
                9044#  9046#  9048#  9051#  9052#  9058#  9059#  9065#  9066#  9071#  9072#  9075#  9077#  9078#  9090#
                9093#  9094#  9101#  9103#  9104#  9112#  9113#  9116#  9118#  9119#  9126#  9129#  9130#  9137#  9139#
                9145#  9146#  9152#  9160#  9161#  9164#  9166#  9167#  9171#  9174#  9175#  9181#  9182#  9185#  9187#
                9188#  9191#  9197#  9198#  9203#  9204#  9209#  9210#  9215#  9216#  9221#  9222#  9223#  9234#  9235#
                9238#  9240#  9241#  9246#  9248#  9249#  9266#  9268#  9269#  9270#  9272#  9294#  9295#  9308#
M$GNLS          1913#  3454#  7199#  7254#  7309#
M$GNSU          1898#  3454#  5986#  6029#  6900#  6938#  6984#  7085#  7208#  7263#  7340#  7378#  7416#  7460#  7879#
                8309#  8943#  9048#
M$GNTA          1890#  3454#  3543#  3553#  4872#  4899#  4915#  4925#  4932#  4954#  4963#  4993#  5004#  5033#  5096#
                5183#  5487#  5535#  5549#  5561#  5572#  5616#  5632#  5688#  5781#  5851#  5896#  5963#  6027#  6083#
                6084#  6195#  6255#  6698#  6878#  6910#  6915#  6948#  6953#  6994#  6999#  7205#  7260#  7315#  7317#
                7350#  7355#  7388#  7393#  7426#  7430#  7470#  7475#  7559#  7606#  7650#  7696#  7740#  7784#  7830#
                8304#  8795#  8796#  9046#  9248#  9249#  9272#  9295#
M$GNTE          1894#  3454#  5590#  5658#  5700#  5795#  5859#  5905#  5985#  6099#  6210#  6485#  6726#  6890#  6928#
                6967#  7060#  7330#  7368#  7406#  7449#  7488#  7573#  7617#  7661#  7707#  7751#  7795#  7878#  8942#
M$HAPT          1739#  3454#  3491#
M$HNAP          1824#  3454#  3491#
M$INCR          2026#  3454#  3456#  3524#  3552#  4859#  4864#  4886#  4891#  4913#  4915#  4919#  4920#  4922#  4925#
                4929#  4932#  4936#  4941#  4950#  4954#  4958#  4959#  4961#  4963#  4967#  4971#  4972#  4973#  4975#
                4976#  4978#  4979#  4982#  4983#  4984#  4986#  4987#  4989#  4990#  4993#  4997#  5000#  5002#  5004#
                5008#  5018#  5021#  5024#  5027#  5030#  5033#  5047#  5050#  5074#  5077#  5080#  5083#  5087#  5090#
                5093#  5096#  5119#  5130#  5133#  5156#  5168#  5171#  5174#  5175#  5178#  5179#  5183#  5211#  5212#
                5213#  5214#  5215#  5216#  5217#  5218#  5226#  5227#  5228#  5229#  5236#  5392#  5405#  5409#  5412#
                5415#  5418#  5429#  5431#  5447#  5480#  5482#  5487#  5513#  5514#  5530#  5533#  5535#  5546#  5547#
                5548#  5549#  5558#  5560#  5561#  5571#  5572#  5590#  5594#  5610#  5615#  5616#  5627#  5628#  5629#
                5630#  5631#  5632#  5658#  5664#  5687#  5688#  5700#  5780#  5781#  5795#  5801#  5840#  5851#  5859#
                5867#  5882#  5894#  5896#  5905#  5916#  5923#  5952#  5960#  5963#  5985#  5986#  5989#  6026#  6027#
                6029#  6039#  6040#  6082#  6083#  6084#  6099#  6103#  6112#  6119#  6120#  6171#  6172#  6181#  6182#
                6190#  6191#  6195#  6210#  6213#  6214#  6225#  6226#  6230#  6239#  6243#  6254#  6255#  6485#  6488#
                6489#  6512#  6513#  6528#  6529#  6547#  6553#  6554#  6565#  6577#  6578#  6587#  6588#  6599#  6697#
                6698#  6726#  6729#  6736#  6742#  6759#  6773#  6799#  6800#  6808#  6814#  6820#  6826#  6827#  6834#
                6839#  6840#  6846#  6852#  6862#  6863#  6869#  6875#  6876#  6878#  6890#  6893#  6894#  6900#  6907#
                6908#  6910#  6915#  6928#  6931#  6932#  6938#  6945#  6946#  6948#  6953#  6967#  6970#  6971#  6977#
                6978#  6984#  6991#  6992#  6994#  6999#  7060#  7066#  7067#  7076#  7077#  7085#  7093#  7110#  7126#
                7144#  7165#  7177#  7195#  7199#  7205#  7208#  7223#  7239#  7250#  7254#  7260#  7263#  7278#  7294#
                7305#  7309#  7315#  7317#  7330#  7333#  7334#  7340#  7347#  7348#  7350#  7355#  7368#  7371#  7372#
                7378#  7385#  7386#  7388#  7393#  7406#  7409#  7410#  7416#  7423#  7424#  7426#  7430#  7449#  7452#
                7453#  7460#  7467#  7468#  7470#  7475#  7488#  7492#  7493#  7504#  7505#  7512#  7513#  7517#  7518#
                7526#  7527#  7532#  7543#  7544#  7551#  7552#  7557#  7559#  7573#  7577#  7578#  7588#  7589#  7593#
                7594#  7604#  7606#  7617#  7621#  7622#  7632#  7633#  7637#  7638#  7648#  7650#  7661#  7665#  7666#
                7679#  7680#  7684#  7685#  7694#  7696#  7707#  7711#  7712#  7722#  7723#  7727#  7728#  7738#  7740#
                7751#  7755#  7756#  7766#  7767#  7771#  7772#  7782#  7784#  7795#  7799#  7800#  7812#  7813#  7817#
                7818#  7828#  7830#  7878#  7879#  7884#  7885#  7890#  7891#  7894#  7900#  7901#  7906#  7907#  7912#
```

```
                7913#   7918#   7919#   7924#   7925#   7926#   7927#   7936#   7937#   7940#   7946#   7947#   7952#   7953#   7958#
                7959#   7960#   7961#   7969#   7970#   7976#   7977#   7983#   7984#   7993#   7995#   8000#   8001#   8009#   8010#
                8017#   8018#   8023#   8024#   8025#   8031#   8032#   8040#   8041#   8046#   8047#   8052#   8053#   8054#   8055#
                8063#   8064#   8070#   8071#   8079#   8085#   8086#   8091#   8092#   8093#   8094#   8097#   8103#   8104#   8109#
                8110#   8111#   8116#   8117#   8120#   8126#   8127#   8132#   8133#   8134#   8141#   8142#   8149#   8150#   8151#
                8156#   8162#   8163#   8164#   8171#   8172#   8175#   8180#   8182#   8190#   8191#   8194#   8200#   8201#   8206#
                8207#   8208#   8216#   8217#   8220#   8226#   8227#   8232#   8233#   8234#   8235#   8244#   8245#   8248#   8254#
                8255#   8260#   8261#   8262#   8263#   8272#   8273#   8276#   8282#   8283#   8288#   8289#   8294#   8295#   8300#
                8301#   8302#   8304#   8309#   8312#   8313#   8318#   8319#   8325#   8332#   8333#   8338#   8339#   8344#   8345#
                8350#   8351#   8356#   8357#   8358#   8367#   8368#   8371#   8378#   8379#   8384#   8385#   8386#   8387#   8397#
                8398#   8403#   8404#   8409#   8410#   8419#   8425#   8426#   8431#   8432#   8437#   8438#   8443#   8444#   8449#
                8450#   8451#   8454#   8455#   8463#   8464#   8468#   8471#   8472#   8478#   8479#   8487#   8488#   8493#   8494#
                8495#   8496#   8504#   8505#   8513#   8519#   8520#   8525#   8526#   8531#   8532#   8537#   8538#   8539#   8540#
                8543#   8549#   8550#   8555#   8556#   8561#   8562#   8567#   8568#   8569#   8575#   8576#   8579#   8586#   8587#
                8592#   8593#   8598#   8599#   8600#   8607#   8608#   8616#   8617#   8618#   8623#   8630#   8631#   8632#   8639#
                8640#   8643#   8648#   8650#   8658#   8659#   8662#   8664#   8673#   8674#   8679#   8680#   8683#   8689#   8690#
                8695#   8696#   8697#   8698#   8704#   8706#   8712#   8713#   8716#   8722#   8723#   8724#   8725#   8734#   8735#
                8738#   8744#   8745#   8750#   8751#   8752#   8758#   8759#   8762#   8768#   8769#   8774#   8775#   8780#   8781#
                8786#   8787#   8792#   8793#   8794#   8795#   8796#   8830#   8888#   8942#   8943#   8946#   8947#   8952#   8953#
                8956#   8958#   8959#   8971#   8974#   8975#   8981#   8982#   8985#   8987#   8990#   8991#   8997#   9005#   9006#
                9009#   9011#   9015#   9018#   9019#   9025#   9026#   9029#   9031#   9032#   9038#   9039#   9042#   9044#   9046#
                9048#   9051#   9052#   9058#   9059#   9065#   9066#   9071#   9072#   9075#   9077#   9078#   9090#   9093#   9094#
                9101#   9103#   9104#   9112#   9113#   9116#   9118#   9119#   9126#   9129#   9130#   9137#   9139#   9145#   9146#
                9152#   9160#   9161#   9164#   9166#   9167#   9171#   9174#   9175#   9181#   9182#   9185#   9187#   9188#   9191#
                9197#   9198#   9203#   9204#   9209#   9210#   9215#   9216#   9221#   9222#   9223#   9234#   9235#   9238#   9240#
                9241#   9246#   9248#   9249#   9266#   9294#
M$IOSE          1700#   3454#
M$LDRO          1942#   3454#   5409#   5412#   5415#   5418#   5431#   5447#   5530#   5533#   5547#   5548#   5610#
M$MASK          1671#   3454#
M$MCHI            4#    3454#
M$MCLO          1624#   3454#
M$MSK1          1677#   3454#
M$POP           1881#   3454#   3543#   3553#   4872#   4899#   4915#   4925#   4932#   4954#   4963#   4993#   5004#   5033#   5096#
                5183#   5396#   5487#   5535#   5549#   5561#   5572#   5616#   5632#   5688#   5781#   5851#   5896#   5963#   6027#
                6083#   6084#   6195#   6255#   6698#   6878#   6910#   6915#   6948#   6953#   6994#   6999#   7199#   7205#   7254#
                7260#   7309#   7315#   7317#   7350#   7355#   7388#   7393#   7426#   7430#   7470#   7475#   7559#   7606#   7650#
                7696#   7740#   7784#   7830#   8304#   8795#   8796#   9046#   9248#   9249#   9272#   9295#   9307#
M$PRIN          1636#   3454#   4920#   4922#   4941#   4950#   4959#   4961#   4971#   4972#   4973#   4975#   4976#   4978#   4979#
                4982#   4983#   4984#   4986#   4987#   4989#   4990#   5000#   5002#   5018#   5021#   5024#   5027#   5030#   5047#
                5050#   5077#   5080#   5083#   5087#   5090#   5093#   5119#   5130#   5133#   5168#   5171#   5174#   5175#   5178#
                5179#   5211#   5212#   5213#   5214#   5215#   5216#   5217#   5218#   5226#   5227#   5228#   5229#   5236#   5628#
                5629#   5630#   5631#   7927#
M$PUSH          1631#   3454#   3456#   3524#   3552#   4859#   4886#   4913#   4919#   4929#   4936#   4958#   4967#   4997#   5008#
                5074#   5156#   5392#   5405#   5513#   5546#   5558#   5571#   5590#   5627#   5658#   5700#   5795#   5859#   5905#
                5985#   5986#   6029#   6099#   6210#   6485#   6726#   6890#   6900#   6928#   6938#   6967#   6984#   7060#   7085#
                7093#   7208#   7223#   7263#   7278#   7330#   7340#   7368#   7378#   7406#   7416#   7449#   7460#   7488#   7573#
                7617#   7661#   7707#   7751#   7795#   7878#   7879#   8309#   8942#   8943#   9048#   9266#   9294#
M$PUT           1972#   3454#   4920#   4922#   4941#   4950#   4959#   4961#   4971#   4972#   4973#   4975#   4976#   4978#   4979#
                4982#   4983#   4984#   4986#   4987#   4989#   4990#   5000#   5002#   5018#   5021#   5024#   5027#   5030#   5047#
                5050#   5077#   5080#   5083#   5087#   5090#   5093#   5119#   5130#   5133#   5168#   5171#   5174#   5175#   5178#
                5179#   5211#   5212#   5213#   5214#   5215#   5216#   5217#   5218#   5226#   5227#   5228#   5229#   5236#   5429#
                5480#   5482#   5514#   5594#   5628#   5629#   5630#   5631#   7927#
M$PUT1          1981#   3454#   4920#   4922#   4941#   4950#   4959#   4961#   4971#   4972#   4973#   4975#   4976#   4978#   4979#
                4982#   4983#   4984#   4986#   4987#   4989#   4990#   5000#   5002#   5018#   5021#   5024#   5027#   5030#   5047#
                5050#   5077#   5080#   5083#   5087#   5090#   5093#   5119#   5130#   5133#   5168#   5171#   5174#   5175#   5178#
                5179#   5211#   5212#   5213#   5214#   5215#   5216#   5217#   5218#   5226#   5227#   5228#   5229#   5236#   5429#
```

```
            5480#  5482#  5514#  5594#  5628#  5629#  5630#  5631#  7927#
M$RADI      2077#  3454#  9268#  9269#  9270#
M$RBRO      1952#  3454#
M$RNRO      1962#  3454#  5447#
M$SETS      2032#  3454#  3456#  3524#  3552#  4859#  4886#  4913#  4919#  4929#  4936#  4958#  4967#  4997#  5008#
            5074#  5156#  5392#  5405#  5513#  5546#  5558#  5571#  5590#  5627#  5658#  5700#  5795#  5859#  5905#
            5985#  5986#  6029#  6099#  6210#  6485#  6726#  6890#  6900#  6928#  6938#  6967#  6984#  7060#  7085#
            7093#  7208#  7223#  7263#  7278#  7330#  7340#  7368#  7378#  7406#  7416#  7449#  7460#  7488#  7573#
            7617#  7661#  7707#  7751#  7795#  7878#  7879#  8309#  8942#  8943#  9048#  9266#  9294#
M$STAR      1733#  3454#
M$SVC       1933#  3454#  4864   4891   4915#  4920#  4922#  4925#  4932#  4941#  4950#  4954#  4959#  4961#  4963#
            4971#  4972#  4973#  4975#  4976#  4978#  4979#  4982#  4983#  4984#  4986#  4987#  4989#  4990#  4993#
            5000#  5002#  5004#  5018#  5021#  5024#  5027#  5030#  5033#  5047#  5050#  5077#  5080#  5083#  5087#
            5090#  5093#  5096#  5119#  5130#  5133#  5168#  5171#  5174#  5175#  5178#  5179#  5183#  5211#  5212#
            5213#  5214#  5215#  5216#  5217#  5218#  5226#  5227#  5228#  5229#  5236#  5409#  5412#  5415#  5418#
            5429#  5431#  5447#  5480#  5482#  5487#  5514#  5530#  5533#  5535#  5547#  5548#  5549#  5560#  5561#
            5572#  5594#  5610#  5615   5616#  5628#  5629#  5630#  5631#  5632#  5664#  5687   5688#  5780   5781#
            5801#  5840   5851#  5867#  5882#  5894   5896#  5916#  5923#  5952   5960   5963#  5986#  5989#  6026
            6027#  6029#  6039   6040#  6082   6083#  6084#  6103#  6112#  6119   6120#  6171   6172#  6181   6182#
            6190   6191#  6195#  6213#  6214#  6225#  6226#  6230#  6239#  6243#  6254#  6255#  6488#  6489#  6512#
            6513#  6528#  6529#  6547#  6553#  6554#  6565   6577#  6578#  6587#  6588#  6599   6697#  6698#  6729#
            6736#  6742#  6759#  6773#  6799   6800#  6808#  6814#  6820#  6826   6827#  6834#  6839   6840#  6846#
            6852#  6862   6863#  6869#  6875   6876#  6878#  6893#  6894#  6900#  6907#  6908#  6910#  6915#  6931#
            6932#  6938#  6945#  6946#  6948#  6953#  6970#  6971#  6977#  6978#  6984#  6991#  6992#  6994#  6999#
            7066#  7067#  7076#  7077#  7085#  7093#  7110   7126   7144   7165   7177   7195   7199#  7205#  7208#
            7223#  7239   7250   7254#  7260#  7263#  7278#  7294   7305   7309#  7315#  7317#  7333#  7334#  7340#
            7347#  7348#  7350#  7355#  7371#  7372#  7378#  7385#  7386#  7388#  7393#  7409#  7410#  7416#  7423#
            7424#  7426#  7430#  7452#  7453#  7460#  7467#  7468#  7470#  7475#  7492#  7493#  7504#  7505#  7512#
            7513#  7517#  7518#  7526#  7527#  7532   7543#  7544#  7551#  7552#  7557   7559#  7577#  7578#  7588#
            7589#  7593#  7594#  7604   7606#  7621#  7622#  7632#  7633#  7637#  7638#  7648   7650#  7665#  7666#
            7679#  7680#  7684#  7685#  7694   7696#  7711#  7712#  7722#  7723#  7727#  7728#  7738   7740#  7755#
            7756#  7766#  7767#  7771#  7772#  7782   7784#  7799#  7800#  7812#  7813#  7817#  7818#  7828   7830#
            7879#  7884#  7885#  7890#  7891#  7894#  7900#  7901#  7906#  7907#  7912#  7913#  7918#  7919#  7924#
            7925#  7926   7927#  7936#  7937#  7940#  7946#  7947#  7952#  7953#  7958#  7959#  7960   7961#  7969#
            7970#  7976#  7977#  7983#  7984#  7993#  7995   8000#  8001#  8009#  8010#  8017#  8018#  8023#  8024#
            8025   8031#  8032#  8040#  8041#  8046#  8047#  8052#  8053#  8054   8055#  8063#  8064#  8070#  8071#
            8079#  8085#  8086#  8091#  8092#  8093   8094#  8097#  8103#  8104#  8109#  8110#  8111   8116#  8117#
            8120#  8126#  8127#  8132#  8133#  8134   8141#  8142#  8149#  8150#  8151   8156#  8162#  8163#  8164
            8171#  8172#  8175   8180#  8182   8190#  8191#  8194#  8200#  8201#  8206#  8207#  8208   8216#  8217#
            8220#  8226#  8227#  8232#  8233#  8234   8235#  8244#  8245#  8248#  8254#  8255#  8260#  8261#  8262
            8263#  8272#  8273#  8276#  8282#  8283#  8288#  8289#  8294#  8295#  8300#  8301#  8302   8304#  8309#
            8312#  8313#  8318#  8319#  8325#  8332#  8333#  8338#  8339#  8344#  8345#  8350#  8351#  8356#  8357#
            8358   8367#  8368#  8371#  8378#  8379#  8384#  8385#  8386   8387#  8397#  8398#  8403#  8404#  8409#
            8410#  8419#  8425#  8426#  8431#  8432#  8437#  8438#  8443#  8444#  8449#  8450#  8451   8454#  8455#
            8463#  8464#  8468   8471#  8472#  8478#  8479#  8487#  8488#  8493#  8494#  8495   8496#  8504#  8505#
            8513#  8519#  8520#  8525#  8526#  8531#  8532#  8537#  8538#  8539   8540#  8543#  8549#  8550#  8555#
            8556#  8561#  8562#  8567#  8568#  8569   8575#  8576#  8579#  8586#  8587#  8592#  8593#  8598#  8599#
            8600   8607#  8608#  8616#  8617#  8618   8623#  8630#  8631#  8632   8639#  8640#  8643   8648#  8650
            8658#  8659#  8662#  8664   8673#  8674#  8679#  8680#  8683#  8689#  8690#  8695#  8696#  8697   8698#
            8704#  8706   8712#  8713#  8716#  8722#  8723#  8724   8725#  8734#  8735#  8738#  8744#  8745#  8750#
            8751#  8752   8758#  8759#  8762#  8768#  8769#  8774#  8775#  8780#  8781#  8786#  8787#  8792#  8793#
            8794   8795#  8796#  8830#  8888#  8943#  8946#  8947#  8952#  8953#  8956#  8958   8959#  8971#  8974
            8975#  8981#  8982#  8985#  8987   8990#  8991#  8997#  9005#  9006#  9009#  9011   9015#  9018   9019#
            9025#  9026#  9029#  9031   9032#  9038#  9039#  9042#  9044   9046#  9048#  9051#  9052#  9058#  9059#
            9065#  9066#  9071#  9072#  9075#  9077   9078#  9090#  9093   9094#  9101#  9103   9104#  9112#  9113#
            9116#  9118   9119#  9126#  9129   9130#  9137#  9139   9145#  9146#  9152#  9160#  9161#  9164#  9166
```

M$TLAB

91670 91710 9174 91750 91810 91820 91850 9187 91880 91910 91970 91980 92030 92040 92090
92100 92150 92160 92210 92220 9223 92340 92350 92380 9240 92410 92460 92480 92490
19290 34540 48640 48910 49150 49200 49220 49250 49320 49410 49500 49540 49590 49610 49630
49710 49720 49730 49750 49760 49780 49790 49820 49830 49840 49860 49870 49890 49900 49930
50000 50020 50040 50180 50210 50240 50270 50300 50330 50470 50500 50770 50800 50830 50870
50900 50930 50960 51190 51300 51330 51680 51710 51740 51750 51780 51790 51830 52110 52120
52130 52140 52150 52160 52170 52180 52260 52270 52280 52290 52360 54090 54120 54150 54180
54290 54310 54470 54800 54820 54870 55140 55300 55330 55350 55470 55480 55490 55600 55610
55720 55940 56100 56150 56160 56280 56290 56300 56310 56320 56640 56870 56880 57800 57810
58010 58400 58510 58670 58820 58940 58960 59160 59230 59520 59600 59630 59860 59890 60260
60270 60290 60390 60400 60820 60830 60840 61030 61120 61190 61200 61710 61720 61810 61820
61900 61910 61950 62130 62140 62250 62260 62300 62390 62430 62540 62550 64880 64890 65120
65130 65280 65290 65470 65530 65540 65650 65770 65780 65870 65880 65990 66970 66980 67290
67360 67420 67590 67750 67990 68000 68080 68140 68200 68260 68270 68340 68390 68400 68460
68520 68620 68630 68690 68750 68760 68780 68930 68940 69000 69070 69080 69100 69150 69310
69320 69380 69450 69460 69480 69530 69700 69710 69770 69780 69840 69910 69920 69940 69990
70660 70670 70760 70770 70850 70930 71100 71260 71440 71650 71770 71950 71990 72050 72080
72230 72390 72500 72540 72600 72630 72780 72940 73050 73090 73150 73170 73330 73340 73400
73470 73480 73500 73550 73710 73720 73780 73850 73860 73880 73930 74090 74100 74160 74230
74240 74260 74300 74520 74530 74600 74670 74680 74700 74750 74920 74930 75040 75050 75120
75130 75170 75180 75260 75270 75320 75430 75440 75510 75520 75570 75590 75770 75780 75880
75890 75930 75940 76040 76060 76210 76220 76320 76330 76370 76380 76480 76500 76650 76660
76790 76800 76840 76850 76940 76960 77110 77120 77220 77230 77270 77280 77380 77400 77550
77560 77660 77670 77710 77720 77820 77840 77990 78000 78120 78130 78170 78180 78280 78300
78790 78840 78850 78900 78910 78940 79000 79010 79060 79070 79120 79130 79180 79190 79240
79250 79260 79270 79360 79370 79400 79460 79470 79520 79530 79580 79590 79600 79610 79690
79700 79760 79770 79830 79840 79930 79950 80000 80010 80090 80100 80170 80180 80230 80240
80250 80310 80320 80400 80410 80460 80470 80520 80530 80540 80550 80630 80640 80700 80710
80790 80850 80860 80910 80920 80930 80940 80970 81030 81040 81090 81100 81110 81160 81170
81200 81260 81270 81320 81330 81340 81410 81420 81490 81500 81510 81560 81620 81630 81640
81710 81720 81750 81800 81820 81900 81910 81940 82000 82010 82060 82070 82080 82160 82170
82200 82260 82270 82320 82330 82340 82350 82440 82450 82480 82540 82550 82600 82610 82620
82630 82720 82730 82760 82820 82830 82880 82890 82940 82950 83000 83010 83020 83040 83090
83120 83130 83180 83190 83250 83320 83330 83380 83390 83440 83450 83500 83510 83560 83570
83580 83670 83680 83710 83780 83790 83840 83850 83860 83870 83970 83980 84030 84040 84090
84100 84190 84250 84260 84310 84320 84370 84380 84430 84440 84490 84500 84510 84540 84550
84630 84640 84680 84710 84720 84780 84790 84870 84880 84930 84940 84950 84960 85040 85050
85130 85190 85200 85250 85260 85310 85320 85370 85380 85390 85400 85430 85490 85500 85550
85560 85610 85620 85670 85680 85690 85750 85760 85790 85860 85870 85920 85930 85980 85990
86000 86070 86080 86160 86170 86180 86230 86300 86310 86320 86390 86400 86430 86480 86500
86580 86590 86620 86640 86730 86740 86790 86800 86830 86890 86900 86950 86960 86970 86980
87040 87060 87120 87130 87160 87220 87230 87240 87250 87340 87350 87380 87440 87450 87500
87510 87520 87580 87590 87620 87680 87690 87740 87750 87800 87810 87860 87870 87920 87930
87940 87950 87960 88300 88880 89430 89460 89470 89520 89530 89560 89580 89590 89710 89740
89750 89810 89820 89850 89870 89900 89910 89970 90050 90060 90090 90110 90150 90180 90190
90250 90260 90290 90310 90320 90380 90390 90420 90440 90460 90480 90510 90520 90580 90590
90650 90660 90710 90720 90750 90770 90780 90900 90930 90940 91010 91030 91040 91120 91130
91160 91180 91190 91260 91290 91300 91370 91390 91450 91460 91520 91600 91610 91640 91660
91670 91710 91740 91750 91810 91820 91850 91870 91880 91910 91970 91980 92030 92040 92090
92100 92150 92160 92210 92220 92230 92340 92350 92380 92400 92410 92460 92480 92490

M$TSTL

19210 34540 48640 48910 49150 49200 49220 49250 49320 49410 49500 49540 49590 49610 49630
49710 49720 49730 49750 49760 49780 49790 49820 49830 49840 49860 49870 49890 49900 49930
50000 50020 50040 50180 50210 50240 50270 50300 50330 50470 50500 50770 50800 50830 50870
50900 50930 50960 51190 51300 51330 51680 51710 51740 51750 51780 51790 51830 52110 52120
52130 52140 52150 52160 52170 52180 52260 52270 52280 52290 52360 54090 54120 54150 54180
54290 54310 54470 54800 54820 54870 55140 55300 55330 55350 55470 55480 55490 55600 55610

```
                55720  55940  56100  56150  56160  56280  56290  56300  56310  56320  56640  56870  56880  57800  57810
                58010  58400  58510  58670  58820  58940  58960  59160  59230  59520  59600  59630  59860  59890  60260
                60270  60290  60390  60400  60820  60830  60840  61030  61120  61190  61200  61710  61720  61810  61820
                61900  61910  61950  62130  62140  62250  62260  62300  62390  62430  62540  62550  64880  64890  65120
                65130  65280  65290  65470  65530  65540  65650  65770  65780  65870  65880  65990  66970  66980  67290
                67360  67420  67590  67730  67990  68000  68080  68140  68200  68260  68270  68340  68390  68400  68460
                68520  68620  68630  68690  68750  68760  68780  68930  68940  69000  69070  69080  69100  69150  69310
                69320  69380  69450  69460  69480  69530  69700  69710  69770  69780  69840  69910  69920  69940  69990
                70660  70670  70760  70770  70850  70930  71100  71260  71440  71650  71770  71950  71990  72050  72080
                72230  72390  72500  72540  72600  72630  72780  72940  73050  73090  73150  73170  73330  73340  73400
                73470  73480  73500  73550  73710  73720  73780  73850  73860  73880  73930  74090  74100  74160  74230
                74240  74260  74300  74520  74530  74600  74670  74680  74700  74750  74920  74930  75040  75050  75120
                75130  75170  75180  75260  75270  75320  75430  75440  75510  75520  75570  75590  75770  75780  75880
                75890  75930  75940  76040  76060  76210  76220  76320  76330  76370  76380  76480  76500  76650  76660
                76790  76800  76840  76850  76940  76960  77110  77120  77220  77230  77270  77280  77380  77400  77550
                77560  77660  77670  77710  77720  77820  77840  77990  78000  78120  78130  78170  78180  78280  78300
                78790  78840  78850  78900  78910  78940  79000  79010  79060  79070  79120  79130  79180  79190  79240
                79250  79260  79270  79360  79370  79400  79460  79470  79520  79530  79580  79590  79600  79610  79690
                79700  79760  79770  79830  79840  79930  79950  80000  80010  80090  80100  80170  80180  80230  80240
                80250  80310  80320  80400  80410  80460  80470  80520  80530  80540  80550  80630  80640  80700  80710
                80790  80850  80860  80910  80920  80930  80940  80970  81030  81040  81090  81100  81110  81160  81170
                81200  81260  81270  81320  81330  81340  81410  81420  81490  81500  81510  81560  81620  81630  81640
                81710  81720  81750  81800  81820  81900  81910  81940  82000  82010  82060  82070  82080  82160  82170
                82200  82260  82270  82320  82330  82340  82350  82440  82450  82480  82540  82550  82600  82610  82620
                82630  82720  82730  82760  82820  82830  82880  82890  82940  82950  83000  83010  83020  83040  83090
                83120  83130  83180  83190  83250  83320  83330  83380  83390  83440  83450  83500  83510  83560  83570
                83580  83670  83680  83710  83780  83790  83840  83850  83860  83870  83970  83980  84030  84040  84090
                84100  84190  84250  84260  84310  84320  84370  84380  84430  84440  84490  84500  84510  84540  84550
                84630  84640  84680  84710  84720  84780  84790  84870  84880  84930  84940  84950  84960  85040  85050
                85130  85190  85200  85250  85260  85310  85320  85370  85380  85390  85470  85430  85490  85500  85550
                85560  85610  85620  85670  85680  85690  85750  85760  85790  85860  85070  85920  85930  85980  85990
                86000  86070  86080  86160  86170  86180  86230  86300  86310  86320  86390  86400  86430  86480  86500
                86580  86590  86620  86640  86730  86740  86790  86800  86830  86890  86900  86950  86960  86970  86980
                87040  87060  87120  87130  87160  87220  87230  87240  87250  87340  87350  87380  87440  87450  87500
                87510  87520  87580  87590  87620  87680  87690  87740  87750  87800  87810  87860  87870  87920  87930
                87940  87950  87960  88300  88880  89430  89460  89470  89520  89530  89560  89580  89590  89710  89740
                89750  89810  89820  89850  89870  89900  89910  89970  90050  90060  90090  90110  90150  90180  90190
                90250  90260  90290  90310  90320  90380  90390  90420  90440  90460  90480  90510  90520  90580  90590
                90650  90660  90710  90720  90750  90770  90780  90900  90930  90940  91010  91030  91040  91120  91130
                91160  91180  91190  91260  91290  91300  91370  91390  91450  91460  91520  91600  91610  91640  91660
                91670  91710  91740  91750  91810  91820  91850  91870  91880  91910  91970  91980  92030  92040  92090
                92100  92150  92160  92210  92220  92230  92340  92350  92380  92400  92410  92460  92480  92490
M$WORD          19940  34540  34910  35070  48640  48910  56150  56870  57800  58400  58940  59520  59600  60260  60390
                60820  61190  61710  61810  61900  65650  65990  67990  68260  68390  68620  68750  71100  71260  71440
                71650  71770  71950  72390  72500  72940  73050  75320  75570  76040  76480  76940  77380  77820  78280
                79260  79600  79950  80250  80540  80930  81110  81340  81510  81640  81750  81820  82080  82340  82620
                83020  83580  83860  84510  84680  84950  85390  85690  86000  86180  86320  86430  86500  86640  86970
                87060  87240  87520  87940  89580  89740  89870  90110  90180  90310  90440  90770  90930  91030  91180
                91290  91390  91660  91740  91870  92230  92400  92680  92690  92700  9308
M$XFER          16820  34540
NEWTST          39470  5590   5658   5700   5795   5859   5905   5985   6099   6210   6485   6726   6890   6928   6967
                7060   7330   7368   7406   7449   7488   7573   7617   7661   7707   7751   7795   7878   8942
NTST            39180  5590   5658   5700   5795   5859   5905   5985   6099   6210   6485   6726   6890   6928   6967
                7060   7330   7368   7406   7449   7488   7573   7617   7661   7707   7751   7795   7878   8942
OPEN            11710  34540
POINTE          11760  34540  3472
```

```
PRINTB  12390  34540  4920  4922  4959  4961  5000  5002  5236  5628
PRINTF  12790  34540
PRINTS  13190  34540
PRINTX  13590  34540  4941  4950  4971  4972  4973  4975  4976  4978  4979  4982  4983  4984  4986
        4987   4989   4990  5018  5021  5024  5027  5030  5047  5050  5077  5080  5083  5087  5090
        5093   5119   5130  5133  5168  5171  5174  5175  5178  5179  5211  5212  5213  5214  5215
        5216   5217   5218  5226  5227  5228  5229  5629  5630  5631  7927
READBU  13990  34540
READEF  14030  34540  5409  5412  5415  5418
RFLAGS  14080  34540
SETDF   38800  4488   4527  4563  4602  4662  4845  6298  6335  8867
SETHRD  38850
SETPRI  14130  34540
SETSF   38750
SETSFT  38900
SETVEC  14180  34540  5429  5480  5482  5514  5594
SLASH   14240  34540
STARS   14380  34540
SVC     14520  34530  3454
T$GEN   38980  4488   4527  4563  4602  4662  4845  6298  6335  8867
XFER    16120  34540
XFERF   16160  34540
XFERT   16200  34540
$GEDF   38040  4864   4891  5615  5687  5780  5840  5894  5952  5960  6026  6039  6082  6119  6171
        6181   6190   6565  6599  6799  6826  6839  6862  6875  7110  7126  7144  7165  7177  7195
        7239   7250   7294  7305  7532  7557  7604  7648  7694  7738  7782  7828  7926  7960  7995
        8025   8054   8093  8111  8134  8151  8164  8175  8182  8208  8234  8262  8302  8358  8386
        8451   8468   8495  8539  8569  8600  8618  8632  8643  8650  8664  8697  8706  8724  8752
        8794   8958   8974  8987  9011  9018  9031  9044  9077  9093  9103  9118  9129  9139  9166
        9174   9187   9223  9240
$GEHRD  38140
$GESF   37940
$GESFT  38250
$GTDF   38450  4488   4527  4563  4602  4662  4845  6298  6335  8867
$GTHRD  38550
$GTSF   38350
$GTSFT  38650

. ABS.  040374     000

 ERRORS DETECTED:  0

 CVDMAC,CVDMAC/CRF-SVC34R.MLB,CVDMAC.P11
 RUN-TIME: 48 59 6 SECONDS
 RUN-TIME RATIO: 142/114=1.2
 CORE USED:  22K  (43 PAGES)
```