PDP11

MAIN MEMORY CRAM TEST

MD-11-DZKCD-A

EP-DZKCD-A-DL-A

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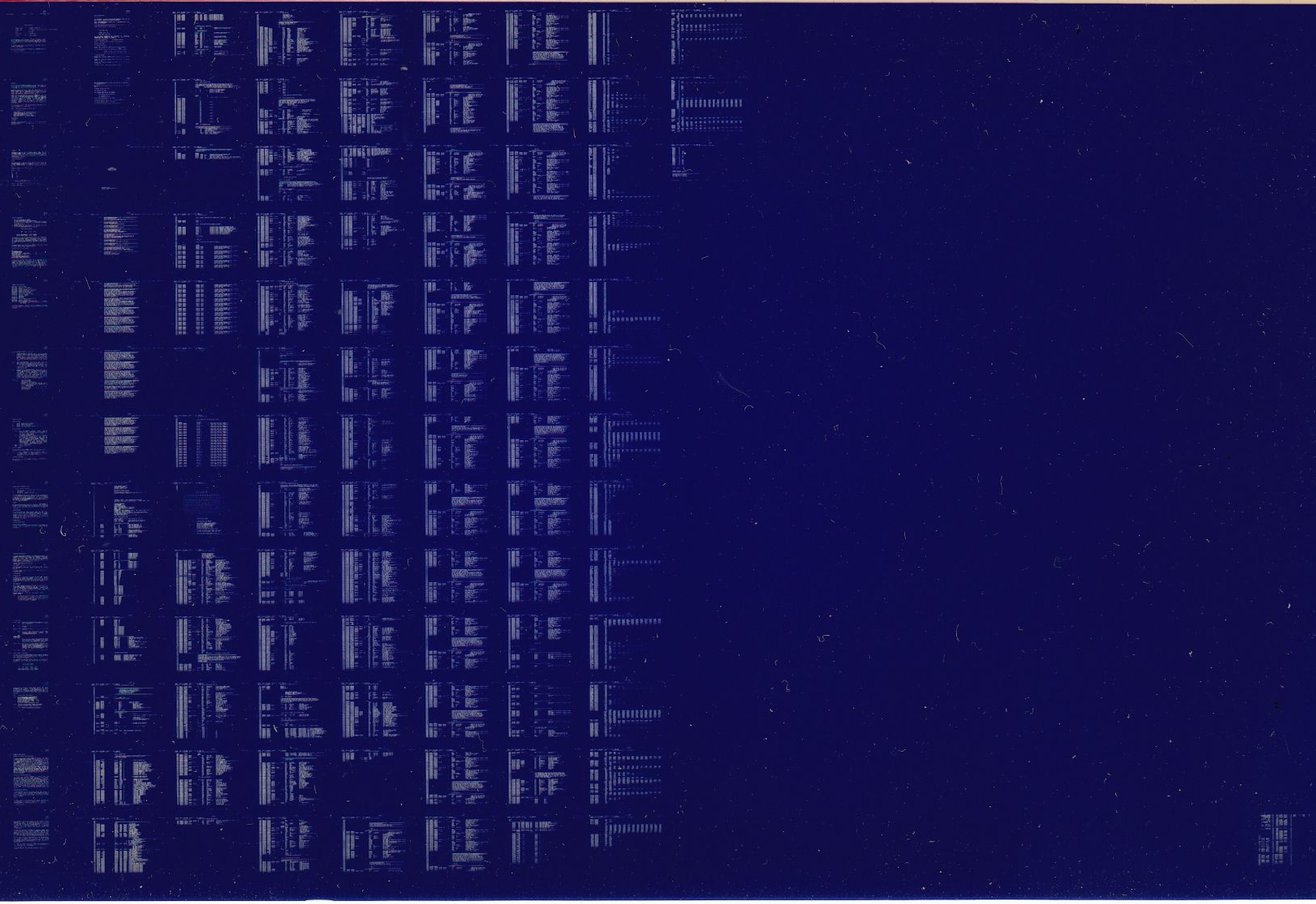

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZKCD-A-D
PRODUCT NAME:	MAIN MEMORY, JUMP AND CRAM TESTS ON MICRO-PROCESSOR
DATE:	MAY 1977
MAINTAINER:	DIAGNOSTICS
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1. ABSTRACT

The function of the KMC11 diagnostics is to verify that the option operates according to specifications. The diagnostics verfiy that there are no malfunctions and the all operations of the KMC11 are correct in its environment.

Parameters must be set up to alert the diagnostics to the KMC11 configuration. These parameters are contained in the STATUS TABLE and are generated in two ways: 1) Manual Input - the operator answers questions. 2) Autosizing - the program determines the parameters automatically.

DZKCE tests the KMC11-AR micro-processor (M8204-YA) with low speed cram, or the KMC11 micro-processor (M8204). It performs jump tests on the micro-processor, and tests the CRAM and other unique functions of the M8204. If a KMC11-AR (M8200-YA) and line unit (M8201) are present, free-running tests are performed. These tests are skipped if a KMC (M8204) or no line-unit is present. The best test is with a line-unit installed. DZKCE can be used as a Heat Test Diagnostic by Manufacturing.

Currently there are four off line diagnostics that are to be run in sequence to insure that if an error should occur it will be detected at an early stage.

NOTE: Additional diagnostics may be added in the future.

The four diagnostics are:

1. DZKCC [REV] Basic W/R and Micro-processor tests
2. DZKCD [REV] jump and main memory tests
3. DZKCE [REV] DDCMP Line unit tests
4. DZKCF [REV] BITSTUFF Line unit tests
5. DZKCA [REV] KMC11 CPU MICRO-DIAGNOSTICS.

2. REQUIREMENTS

2.1 EQUIPMENT

Any PDP11 family CPU (except an LSI-11) with minimum 8k memory
ASR 33 (or equilivalent)
KMC11-AR (M8200-YA) or an KMC11-A (M8204) with a KMC11-DA or a KMC11-FA

2.2 STORAGE

Program will use all 8K of memory except where ABL and BOOTSTRAP LOADER reside. Locations 2100 thru 2300; contain the "STATUS TABLE" information which is generated at start of diagnostics by manual input (questions) or automatically (auto-sizing). This area is an overlay area and should not be altered by the operator.

3. LOADING PROCEEDURE

3.1 METHOD

All programs are in absolute format and are loaded using the ABSOLUTE LOADER. NOTE: if the diagnostics are on a media such as DISK ,MAGTAPE,DECTAPE, or CASSETTE; follow instructions for the monitor which has been provided on that specific media.

ABSOLUTE LOADER starting address *500

MEMORY	* SIZE
4k	17
8k	37
12k	57
16k	77
20k	117
24k	137
28k	157

3.1.1 Place address of ABS loader into switch register.
(also place 'HALT' SW up)

3.1.2 Depress 'LOAD ADDRESS' key on console and release.

3.1.3 Depress 'START KEY' on console and release (program should now be loading into CPU)

4. STARTING PROCEEDURE

a. Set switch register to 000200
b. Depress 'LOAD ADDRESS' key and release
c. Set SWR to zero for 'AUTO SIZING' or SWR bit0=1 for manual input (questions) or SWR bit7=1 to use existing parameters set up by a previous start or a previously run KMC11 diagnostic.
d. Depress 'START KEY' and release. The program will type Maindec Name and program name (if this was the first start up of the program) and also the following:

```
                 MAP OF KMC11 STATUS
                 -------------------

            PC     CSR    STAT1    STAT2    STAT3
            --     ---    -----    -----    -----

          002100 160010 045310   177777   000000
          002110 160020 045320   177777   000000
```

The program will type 'R' and proceed to run the diagnostic. The above is only an example. This would indicate the status table starting at add. 2100 in the program. In this example the table contains the information and status of two KMC11'S. THE STATUS TABLE MUST BE VERIFIED BY THE USER IF AUTO SIZING IS DONE. For information of status table see section 8.4 for help.

If the diagnostic was started with SW00=1 indicating manual parameter input then the following shows an example of the questions asked and some example answers:

```
HOW MANY KMC11'S TO BE TESTED?1

01
CSR ADDRESS?160010
VECTOR ADDRESS?310
BR PRIORITY LEVEL?  (4,5,6,7)?5
WHICH LINE UNIT?  IF NONE TYPE "N",  IF  M8201  TYPE  "1",  IF
M8202 TYPE "2"?1
IS THE LOOP BACK CONNECTOR ON?Y
SWITCH PAC#1 (DDCMP LINE#)?377
SWITCH PAC#2 (BM873 BOOT ADD)?377
```

Following the questions the status map is printed out as described above, the information in the map reflects the answers to the questions. If the diagnostic was started with SW00=0 and SW07=0 (AUTO-SIZING) then no questions are asked and only the status-map is printed out. If AUTO-SIZING is used the status information must be verified to be correct (match the hardware). if it does not match the hardware the diagnostic must be restarted with SW00=1 and the questions answered.

4.1 CONTROL SWITCH SETTINGS

SW 15 Set: Halt on error

SW 14 Set: Loop on current test

SW 13 Set: Inhibit error print out

SW 12 Set: Inhibit type out abell on error.

SW 11 Set: Inhibit iterations. (quick pass)

SW 10 Set: Escape to next test on error

SW 09 Set: Loop with current data

SW 08 Set: Catch error and loop on it

SW 07 Set: Use previous status table.

SW 06 Set: Halt in ROMCLK routine before clocking micro-processor

SW 05 Set: Reserved

SW 04 Set: Reserved

SW 03 Set: Reselect KMC11's desired active

SW 02 Set: Lock on selected test

SW 01 Set: Restart program at selected test

SW 00 Set: Build new status table from questions. (If SW07=0 and SW00=0 a new status table is built by auto-sizing)

Switch 06 and 08-15 are dynamic and can be changed as needed while the diagnostic is running. Switches 00-03 and switch 07 are static, and are used only on starting or restarting the diagnostic.

4.1.2 SWITCH REGISTER OPTIONS (at start up)

SW 01 RESTART PROGRAM AT SELECTED TEST. It is strongly suggested that at least one pass has been made before trying to select a test, the reason being is that the program has to clear areas and set up parameters. When this switch is used the diagnostic will ask TEST NO.? Answer by typing the number of the test desired and carrige return to begin execution at the selected test.

SW 02 LOCK ON SELECTED TEST. This switch when used with SW01 will cause the program to constantly loop on the selected test. Hitting any key on the console will let it advance to the next test and loop until a key is hit again. If SW02=0 when SW01 is used. The program will begin at the selected test and continue normal operations.

SW 03 RESELECT KMC11'S DESIRED ACTIVE. Please note that a message is typed out for setting the switch register equal to KMC11's active. this means if the system has four KMC11s; bits 00,01,02,03 will be set in loc 'KMACTV' from the switch register. Using this switch(SWC0) alters that location;therefore if four KMC11s are in the system ***DO NOT*** set switchs greater than SW 03 in the up position. this would be a fatal error. do not select more active KMC11s than there is information on in the status table.

METHOD: A: Load address 200
B: Start with SW 00=1
C: Program will type message
D: Set a switch for each KMC desired active. EXAMPLE: If you have 4 KMC's but only want to run the first and the last set SWR bits 0 and 3 = 1. PRESS CONTINUE
E: Number (IF VALID) will be in data lights (excluding 11/05)
F: Set with any other switch settings desired. PRESS CONTINUE.

4.1.3 DYNAMIC SWITCHES

ERROR SWITCHES

1. SW 12 Delete print out/bell on error.
2. SW 13 Delete error printout.
3. SW 15 Halt on the error.
4. SW 08 Goto beginning of the test(on error).
5. SW 10 Goto next test(on error).

SCOPE SWITCHES

1. SW06 Halt in ROMCLK routine before clocking micro-processor instruction. This allows the operator to scope a micro-processor instruction in the static state before it is clocked. Hit continue to resume running.
2. SW09 (if enabled by 'SCOP1') on an error; If an '*' is printed in front of the test no. (ex. *TEST NO. 10) SW09 is incorporated in that test and therefore SW09 is usually the best switch for the scope loop (SW14=0, SW10=0, SW09=1, SW08=0). If SW09 is not enabeled; and there is a HARD error (constant); SW08 is best. (SW14=1,0, SW10=0, SW09=0, SW08=1). for intermittemt errors; SW14=1 will loop on test reguardless of error or not error. (SW14=1, SW10=0, SW09=0, SW08=1,0)
3. SW11 Inhibit interations.
4. SW14 Loop on current test.

4.2 STARTING ADDRESS

Starting address is at 000200 there are no other starting addresses for the KMC11 diagnostics. (See Section 4.0)

NOTE: If address 000042 is non-zero the program assumes it is under ACT11 or XXDP control and will act accordingly after all available KMC11's are tested the program will return to 'XXDP' or 'ACT-11'.

5. OPERATING PROCEDURE

When program is initially started messages as described in section 4.0 will be printed, and program will begin running the diagnostic

5.2 PROGRAM AND/OR OPERATOR ACTION

The typical approach should be

1. Halt on error (via SW 15=1) when ever an error occurs.
2. Clear SW 15.
3. Set SW 14: (loop on this test)
4. Set SW 13: (inhibit error print out)

The TEST NUMBER and PC will be typed out and possibily an error message (this depends on the test) to give the operator an idea as to the source of the problem. If it is necessary to know more information concerning the error report; LOOK IN THE LISTING for that TEST NUMBER which was typed out and then NOTE THE PC of thE ERROR REPORT this way the EXACT FUNCTION of the test CAN BE DETERMINED.

6. ERRORS

As described previously there will always be a TEST NUMBER and PC typed out at the time of an error (providing SW 13=0 and SW 12=0). in most cases additional information will be supplied in the the error message to give the operator an indication of the error.

6.2 ERROR RECOVERY

If for some reason the KMC11 should 'HANG THE BUS' (gain control of bus so that console manual functions are inhibited) an init or power down/up is necessary for operator to regain control of cpu. If this should happen; look in location '$TSTNM' (address 1202)for the number of the test that was running at the time of the catastrophic error. In this way the operator will have an idea as to what the KMC11 was doing at the time of the error.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

See section 4. (PLEASE)
Status table should be verified reguardless of how program was started. Also it is important to use this listing along with the information printed on the TTY to complelly isolate problems.

7.2 OPERATING RESTRICTIONS

The first time a KMC11 diagnostic is loaded into core and run the STATUS TABLE must be set up. This is done by manual input (SW00=1) or by autosizing (SW00=0 and SW07=0). Thereafter however the status table need not be setup by subsequent restarts or even loading the next KMC diagnostic because the STATUS TABLE is overlayed. The current parameters in the STATUS TABLE are used when SW07=1 on start up.

7.3 HARDWARE CONFIGURATION RESTRICTIONS

KMC11(M8204)- Jumper W1 must be in,

LINE UNIT(M8201)- Jumpers W1, W2, and W4 must be IN. Jumpers W3, and W5 must be OUT. SW8 of E26 must be in the ON POSITION.

LINE UNIT (M8202)- Jumper W1 must be in. SW8 of E26 must be in the OFF position.

8. MISCELLANEOUS

8.1 EXECUTION TIME

All KMC11 device diagnostics will give an 'END PASS' message (providing no errors and sw12=0) within 4 mins. This is assuming SW11=1 (DELETE ITERATIONS) is set to give the fastest possible execution. The actual execution time depends greatly on the PDP11 CPU configuration and the amount of memory in the system.

8.2 PASS COMPLETE

NOTE: EVERY time the program is started; the tests will run as if SW11 (delete iterations) was up (=1). This is to 'VERIFY NO HARD ERRORS' as soon as possible. Therefore the first pass -EACH TIME PROGRAM IS STARTED- will be a 'QUICK PASS' until all KMC11's in system are tested. When the diagnostic has completed a pass the following is an example of the print out to be expected.

```
END PASS DZKCD CSR:  175000 VEC:  0300 PASSES:  000001
ERRORS:  000000
```

NOTE: The pass count and error counts are cummulitive for each KMC11 that is running, and are set to zero only when the diagnostic is started. Therefore after an overnight run for example, the total passes and errors for each KMC11 since the diagnostic was started are reflected in PASSES: and ERRORS:.

8.4 KEY LOCATIONS

$lpadr (1206) Contains the address where program will return when iteration count is reached or if loop on test is asserted.

NEXT (1442) Contains the address of the next test to be peformed.

$TSTNM (1202) Contains the number of the test now being peformed.

RUN (1500) The bit in 'RUN' always points to the KMC11 currently being tested. EXAMPLE: (RUN) 1500/0000000001000000 Means that KMC11 no.06 is the KMC11 now running.

KMCR00-KMCR17
KMST00-KMST17
(2100)-(2300)

These locations contain the information needed to test up to 16 (decimal) KMC11s sequentialy. they contain the CSR,VECTOR and STATUS concerning the configuration of each KMC11.

KMACTV (1470) Each bit set in this location indicates that the associated KMC11 will be tested in turn. EXAMPLE: (KMACTV) 1470/0000000000011111 means that KMC11 no. 00,01,02,03,04 will be tested. EXAMPLE: (KMACTV) 1470/0000000000010001 Means that KMC11 no. 00,04 will be tested.

KMCSR (2066) Contains the CSR of the current KMC11 under test.

8.4A 'STATUS TABLE' (2100-2300)

The table is filled by AUTO SIZING or by the manual parameter input (questions) as described previously. Also if desired by user; the locations may be altered by hand (toggled in) to suit the specific configuration.

The example status map shown below contains information for two KMC11'S. the table can contain up to 16 KMC11'S. Following the map is a description of the bits for each map entry

```
                  MAP OF KMC11 STATUS
                  -------------------

         PC     CSR    STAT1   STAT2   STAT3
         --     ---    -----   -----   -----
       002100 160010 045310  177777  000000
       002110 160020 016320  000000  000000
```

Each map entry contains 4 words which contain the status information for 1 KMC11. The PC shows where in core memory the first of the 4 words is. In the example above the first KMC'S status is in locations, 2100, 2102, 2104, and 2106. The second KMC status is located at 2110, 2112, 2114, and 2116. The information contained in each 4 word entry is defined as follows:

CSR: Contains KMC11 CSR address

STAT1: BITS 00-08 IS KMC11 VECTOR ADDRESS
BIT14=1 TURNAROUND CONNECTOR IS ON
BIT14=0 NO TURNAROUND CONNECTOR
BIT13=0 LINE UNIT IS AN M8201
BIT13=1 LINE UNIT IS AN M8202
BIT12=1 NO LINE UNIT
BITS 09-11 IS KMC11 BR PRIORITY LEVEL

STAT2: LOW BYTE IS SWITCH PAC#1 (DDCMP LINE NUMBER)
HIGH BYTE IS SWITCH PAC#2 (BM873 BOOT ADD)

STAT3: BIT0=1 PERFORM FREE RUNNING TESTS ON KMC
(must be set manually. SEE TEST 50)

8.5 METHOD OF AUTO SIZING

8.5.1 FINDING THE CONTROL STATUS REGISTER.

The auto-sizing routine finds a KMC11 as follows: It starts at address 160000 and tests all address in increments of 10 up to and including address 167760. If the address does not time out, the following is done, the first CRAM address is written to a 125252 then it is read back. If it contains a -1 or 125252 KMC11 has been found, if not, the address is updated by 10 and the search continues. A -1 indicates a KMC11 with no CRAM, and a 125252 indicates a KMC11 with CRAM Further tests are performed at this point to determine which line unit, if any, is installed, if a loop-back connector is installed and various switch settings on the line unit. THIS IS WHY THE STATUS TABLE MUST BE VERIFIED BY THE USER AND IF ANY OF THE INFORMATION DOES NOT AGREE WITH THE HARDWARE THE DIAGNOSTIC MUST BE RESTARTED AND THE QUESTIONS MUST BE ANSWERED. All KMC11's in the system will be found by the auto-sizer. If it does not find a KMC11 the diagnostic must be restarted and the questions answered.

8.5.2 FINDING THE VECTOR AND BR LEVEL

The vector area (address 300-776) is filled with the instruction IOT and '.+2' (next address). The processor status is started at 7 and the KMC is programmed to interrupt. The PS is lowered by 1 until the KMC interrupts, a delay is made and if no interupt occures at PS level 3 (because of a bad KMC11) the program assumes vector address 300 at BR level 5 and the problem should be fixed in the diagnostic. Once the problem is fixed; the program should be re-setup again to get correct vector. If an interupt occured; the address to which the KMC11 interupted to is picked up and reported as the vector. NOTE: if the vector reported is not the vector set up by you; there is a problem and AUTO SIZING should not be done.

8.6 SOFTWARE SWITCH REGISTER

If the diagnostic is run on an 11/04 or other CPU without a switch register then a software switch register is used to allow user the same switch options as described previously. If the hardware switch register does not exist or if one does and it contains all ones (177777) this software switch register is used.

Control:

To obtain control at any allowable time during execution of the diagnostic the operator types a CTRL G on the console terminal keyboard. As soon as the CTRL G is recognized, by the diagnostic, the following message will be displayed:

```
SWR=XXXXXX NEW?
```

Where XXXXXX is the current contents of the software switch register in octal. The software control routine will then await operator action. At which time the operator is required to type one or more of the legal characters: 1) 0 - 7, 2) line feed(<LF>), 3) carriage return(<CR>), or 4) control-U (CTRL U). No check is made for legality. If the input character is not a <LF>, <CR>, or CTRL U it is assumed to be an octal digit.

To change the contents of the SSR the operator simply types the new desired value in octal - leading zeros need not be typed. And terminates the input string with a <CR> or <LF> depending on the program action desired as described below. The input value will be truncated to the last 6 digits typed. At least one digit must be typed on any given input string prior to the terminator before a change to the SSR will occur.

When the input string is terminated with a <CR> the diagnostic will continue execution from the point at which it was interrupted. If a <CR> is the only thing typed the program will continue without changing the SSR. The <LF> differs from the <CR> by restarting the program as if it were restarted at address 200.

If a CTRL U is typed at any point in the input string prior to the terminator the input value will be disregarded and the prompt displayed (SWR = XXXXXX NEW?).

To set the SSR for the starting switches, first load the diagnostic, then hit CTRL G, then start the diagnostic.

APT/ACT/XXDP/SLIDE

+++++++++++

THIS DIAGNOSTIC IS APT/ACT/XXDP/SLIDE COMPATIBLE USER WOULD BE ABLE TO RUN IT UNDER APT/ACT/XXDP ENVIRONMENT.

NOTE: FOR MANUFACTURING PURPOSE ONLY ITS DESCRIBED HOW TO RUN UNDER APT ENVIRONMENT.

****

ETABLE SETTING FOR APT TO RUN UNDER APT

++++++++++++++++++++

```
        FIRST PASS TIME:

        LONGEST TEST TIME:

        ADDITIONAL TEST TIME:
```

ALL THE ABOVE PARAMETERS ARE DEPENDENT ON PARTICULAR DIAGNOSTICS AND SHOULD BE LOADED AT THE TIME OF SETTING ETABLE.THERE IS NO DEFAULT TIME SET UP.

```
SOFTWARE ENVIRONMENT:001        ENVIRONMENT MODE:200

SWITCH 1:-SHOULD BE USED AS NORMAL SWITCH REGISTER.

SWITCH 2:-NOT USED.

CPU OPTIONS:-NOT USED.

MEMORY TYPE 1:-BITS<2:4>:=BITS <12:14> OF STAT1 OF DEV:0.

MAXIMUM ADDRESS:-BITS<17:19>:=BITS<12:14> OF STAT1 OF DEV:1

                 BITS<2:4>:=BITS <12:14> OF STAT1 OF DEV:2

                 BITS<10:12>:=BITS<12:14> OF STAT1 OF DEV:3
```

IN THE SAME MANNER

MEMORY TYPE 2 MAXIMUM ADDRESS:-GETS STAT1<12:14> OF DEVICE 4,5,6,7.

MEMORY TYPE 3 MAXIMUM ADDRESS:-GETS STAT1<12:14> OF DEVICE 8,9,10,11.

MEMORY TYPE 4 MAXIMUM ADDRESS:-GETS STAT1<12:14> OF DEVICE 12,13,14,15.

INTERRUPT VECTOR 1:FIRST DEVICE RECEIVE VECTOR.

```
REST OF THE DEVICE(KMC'S) VECTOR SHOULD BE SET UP SEQUENTIALLY
IN INCREMENTS OF 10.

BUS PRIORITY:KMC'S PRIORITY(SHOULD BE SAME FOR ALL KMC'S UNDER
TEST).

INTERRUPT VECTOR 2:NOT USED.

BUS PRIORITY:NOT USED.

BASE ADDRESS:FIRST DEVICE CSR ADDRESS.

         REST SHOULD FOLLOW SEQUENTIALLY

         IN INCREMENTS OF 10.

DEVICE MAP:AS DESCRIBED IN APT MANUAL.

CONTROLLER SPECIFIC CODE 1:-NO.  OF DEVICES UNDER TEST.

CONTROLLER SPECIFIC CODE 2:-NOT USED.

DEVICE DESCRIPTOR WORD 0:STAT2 OF FIRST DEVICE.

.  .

.  .

TO

.  .

.  .

DEVICE DESCRIPTOR WORD 15:STAT2 OF 16TH DEVICE.(KMC)
```

DOCUMENT
****
MAINDEC-11-DZKCD
****

```
2191    *************************** TEST 1 ****************************
        TEST OF BR RIGHT SHIFT
        VERIFY THAT A DEST OF BR RSH (011) OF A MICRO-INSTRUCTION
        SHIFTS THE RESULTING BR DATA RIGHT ONCE.

2233    *************************** TEST 2 ****************************
        IOP CRAM WRITE/READ TEST
        FLOAT A 1 THROUGH EACH CRAM LOCATION

2267    *************************** TEST 3 ****************************
        IOP CRAM WRITE/READ TEST
        FLOAT A 0 THROUGH EACH CRAM LOCATION

2304    *************************** TEST 4 ****************************
        IOP CRAM DUAL ADDRESSING TEST
        WRITE EACH ADDRESS INTO ITSELF,READ EACH
        ADDRESS TO VERIFY CORRECT ADDRESSING

2350    *************************** TEST 5 ****************************
        IOP CRAM READ TEST
        THIS TEST WRITES THE CRAM WITH THE CROM MICRO-CODE MAP
        THEN READS IT BACK AND COMPARES EACH ADDRESS WITH THE
        DUPLICATE OF THE CROM MICRO-CODE.

2387    *************************** TEST 6 ****************************
        IOP MAIN MEMORY TEST
        FLOAT A 1 THROUGH ALL MAIN MEMORY LOCATIONS

2433    *************************** TEST 7 ****************************
        IOP MAIN MEMORY TEST
        FLOAT A 0 THROUGH ALL MAIN MEMORY LOCATIONS

2481    *************************** TEST 10 ***************************
        IOP MAIN MEMORY DUAL ADDRESSING TEST
        LOAD EACH MEMORY LOCATION WITH ITS OWN ADDRESS
        READ BACK EACH LOCATION TO VERIFY CORRECT ADDRESSING

2549    *************************** TEST 11 ***************************
        IOP MAR TEST
        PERFORM DUAL ADDRESSING TEST
        USING MAR AUTO-INC FEATURE
```

```
2589    *************************** TEST 12 ***************************
        IOP (CRAM) ODT BITS TEST
        LOAD MAR WITH A 0 INC MAR UNTIL IT OVERFLOWS (2000 TIMES)
        VERIFY THAT IBUS* 10 BITS IS SET ONLY WHEN MAR BIT 8 IS A ONE
        AND THAT IBUS* 10 BIT6 IS SET ON MAR OVERFLOW(2000)

2650    *************************** TEST 13 ***************************
        CRAM TEST OF JUMP(I) NEVER MICRO-PROCESSOR INSTRUCTION.
        PERFORM THE JUMP INSTRUCTION
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

2711    *************************** TEST 14 ***************************
        CRAM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
        PERFORM THE JUMP INSTRUCTION
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

2769    *************************** TEST 15 ***************************
        CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
        SET THE C BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

2830    *************************** TEST 16 ***************************
        CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
        SET THE Z BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

2891    *************************** TEST 17 ***************************
        CRAM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

2952    *************************** TEST 20 ***************************
        CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3013    *************************** TEST 21 ***************************
        CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3074    *************************** TEST 22 ***************************
        CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3135    *************************** TEST 23 ***************************
        CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE

3140    BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3196    *************************** TEST 24 ***************************
        CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37
```

```
3257    ************************** TEST 25 ***************************
        CRAM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3318    ************************** TEST 26 ***************************
        CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3379    ************************** TEST 27 ***************************
        CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3440    ************************** TEST 30 ***************************
        CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37
```

```
                        .TITLE  MAINDEC-11-DZKCD
                        ;*COPYRIGHT (C) 1976
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY DINESH GORADIA
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*





                        ;*MAINDEC-11-DZKCD   KMC11 REMOTE CROM, JUMP TESTS
                        ;*COPYRIGHT 1976, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        ;*-----------------------------------------------------------------

                        ;STARTING PROCEDURE
                        ;LOAD PROGRAM
                        ;LOAD ADDRESS 000200
                        ;SWR=0  AUTOSIZE KMC11
                        ;SW07=1  USE CURRENT KMC11 PARAMETERS
                        ;SW00=1  INPUT NEW KMC11 PARAMETERS
                        ;PRESS START
                        ;PROGRAM WILL TYPE "MAINDEC-11-DZKCD   KMC11 REMOTE CROM, JUMP TESTS"
                        ;PROGRAM WILL TYPE STATUS MAP
                        ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                        ;AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
                        ;AND THEN RESUME TESTING
                        ;SUBSEQUENT RESTARTS WILL NOT TYPE PROGRAM TITLE

                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1200 ***
        001200          STACK=  1200
                        .EQUIV  EMT,ERROR          ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE          ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
        000011          HT=     11                 ;;CODE FOR HORIZONTAL TAB
        000012          LF=     12                 ;;CODE FOR LINE FEED
        000015          CR=     15                 ;;CODE FOR CARRIAGE RETURN
        000200          CRLF=   200                ;;CODE FOR CARRIAGE RETURN-LINE FEED
        177776          PS=     177776             ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
        177774          STKLMT= 177774             ;;STACK LIMIT REGISTER
        177772          PIRQ=   177772             ;;PROGRAM INTERRUPT REQUEST REGISTER
        177570          DSWR=   177570             ;;HARDWARE SWITCH REGISTER
        177570          DDISP=  177570             ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
        000000          R0=     %0                 ;;GENERAL REGISTER
        000001          R1=     %1                 ;;GENERAL REGISTER
        000002          R2=     %2                 ;;GENERAL REGISTER
```

```
     57        000003            R3=     %3                      ;;GENERAL REGISTER
     58        000004            R4=     %4                      ;;GENERAL REGISTER
     59        000005            R5=     %5                      ;;GENERAL REGISTER
     60        000006            R6=     %6                      ;;GENERAL REGISTER
     61        000007            R7=     %7                      ;;GENERAL REGISTER
     62        000006            SP=     %6                      ;;STACK POINTER
     63        000007            PC=     %7                      ;;PROGRAM COUNTER
     64
     65                          ;*PRIORITY LEVEL DEFINITIONS
     66        000000            PR0=    0                       ;;PRIORITY LEVEL 0
     67        000040            PR1=    40                      ;;PRIORITY LEVEL 1
     68        000100            PR2=    100                     ;;PRIORITY LEVEL 2
     69        000140            PR3=    140                     ;;PRIORITY LEVEL 3
     70        000200            PR4=    200                     ;;PRIORITY LEVEL 4
     71        000240            PR5=    240                     ;;PRIORITY LEVEL 5
     72        000300            PR6=    300                     ;;PRIORITY LEVEL 6
     73        000340            PR7=    340                     ;;PRIORITY LEVEL 7
     74
     75                          ;*"SWITCH REGISTER" SWITCH DEFINITIONS
     76        100000            SW15=   100000
     77        040000            SW14=   40000
     78        020000            SW13=   20000
     79        010000            SW12=   10000
     80        004000            SW11=   4000
     81        002000            SW10=   2000
     82        001000            SW09=   1000
     83        000400            SW08=   400
     84        000200            SW07=   200
     85        000100            SW06=   100
     86        000040            SW05=   40
     87        000020            SW04=   20
     88        000010            SW03=   10
     89        000004            SW02=   4
     90        000002            SW01=   2
     91        000001            SW00=   1
     92                          .EQUIV  SW09,SW9
     93                          .EQUIV  SW08,SW8
     94                          .EQUIV  SW07,SW7
     95                          .EQUIV  SW06,SW6
     96                          .EQUIV  SW05,SW5
     97                          .EQUIV  SW04,SW4
     98                          .EQUIV  SW03,SW3
     99                          .EQUIV  SW02,SW2
    100                          .EQUIV  SW01,SW1
    101                          .EQUIV  SW00,SW0
    102
    103                          ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
    104        100000            BIT15=  100000
    105        040000            BIT14=  40000
    106        020000            BIT13=  20000
    107        010000            BIT12=  10000
    108        004000            BIT11=  4000
    109        002000            BIT10=  2000
    110        001000            BIT09=  1000
    111        000400            BIT08=  400
    112        000200            BIT07=  200
```

```
        000100          BIT06=  100
        000040          BIT05=  40
        000020          BIT04=  20
        000010          BIT03=  10
        000004          BIT02=  4
        000002          BIT01=  2
        000001          BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
        000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
        000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
        000014          TBITVEC=14              ;;"T" BIT
        000014          TRTVEC= 14              ;;TRACE TRAP
        000014          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
        000020          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
        000024          PWRVEC= 24              ;;POWER FAIL
        000030          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
        000034          TRAPVEC=34              ;;"TRAP" TRAP
        000060          TKVEC=  60              ;;TTY KEYBOARD VECTOR
        000064          TPVEC=  64              ;;TTY PRINTER VECTOR
        000240          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR




                        ;INSTRUCTION DEFINITIONS
                        ;-----------------------

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

```

                                     ;;*************************************************************
                                     ;------------------------------------------------------------
                                                  ;TRAPCATCAER FOR ILLEGAL INTERUPTS
                                                  ;THE STANDARD "TRAP CATCHER" IS PLACED
                                                  ;BETWEEN ADDRESS 0 TO ADDRESS 776.
                                                  ;IT LOOKS LIKE "PC+2 HALT".
                                     ;------------------------------------------------------------
                                     ;;*************************************************************

        000000                       .=0
000000  000000  000000                            .WORD   0,0
                                     ;STANDARD INTERRUPT VECTORS
                                     ;--------------------------

        000020                       .=20
000020  004134                                    $SCOPE             ; SCOPE LOOP HANDLER.
000022  000340                                    PR7                ; SERVICE AT LEVEL 7.
000024  007126                                    $PWRDN                     ;POWER FAIL HANDLER
000026  000340                                    PR7                        ;SERVICE AT LEVEL 7
000030  006512                                    $ERROR                     ;ERROR HANDLER
000032  000340                                    PR7                        ;SERVICE AT LEVEL 7
000034  006414                                    $TRAP                      ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                                    PR7                        ;SERVICE AT LEVEL 7
                                     .SBTTL  ACT11 HOOKS

                                     ;;*******************************************************
                                     ;HOOKS REQUIRED BY ACT11
        000040                                    $SVPC=.                    ;SAVE PC
        000046                                    .=46
000046  004070                                    $ENDAD                     ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
        000052                                    .=52
000052  040000                                    .WORD   BIT14              ;;2)SET LOC.52 TO BIT14
        000040                                    .=$SVPC                    ;; RESTORE PC
                                                                             ;BIT14=1 PROGRAM EXECUTION TIME
                                                                             ;IS MEMORY SIZE DEPENDENT

        000174                       .=174
000174  000000                       DISPREG:0                               ;SOFTWARE DISPLAY REGISTER
000176  000000                       SWREG:  0                               ;SOFTWARE SWITCH REGISTER

        000200                       .=200
000200  000137  002402                            JMP     .START             ;GO TO START OF PROGRAM

        001000                       .=1000
001000  005200  040515  047111       MTITLE: .ASCII   <200><12>/MAINDEC-11-DZKCD/<200>
001023     113  041515  030461               .ASCIZ   /KMC11 REMOTE CROM, JUMP TESTS/<200>

        177570                       DSWR    =        177570
        177570                       DDISP   =        177570
```

```
                                .SBTTL  COMMON TAGS

                                ;;*****************************************************
                                ;;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;;*USED IN THE PROGRAM.

                001200                  .=1200
        001200                  $CMTAG:                         ;;START OF COMMON TAGS
        001200  000000                  .WORD   0
        001202     000          $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
        001203     000          $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
        001204  000000          $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
        001206  000000          $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
        001210  000000          $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
        001212  000000          $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
        001214     000          $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
        001215     001          $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
        001216  000000          $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
        001220  000000          $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
        001222  000000          $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
        001224  000000          $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
        001226  000000          $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
        001230  000000                  .WORD   0               ;;RESERVED--NOT TO BE USED
        001232  000000                  .WORD   0
        001234     000          $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
        001235     000          $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
        001236  000000                  .WORD   0
        001240  177570          SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
        001242  177570          DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
        001244  177560          $TKS:   177560                  ;;TTY KBD STATUS
        001246  177562          $TKB:   177562                  ;;TTY KBD BUFFER
        001250  177564          $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
        001252  177566          $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
        001254     000          $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
        001255     002          $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
        001256     012          $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
        001257     000          $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
        001260  000000          $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                                ;;WHICH ($REG0) WAS OBTAINED
        001262  000000          $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
        001264  000000          $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
        001266  000000          $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
        001270  000000          $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
        001272  000000          $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
        001274  000000          $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
        001276  000000          $TMP0:  .WORD   0               ;;USER DEFINED
        001300  000000          $TMP1:  .WORD   0               ;;USER DEFINED
        001302  000000          $TMP2:  .WORD   0               ;;USER DEFINED
        001304  000000          $TMP3:  .WORD   0               ;;USER DEFINED
        001306  000000          $TMP4:  .WORD   0               ;;USER DEFINED
        001310  000000          $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
        001312     077          $QUES:  .ASCII  /?/             ;;QUESTION MARK
        001313     015          $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
        001314  000012          $LF:    .ASCIZ  <12>            ;;LINE FEED
                                ;;*****************************************************
                                .SBTTL  APT MAILBOX-ETABLE
```

```
                           ;;**********************************************************************
                           .EVEN
001316                     $MAIL:                          ;;APT MAILBOX
001316   000000            $MSGTY:  .WORD    AMSGTY        ;;MESSAGE TYPE CODE
001320   000000            $FATAL:  .WORD    AFATAL        ;;FATAL ERROR NUMBER
001322   000000            $TESTN:  .WORD    ATESTN        ;;TEST NUMBER
001324   000000            $PASS:   .WORD    APASS         ;;PASS COUNT
001326   000000            $DEVCT:  .WORD    ADEVCT        ;;DEVICE COUNT
001330   000000            $UNIT:   .WORD    AUNIT         ;;I/O UNIT NUMBER
001332   000000            $MSGAD:  .WORD    AMSGAD        ;;MESSAGE ADDRESS
001334   000000            $MSGLG:  .WORD    AMSGLG        ;;MESSAGE LENGTH
001336                     $ETABLE:                        ;;APT ENVIRONMENT TABLE
001336      002            $ENV:    .BYTE    AENV          ;;ENVIRONMENT BYTE
001337      000            $ENVM:   .BYTE    AENVM         ;;ENVIRONMENT MODE BITS
001340   000000            $SWREG:  .WORD    ASWREG        ;;APT SWITCH REGISTER
001342   000000            $USWR:   .WORD    AUSWR         ;;USER SWITCHES
001344   000000            $CPUOP:  .WORD    ACPUOP        ;;CPU TYPE,OPTIONS
                           ;*                              BITS 15-11=CPU TYPE
                           ;*                                         11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                           ;*                                         11/70=06,PDQ=07,Q=10
                           ;*                              BIT 10=REAL TIME CLOCK
                           ;*                              BIT  9=FLOATING POINT PROCESSOR
                           ;*                              BIT  8=MEMORY MANAGEMENT
001346      000            $MAMS1:  .BYTE    AMAMS1        ;;HIGH ADDRESS,M.S. BYTE
001347      000            $MTYP1:  .BYTE    AMTYP1        ;;MEM. TYPE,BLK#1
                           ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
                           ;*                                         900 NSEC CORE=001
                           ;*                                         300 NSEC BIPOLAR=002
                           ;*                                         500 NSEC MOS=003
001350   000000            $MADR1:  .WORD    AMADR1        ;;HIGH ADDRESS,BLK#1
                           ;*                                MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
001352      000            $MAMS2:  .BYTE    AMAMS2        ;;HIGH ADDRESS,M.S. BYTE
001353      000            $MTYP2:  .BYTE    AMTYP2        ;;MEM.TYPE,BLK#2
001354   000000            $MADR2:  .WORD    AMADR2        ;;MEM.LAST ADDRESS,BLK#2
001356      000            $MAMS3:  .BYTE    AMAMS3        ;;HIGH ADDRESS,M.S.BYTE
001357      000            $MTYP3:  .BYTE    AMTYP3        ;;MEM.TYPE,BLK#3
001360   000000            $MADR3:  .WORD    AMADR3        ;;MEM.LAST ADDRESS,BLK#3
001362      000            $MAMS4:  .BYTE    AMAMS4        ;;HIGH ADDRESS,M.S.BYTE
001363      000            $MTYP4:  .BYTE    AMTYP4        ;;MEM.TYPE,BLK#4
001364   000000            $MADR4:  .WORD    AMADR4        ;;MEM.LAST ADDRESS,BLK#4
001366   000000            $VECT1:  .WORD    AVECT1        ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001370   000000            $VECT2:  .WORD    AVECT2        ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001372   000000            $BASE:   .WORD    ABASE         ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001374   000000            $DEVM:   .WORD    ADEVM         ;;DEVICE MAP
001376   000000            $CDW1:   .WORD    ACDW1         ;;CONTROLLER DESCRIPTION WORD#1
001400   000000            $CDW2:   .WORD    ACDW2         ;;CONTROLLER DESCRIPTION WORD#2
001402   000000            $DDW0:   .WORD    ADDW0         ;;DEVICE DESCRIPTOR WORD#0
001404   000000            $DDW1:   .WORD    ADDW1         ;;DEVICE DESCRIPTOR WORD#1
001406   000000            $DDW2:   .WORD    ADDW2         ;;DEVICE DESCRIPTOR WORD#2
001410   000000            $DDW3:   .WORD    ADDW3         ;;DEVICE DESCRIPTOR WORD#3
001412   000000            $DDW4:   .WORD    ADDW4         ;;DEVICE DESCRIPTOR WORD#4
001414   000000            $DDW5:   .WORD    ADDW5         ;;DEVICE DESCRIPTOR WORD#5
001416   000000            $DDW6:   .WORD    ADDW6         ;;DEVICE DESCRIPTOR WORD#6
001420   000000            $DDW7:   .WORD    ADDW7         ;;DEVICE DESCRIPTOR WORD#7
001422   000000            $DDW8:   .WORD    ADDW8         ;;DEVICE DESCRIPTOR WORD#8
```

```
001424  000000          $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
001426  000000          $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
001430  000000          $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
001432  000000          $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
001434  000000          $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
001436  000000          $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
001440  000000          $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15


001442                  $ETEND:

                        ;
                        ;  PROGRAM CONTROL PARAMETERS
                        ;-------------------------------------
001442  000000          NEXT:   .WORD   0                       ; ADDRSS OF NEXT TEST TO BE EXECUTED
001444  000000          LOCK:   .WORD   0                       ; ADDRESS FOR LOCK CURRENT DATA
                        ;
                        ;   PROGRAM VARIABLES
                        ;-------------------------
001446  000000          STRTSW: .WORD   0                       ; SWITCHES AT START OF PROGRAM
001450  000000          STAT:   .WORD   0                       ; KM STATUS WORD STORAGE
001452  000000          CLKX:   .WORD   0                       ;
001454  000000          MASKX:  .WORD   0                       ;
001456  000000          SAVSP:  .WORD   0                       ; STACK POINTER STORAGE
001460  000000          SAVPC:  .WORD   0                       ; PROGRAM COUNTER STORAGE
001462  000000          ZERO:   .WORD   0                       ;
001464  000001          ONE:    .WORD   1                       ;
001466  000000          MEMLIM: .WORD   0                       ; HIGHEST LOCATION FOR NPR'S
001470  000001          KMACTV: .BLKW   1                       ; KMC11 SELECTED ACTIVE
001472  000001          KMNUM:  .BLKW   1                       ; OCTAL NUMBER OF KMC11'S
001474  000001          SAVACT: .BLKW   1                       ; ORIGINAL ACTIVE DEVICES.
001476  000001          SAVNUM: .BLKW   1                       ; WORKABLE NUMBER.
001500  000000          RUN:    .WORD   0                       ; POINTER TO RUNNING DEVICES
                                .EVEN
001502  002072          CREAM:  .WORD   KM.MAP-6                ; TABLE POINTER
001504  002276          MILK:   .WORD   CNT.MAP-4               ; TABLE POINTER
                        ;
                        ;  PROGRAM CONTROL FLAGS
                        ;------------------------
001506     000          INIFLG: .BYTE   0                       ; PROGRAM INITIALIZING FLAG
        001510                  .EVEN
001510     000          LOKFLG: .BYTE   0                       ; LOCK ON CURRENT TEST FLAG
001511     000          QV.FLG: .BYTE   0                       ; QUICK VERIFY FLAG
                                                                ; ON FIRST PASS OF EACH KMC11 ITERATIONS WILL BE SUPPRES
                                .EVEN
```

```
                    .SBTTL  ERROR POINTER TABLE

                    ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                    ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                    ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                    ;*NOTE1:         IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                    ;*NOTE2:         EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                    ;*       EM                  ;;POINTS TO THE ERROR MESSAGE
                    ;*       DH                  ;;POINTS TO THE DATA HEADER
                    ;*       DT                  ;;POINTS TO THE DATA
                    ;*       DF                  ;;POINTS TO THE DATA FORMAT


001512              $ERRTB:
                    .EVEN
                    ;*       DF                  ;; DOES NOT APPLY IN THIS DIAGNOSTIC.
001512  000000               0
001514  000000               0
001516  000000               0
001520  021330               EM1
001522  021544               DH1                 ; ERROR 1
001524  021620               DT1
001526  021351               EM2
001530  021544               DH1                 ; ERROR 2
001532  021620               DT1
001534  021330               EM1
001536  021544               DH1                 ; ERROR 3
001540  021636               DT2
001542  021405               EM3
001544  021576               DH2                 ; ERROR 4
001546  021654               DT3
001550  021421               EM4
001552  021576               DH2                 ; ERROR 5
001554  021654               DT3
001556  021453               EM5
001560  021544               DH1                 ; ERROR 6
001562  021666               DT4
001564  021501               EM6
001566  021544               DH1                 ; ERROR 7
001570  021704               DT5
001572  021517               EM7
001574  021576               DH2                 ; ERROR 10
001576  021654               DT3
        002034      .=2034
                    .SBTTL  APT PARAMETER BLOCK

                    ;;*****************************************************************
                    ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                    ;;*****************************************************************
        002034               .$X=.    ;;SAVE CURRENT LOCATION
        000024               .=24     ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200               200      ;;FOR APT START UP
        000044               .=44     ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  002034               $APTHDR  ;;POINT TO APT HEADER BLOCK
        002034               .=.$X    ;;RESET LOCATION COUNTER
```

```
                                ;;**************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.

002034                          $APTHD:
002034  000000                  $HIBTS: .WORD   0               ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
002036  001316                  $MBADR: .WORD   $MAIL           ;;ADDRESS OF APT MAILBOX (BITS 0-15)
002040  000132                  $TSTM:  .WORD   90.             ;;RUN TIM OF LONGEST TEST
002042  000137                  $PASTM: .WORD   95.             ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
002044  000137                  $UNITM: .WORD   95.             ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
002046  000052                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```

                                    ;KMC11 CONTROL INDICATORS FOR CURRENT KMC11 UNDER TEST
                                    ;-----------------------------------------------------

 002050  000000                     STAT1:  0
 002052  000000                     STAT2:  0
 002054  000000                     STAT3:  0

                                    ;KMC11 VECTOR AND REGISTER INDIRECT POINTERS
                                    ;-------------------------------------------

 002056  000000                     KMRVEC: 0               ;POINTER TO KMC11 RECEIVER INTERRUPT VECTOR
 002060  000000                     KMRLVL: 0               ;POINTER TO KMC11 RECEIVER INTERRUPT SERVICE PS
 002062  000000                     KMTVEC: 0               ;POINTER TO KMC11 TRANSMITTER INTERRUPT VECTOR
 002064  000000                     KMTLVL: 0               ;POINTER TO KMC11 TRANSMITTER INTERRUPT SERVICE PS
 002066  000000                     KMCSR:  0               ;POINTER TO KMC11 CONTROL STATUS REGISTER
 002070  000000                     KMCSRH: 0               ;POINTER TO KMC11 CONTROL STATUS REGISTER HIGH BYTE.
 002072  000000                     KMCTL:  0               ;POINTER TO KMC11 CONTOL OUT REGISTER
 002074  000000                     KMP04:  0               ;POINTER TO KMC11 PORT REGISTER(SEL 4)
 002076  000000                     KMP06:  0               ;POINTER TO KMC11 PORT REGISTER(SEL 6)

                                    ;TEMP STORAGE
                                    ;------------

                                    ;TEMP:  0
                                    ;.=.+40

                                    ;KMC11 STATUS TABLE AND ADDRESS ASSIGNMENTS
                                    ;-----------------------------------------

         002100                     .=2100
 002100                             KM.MAP:
 002100  000001                     KMCR00: .BLKW   1               ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 00
 002102  000001                     KMS100: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 00
 002104  000001                     KMS200: .BLKW   1               ;DDCMP LINE# FOR KMC11 NUMBER 00
 002106  000001                     KMS300: .BLKW   1               ;3RD STATUS WORD

 002110  000001                     KMCR01: .BLKW   1               ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 01
 002112  000001                     KMS101: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 01
 002114  000001                     KMS201: .BLKW   1               ;DDCMP LINE# FOR KMC11 NUMBER 01
 002116  000001                     KMS301: .BLKW   1               ;3RD STATUS WORD

 002120  000001                     KMCR02: .BLKW   1               ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 02
 002122  000001                     KMS102: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 02
 002124  000001                     KMS202: .BLKW   1               ;DDCMP LINE# FOR KMC11 NUMBER 02
 002126  000001                     KMS302: .BLKW   1               ;3RD STATUS WORD

 002130  000001                     KMCR03: .BLKW   1               ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 03
 002132  000001                     KMS103: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 03
 002134  000001                     KMS203: .BLKW   1               ;DDCMP LINE# FOR KMC11 NUMBER 03
 002136  000001                     KMS303: .BLKW   1               ;3RD STATUS WORD

 002140  000001                     KMCR04: .BLKW   1               ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 04
 002142  000001                     KMS104: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 04
 002144  000001                     KMS204: .BLKW   1               ;DDCMP LINE# FOR KMC11 NUMBER 04
 002146  000001                     KMS304: .BLKW   1               ;3RD STATUS WORD
```

```

002150  000001          KMCR05: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 05
002152  000001          KMS105: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 05
002154  000001          KMS205: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 05
002156  000001          KMS305: .BLKW   1                       ;3RD STATUS WORD

002160  000001          KMCR06: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 06
002162  000001          KMS106: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 06
002164  000001          KMS206: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 06
002166  000001          KMS306: .BLKW   1                       ;3RD STATUS WORD

002170  000001          KMCR07: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 07
002172  000001          KMS107: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 07
002174  000001          KMS207: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 07
002176  000001          KMS307: .BLKW   1                       ;3RD STATUS WORD

002200  000001          KMCR10: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 10
002202  000001          KMS110: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 10
002204  000001          KMS210: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 10
002206  000001          KMS310: .BLKW   1                       ;3RD STATUS WORD

002210  000001          KMCR11: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 11
002212  000001          KMS111: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 11
002214  000001          KMS211: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 11
002216  000001          KMS311: .BLKW   1                       ;3RD STATUS WORD

002220  000001          KMCR12: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 12
002222  000001          KMS112: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 12
002224  000001          KMS212: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 12
002226  000001          KMS312: .BLKW   1                       ;3RD STATUS WORD

002230  000001          KMCR13: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 13
002232  000001          KMS113: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 13
002234  000001          KMS213: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 13
002236  000001          KMS313: .BLKW   1                       ;3RD STATUS WORD

002240  000001          KMCR14: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 14
002242  000001          KMS114: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 14
002244  000001          KMS214: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 14
002246  000001          KMS314: .BLKW   1                       ;3RD STATUS WORD

002250  000001          KMCR15: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 15
002252  000001          KMS115: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 15
002254  000001          KMS215: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 15
002256  000001          KMS315: .BLKW   1                       ;3RD STATUS WORD

002260  000001          KMCR16: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 16
002262  000001          KMS116: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 16
002264  000001          KMS216: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 16
002266  000001          KMS316: .BLKW   1                       ;3RD STATUS WORD

002270  000001          KMCR17: .BLKW   1                       ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 17
002272  000001          KMS117: .BLKW   1                       ;VECTOR FOR KMC11 NUMBER 17
002274  000001          KMS217: .BLKW   1                       ;DDCMP LINE# FOR KMC11 NUMBER 17
002276  000001          KMS317: .BLKW   1                       ;3RD STATUS WORD

```

```
   547  002300  000000                  KM.END: 000000
```

```

                                        ;KMC11 PASS COUNT AND ERROR COUNT TABLE
                                        ;--------------------------------------

 002302                                 CNT.MAP:
 002302  000000                         PACT00: 0                   ;PASS COUNT FOR KMC11 NUMBER 00
 002304  000000                         ERCT00: 0                   ;ERROR COUNT FOR KMC11 NUMBER 00

 002306  000000                         PACT01: 0                   ;PASS COUNT FOR KMC11 NUMBER 01
 002310  000000                         ERCT01: 0                   ;ERROR COUNT FOR KMC11 NUMBER 01

 002312  000000                         PACT02: 0                   ;PASS COUNT FOR KMC11 NUMBER 02
 002314  000000                         ERCT02: 0                   ;ERROR COUNT FOR KMC11 NUMBER 02

 002316  000000                         PACT03: 0                   ;PASS COUNT FOR KMC11 NUMBER 03
 002320  000000                         ERCT03: 0                   ;ERROR COUNT FOR KMC11 NUMBER 03

 002322  000000                         PACT04: 0                   ;PASS COUNT FOR KMC11 NUMBER 04
 002324  000000                         ERCT04: 0                   ;ERROR COUNT FOR KMC11 NUMBER 04

 002326  000000                         PACT05: 0                   ;PASS COUNT FOR KMC11 NUMBER 05
 002330  000000                         ERCT05: 0                   ;ERROR COUNT FOR KMC11 NUMBER 05

 002332  000000                         PACT06: 0                   ;PASS COUNT FOR KMC11 NUMBER 06
 002334  000000                         ERCT06: 0                   ;ERROR COUNT FOR KMC11 NUMBER 06

 002336  000000                         PACT07: 0                   ;PASS COUNT FOR KMC11 NUMBER 07
 002340  000000                         ERCT07: 0                   ;ERROR COUNT FOR KMC11 NUMBER 07

 002342  000000                         PACT10: 0                   ;PASS COUNT FOR KMC11 NUMBER 10
 002344  000000                         ERCT10: 0                   ;ERROR COUNT FOR KMC11 NUMBER 10

 002346  000000                         PACT11: 0                   ;PASS COUNT FOR KMC11 NUMBER 11
 002350  000000                         ERCT11: 0                   ;ERROR COUNT FOR KMC11 NUMBER 11

 002352  000000                         PACT12: 0                   ;PASS COUNT FOR KMC11 NUMBER 12
 002354  000000                         ERCT12: 0                   ;ERROR COUNT FOR KMC11 NUMBER 12

 002356  000000                         PACT13: 0                   ;PASS COUNT FOR KMC11 NUMBER 13
 002360  000000                         ERCT13: 0                   ;ERROR COUNT FOR KMC11 NUMBER 13

 002362  000000                         PACT14: 0                   ;PASS COUNT FOR KMC11 NUMBER 14
 002364  000000                         ERCT14: 0                   ;ERROR COUNT FOR KMC11 NUMBER 14

 002366  000000                         PACT15: 0                   ;PASS COUNT FOR KMC11 NUMBER 15
 002370  000000                         ERCT15: 0                   ;ERROR COUNT FOR KMC11 NUMBER 15

 002372  000000                         PACT16: 0                   ;PASS COUNT FOR KMC11 NUMBER 16
 002374  000000                         ERCT16: 0                   ;ERROR COUNT FOR KMC11 NUMBER 16

 002376  000000                         PACT17: 0                   ;PASS COUNT FOR KMC11 NUMBER 17
 002400  000000                         ERCT17: 0                   ;ERROR COUNT FOR KMC11 NUMBER 17

```

```
                          FORMAT OF STATUS TABLE
                          ----------------------

 15  14  13  12  11  10  09  08  07  06  05  04  03  02  01  00
-----------------------------------------------------------------
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
I C   O   N   T   R   O   L       R   E   G   I   S   T   E   R I     CSR
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
-----------------------------------------------------------------
-----------------------------------------------------------------
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
I * I * I * I * I * I * I * I *   *   V   E   C   T   O   R   * I     STAT1
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
-----------------------------------------------------------------
-----------------------------------------------------------------
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
I *   B   M       A   D   D   * I *   L   I   N   E       #   * I     STAT2
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
-----------------------------------------------------------------
-----------------------------------------------------------------
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I * I     STAT3
I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I   I
-----------------------------------------------------------------


                          DEFINITION OF FORMAT
                          --------------------

               CSR:     CONTAINS KMC11 CSR ADDRESS

               STAT1:   BITS 00-08 IS KMC11 VECTOR ADDRESS
                        BIT14=1 ???? TURNAROUND CONNECTOR IS ON
                        BIT14=0 NO TURNAROUND CONNECTOR
                        BIT13=0 LINE UNIT IS AN M8201
                        BIT13=1 LINE UNIT IS AN M8202
                        BIT12=1 NO LINE UNIT
                        BITS 09-11 IS KMC11 BR PRIORITY LEVEL

               STAT2:   LOW BYTE IS SWITCH PAC#1 (DDCMP LINE NUMBER)
                        HIGH BYTE IS SWITCH PAC#2 (BM873 BOOT ADD)

               STAT3:   BIT0=1 DO FREE RUNNING TESTS ON KMC
                        (MUST BE SET TO A ONE MANUALLY [PROGRAMS G AND H ONLY])
```

```

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

002402  012737  000340  177776  .START: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
002410  012706  001200                  MOV     #STACK,SP               ;SET UP STACK
002414  012737  007126  000024          MOV     #$PWRDN,@#24            ;SET UP POWER FAIL VECTOR
002422  013737  001472  001476          MOV     KMNUM,SAVNUM            ;SAVE NUMBER OF DEVICES IN SYSTEM.
002430  005037  011416                  CLR     SWFLG                   ;CLEAR SOFT TYPEOUT FLAG
002434  105037  001203                  CLRB    $ERFLG                  ;CLEAR ERROR FLAG
002440  105037  001511                  CLRB    QV.FLG                  ;ZERO QUICK VERIFY FLAG
002444  012737  002070  001502          MOV     #KM.MAP-10,CREAM        ;GET MAP POINTER.
002452  012737  002276  001504          MOV     #CNT.MAP-4,MILK         ;GET PASS COUNT MAP POINTER
002460  012737  100000  001500          MOV     #BIT15,RUN              ;POINT POINTER TO FIRST DEVICE.
002466  012700  002302                  MOV     #CNT.MAP,R0             ;PASS COUNT POINTER TO R0
002472  005020                  23$:    CLR     (R0)+                   ;CLEAR TABLE
002474  022700  002402                  CMP     #CNT.MAP+100,R0         ;DONE YET?
002500  001374                          BNE     23$                     ;KEEP GOING
002502  005037  001216                  CLR     $ERRPC                  ;CLEAR LAST ERROR POINTER
002506  012737  000001  001202          MOV     #1,$TSTNM               ;SET UP FOR TEST 1
002514  012737  002402  001206          MOV     #.START,$LPADR          ;SET UP FOR POWER FAIL BEFORE
                                                                        ;TESTING STARTS
002522  132737  000001  001336          BITB    #1,$ENV                 ; IS IT RUNNING UNDER APT?
002530  001404                          BEQ     3$                      ; IF NOT CHECK FOR TYPE OF SWITCH REGISTER.
002532  013737  001340  000176          MOV     $SWREG,SWREG            ; LOAD SOFTWARE SWITCH REG.
002540  000423                          BR      6$+2                    ; GO SET UP SOFTWARE SWITCH REG.
002542  013746  000006          3$:     MOV     @#6,-(SP)               ;SAVE CURRENT VECTORS
002546  013746  000004                  MOV     @#4,-(SP)               ;
002552  012737  002606  000004          MOV     #6$,@#4                 ;SET UP FOR TIMEOUT
002560  012737  177570  001240          MOV     #177570,SWR             ;SET SWR TO HARD SWR ADDRESS
002566  012737  177570  001242          MOV     #177570,DISPLAY         ;SET DISPLAY TO HARD SWR ADDRESS
002574  022777  177777  176436          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
002602  001402                          BEQ     6$+2                    ;IF = -1 USE SOFT SWR ANYWAY
002604  000407                          BR      7$                      ;IF IT EXISTS AND NOT = -1 USE HARD SWR
002606  022626                  6$:     CMP     (SP)+,(SP)+             ;ADJUST STACK
002610  012737  000176  001240          MOV     #SWREG,SWR              ;POINTER TO SOFT SWR
002616  012737  000174  001242          MOV     #DISPREG,DISPLAY        ;POINTER TO SOFT DISPLAY REG
002624  012637  000004          7$:     MOV     (SP)+,@#4               ;RESTORE VECTORS
002630  012637  000006                  MOV     (SP)+,@#6               ;
002634  105737  001506                  TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED
002640  001036                          BNE     20$                     ;BR IF YES
002642  022737  004070  000042          CMP     #$ENDAD,@#42            ;IF ACT-11 AUTOMATIC MODE, DON'T TYPE ID
002650  001402                          BEQ     20$
002652  104401  001000                  TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
002656  004737  011212          20$:    JSR     PC,CKSWR                        ;CHECK FOR SOFT SWR
002662  017737  176352  001446          MOV     @SWR,STRTSW             ;STORE STARTING SWITCHES
002670  005737  000042                  TST     @#42                    ;IS IT RUNNING IN AUTO MODE?
002674  001402                          BEQ     .+6                     ;BR IF NO
002676  005037  001446                  CLR     STRTSW                  ;IF YES, CLEAR SWITCHES
002702  032737  000001  001446          BIT     #SW00,STRTSW            ;IF SW00=1, QUESTIONS ARE ASKED.
002710  001012                          BNE     17$                     ;BR IF SW00=1
002712  105737  001446                  TSTB    STRTSW                  ;BIT7=1??
```

```
002716  100007                           BPL     17$             ;BR IF SW07=0
002720  005737  001470                   TST     KMACTV          ;ARE ANY DEVICES SELECTED?
002724  001027                           BNE     16$             ;BR IF YES
002726  104401  010731                   TYPE,   NOACT           ;NO DEVICES SELECTED.
002732  000000                           HALT                    ;STOP THE SHOW
002734  000776                           BR      .-2             ;DISQUALIFY CONTINUE SWITCH
002736  105737  001336          17$:     TSTB    $ENV            ; IS IT UNDER APT DUMP MODE?
002742  001405                           BEQ     27$             ; YES, CHECK IF APT SIZED IT?
002744  132737  000001  001336           BITB    #1,$ENV         ; IS IT UNDER Q.V OR RUN MODE?
002752  001012                           BNE     30$             ; YES, NEEDS ONLY APT SIZING.
002754  000406                           BR      33$             ; NO, NEEDS REGULAR AUTO.SIZE.
002756  105737  001337          27$:     TSTB    $ENVM           ; IS IT SIZED BY APT?
002762  100406                           BMI     30$             ; YES, NEEDS ONLY APT SIZING.
002764  042737  000001  001446           BIC     #SW00,STRTSW    ; SIZE ONLY IN AUTO MODE.
002772  004737  012110          33$:     JSR     PC,AUTO.SIZE    ; GO DO THE AUTO.SIZE.
002776  000402                           BR      16$             ; GO PRINT THE MAP.
003000  004737  013510          30$:     JSR     PC,APT.SIZE     ; GO DO THE APT SIZING.
003004  105737  001506          16$:     TSTB    INIFLG          ;FIRST TIME?
003010  001410                           BEQ     21$             ;BR IF YES
003012  105737  001446                   TSTB    STRTSW          ;IF USING SAME PARAMETERS DONT TYPE MAP
003016  100431                           BMI     1$
003020  032737  000006  001446           BIT     #BIT1!BIT2,STRTSW;IS TEST NO. OR LOCK SELECTED
003026  001403                           BEQ     24$             ;IF NO THEN TYPE STATUS
003030  000424                           BR      1$              ;IF YES DO NOT TYPE STATUS
003032  105137  001506          21$:     COMB    INIFLG          ;SET FLAG
003036  104401  010077          24$:     TYPE    ,XHEAD          ;TYPE HEADER
003042  012704  002100                   MOV     #KM.MAP,R4      ;SET POINTER
003046  010437  001276          5$:      MOV     R4,$TMP0        ;SET ADDRESS
003052  012437  001300                   MOV     (R4)+,$TMP1     ;SET CSR
003056  001411                           BEQ     1$              ;ALL DONE IF ZERO
003060  012437  001302                   MOV     (R4)+,$TMP2     ;SET STAT1
003064  012437  001304                   MOV     (R4)+,$TMP3     ;SET STAT2
003070  012437  001306                   MOV     (R4)+,$TMP4     ;SET STAT3
003074  104416                           CONVRT                  ;TYPE OUT STATUS MAP
003076  011060                           XSTATQ                  ;
003100  000762                           BR      5$
003102  012700  002100          1$:      MOV     #KM.MAP,R0      ;R0 POINTS TO STATUS TABLE

                                ;;***********************************************************
                                ;;*AUTO SIZE TEST
                                ;;*THIS TEST VERIFYS THAT THE KMC11S AND/OR KMC11S ARE AT THE CORRECT FLOATING
                                ;;*ADDRESSES FOR YOUR SYSTEM. IF THIS TEST FAILS, IT IS NOT A HARDWARE ERROR.
                                ;;*CHECK THE ADDRESSES OF ALL FLOATING DEVICES (DJ,DH,DQ,DU,DUP,LK,DMC,DZ,KMC).
                                ;;*IF THERE ARE NO OTHER FLOATING DEVICES BEFORE THE KMC11, THE FIRST
                                ;;* KMC11 IS 760110. NO DEVICE SHOULD EVER BE AT
                                ;;*ADDRESS 760000.
                                ;;***********************************************************

003106  013746  000004                   MOV     @#4,-(SP)       ;SAVE LOC 4
003112  013746  000006                   MOV     @#6,-(SP)       ;SAVE LOC 6
003116  005037  000006                   CLR     @#6             ;CLEAR VEC+2
003122  005037  001302                   CLR     $TMP2           ;CLEAR FLAG
003126  011037  002066          AUSTRT:  MOV     (R0),KMCSR      ;GET NEXT KMC CSR
003132  001510                           BEQ     AUDONE          ;BR IF DONE
003134  012737  003240  000004  2$:      MOV     #NODEV,@#4      ;SET UP FOR TIMEOUT
003142  012703  000010          3$:      MOV     #10,R3          ;R3 IS COUNT OF DEVICES BEFORE KMC
```

```
003146  012702  003342          4$:     MOV     #DEVTAB,R2          ;R2 IS DEVICE TABLE PONTER
003152  012701  160010                  MOV     #160010,R1          ;START WITH ADDRESS 160010
003156  005711                  FLOAT:  TST     (R1)                ;CHECK ADDRESS IN R1
003160  111204                          MOVB    (R2),R4             ;IF NO TIMEOUT, GET NEXT ADDRESS
003162  060401                          ADD     R4,R1               ;IN R1
003164  005201                          INC     R1                  ;
003166  040401                          BIC     R4,R1               ;
003170  005703                          TST     R3                  ;ANY MORE DEVICES TO CHECK FOR?
003172  001371                          BNE     FLOAT               ;BR IF YES
003174  012737  003244  000004          MOV     #ERR,@#4            ;OK ONLY KMC'S ARE LEFT, SET UP FOR TIMEOUT
003202  005711                  FY:     TST     (R1)                ;CHECK KMC ADDRESS
003204  020137  002066                  CMP     R1,KMCSR            ;DOES IT MATCH
003210  001403                          BEQ     OK                  ;BR IF YES
003212  062701  000010                  ADD     #10,R1              ;GET NEXT KMC ADDRESS
003216  000771                          BR      FY                  ;DO IT AGAIN
003220  062700  000010          OK:     ADD     #10,R0              ;SKIP TO NEXT KMC CSR
003224  062701  000010                  ADD     #10,R1              ; GET NEXT KMC ADDRESS
003230  011037  002066                  MOV     (R0),KMCSR          ; GET NEXT KMC CSR
003234  001447                          BEQ     AUDONE              ; BRANCH IF ALL DONE.
003236  000761                          BR      FY                  ; DO IT AGAIN.
003240  122243                  NODEV:  CMPB    (R2)+,-(R3)         ;ON TIMEOUT, INC R2, DEC R3
003242  000002                          RTI                         ;SLPADR
003244  005737  001302          ERR:    TST     $TMP2               ;CHECK FLAG IF = 0 TYPE HEADER
003250  001014                          BNE     1$                  ;SKIP HEADER
003252  104401                          TYPE                        ;TYPEOUT HEADER MESSAGE
003254  010762                          CONERR                      ;CONFIGURATION ERROR!!!!
003256  012737  003244  001460          MOV     #ERR,SAVPC          ;SAVE PC FOR TYPEOUT
003264  104417                          CNVRT                       ;TYPE OUT ERROR PC
003266  003322                          ERRPC                       ;
003270  104401                          TYPE                        ;TYPE REST OF HEADER
003272  011027                          CNERR                       ;
003274  012737  177777  001302          MOV     #-1,$TMP2           ;SET FLAG SO IT ONLY GETS TYPED ONCE
003302  010137  001264          1$:     MOV     R1,$REG1            ;SAVE R1 FOR TYPEOUT
003306  104416                          CONVRT
003310  003330                          CONTAB                      ;TYPE CSR VALUES
003312  104401                  3$:     TYPE
003314  011050                          KMCM
003316  022626                  4$:     CMP     (SP)+,(SP)+         ;ADJUST STACK
003320  000737                          BR      OK                  ;BR TO GET OUT
003322  000001                  ERRPC:  1
003324     006     002                  .BYTE   6,2
003326  001460                          SAVPC
003330  000002                  CONTAB: 2
003332     006     004                  .BYTE   6,4
003334  001264                          $REG1
003336     006     002                  .BYTE   6,2
003340  002066                          KMCSR
003342     007                  DEVTAB: .BYTE   7                   ;DJ
003343     017                          .BYTE   17                  ;DH
003344     007                          .BYTE   7                   ;DQ
003345     007                          .BYTE   7                   ;DU
003346     007                          .BYTE   7                   ;DUP
003347     007                          .BYTE   7                   ;LK
003350     007                          .BYTE   7                   ;DMC
003351     007                          .BYTE   7                   ;DZ
003352     007                          .BYTE   7                   ;KMC
```

```
        003354                  .EVEN
003354                          AUDONE:
003354  012637  000006          1$:       MOV     (SP)+,@#6       ;RESTORE LOC 6
003360  012637  000004                    MOV     (SP)+,@#4       ;RESTORE LOC 4
003364  032737  000010  001446            BIT     #SW03,STRTSW    ;SELECT SPECIFIC DEVICES??
003372  001422                            BEQ     3$              ;BR IF NO.
003374  104401  010017                    TYPE    ,MNEW           ;TYPE THE MESSAGE.
003400  005000                            CLR     R0              ;ZERO DATA LIGHTS
003402  000000                            HALT                    ;WAIT FOR USER TO TELL WHAT DEVICES TO RUN
003404  027737  175630  001474            CMP     @SWR,SAVACT     ;IS THE NUMBER VALID?
003412  101404                            BLOS    2$              ;BR IF NUMBER IS OK.
003414  104401  007672                    TYPE    ,MERR3          ;TELL USER OF INVALID NUMBER.
003420  000000                            HALT                    ;STOP EVERY THING.
003422  000776                            BR      .-2             ;RESTART THE PROGRAM AGAIN.
003424  017737  175610  001470  2$:       MOV     @SWR,KMACTV     ;GET NEW DEVICE PATTERN
003432  013700  001470                    MOV     KMACTV,R0       ;SHOW THE USER WHAT HE SELECTED.
003436  000000                            HALT                    ;CONTINUE DYNAMIC SWITCHES.
003440  012700  000300          3$:       MOV     #300,R0         ;PREPARE TO CLEAR THE FLOATING
003444  012701  000302                    MOV     #302,R1         ;VECTOR AREA. 300-776
003450  010120                  4$:       MOV     R1,(R0)+        ;START PUTTING "PC+2 - HALT"
003452  005021                            CLR     (R1)+           ;IN VECTOR AREA.
003454  022021                            CMP     (R0)+,(R1)+     ;POP POINTERS
003456  022700  001000                    CMP     #1000,R0        ;ALL DONE??
003462  001372                            BNE     4$              ;BR IF NO.

                                ;TEST START AND RESTART
                                ;----------------------

003464  012706  001200          .BEGIN:   MOV     #STACK,SP       ;SET UP STACK
003470  013746  000006                    MOV     @#6,-(SP)       ;SAVE LOC 6
003474  013746  000004                    MOV     @#4,-(SP)       ;SAVE LOC 4
003500  005000                            CLR     R0              ;START AT 0
003502  012737  003546  000004            MOV     #2$,@#4         ;SET UP FOR TIME OUT
003510  005037  000006                    CLR     @#6             ;TO AUTOSIZE MEMORY
003514  005720                  6$:       TST     (R0)+           ;CHECK ADDRESS IN R0
003516  022700  157776                    CMP     #157776,R0      ;IS IT AT LEAST 28K
003522  001374                            BNE     6$              ;BR IF NO
003524  162700  007776                    SUB     #7776,R0        ;SAVE 2K FOR MONITORS
003530  010037  001466          7$:       MOV     R0,MEMLIM       ;STORE MEMORY LIMIT
003534  012637  000004                    MOV     (SP)+,@#4       ;RESTORE LOC 4
003540  012637  000006                    MOV     (SP)+,@#6       ;RESTORE LOC 6
003544  000413                            BR      10$             ;CONTINUE
003546  022626                  2$:       CMP     (SP)+,(SP)+     ;ADJUST STACK
003550  162700  000004                    SUB     #4,R0           ;GET LAST GOOD ADDRESS
003554  162700  007776                    SUB     #7776,R0        ;SAVE 2K FOR MONITORS
003560  022700  030000                    CMP     #30000,R0       ;IS IT 8K?
003564  001361                            BNE     7$              ;BR IF NO
003566  012700  037400                    MOV     #37400,R0       ;IF 8K DON'T SAVE 2K
003572  000756                            BR      7$              ;
003574  012737  000340  177776  10$:      MOV     #340,PS         ;LOCK OUT INTERRUPTS
003602  032737  000004  001446            BIT     #BIT2,STRTSW    ;CHECK FOR LOCK ON TEST
003610  001406                            BEQ     1$              ;BR IF NO LOCK DESIRED.
003612  104401  007716                    TYPE    ,MLOCK          ;TYPE LOCK SELECTED.
003616  012737  000240  004146            MOV     #NOP,TTST       ;SET UP TO LOCK
003624  000403                            BR      3$              ;CONTINUE ALONG.
003626  013737  004360  004146  1$:       MOV     BRW,TTST        ;PREPARE NORMAL SCOPE ROUTINE
```

```
003634  012737  011460  001206  3$:     MOV     #CYCLE,$LPADR    ;START AT "CYCLE" FIND WHICH DEVICE TO TEST
003642  032737  000002  001446  4$:     BIT     #SW01,STRTSW     ;IS TEST NO. SELECTED?
003650  001002                          BNE     5$               ;BR IF YES
003652  104401  007642                  TYPE    ,MR              ;TYPE R
003656  000177  175324          5$:     JMP     @$LPADR          ;START TESTING
```

```
                                          ;END OF PASS
                                          ;TYPE NAME OF TEST
                                          ;UPDATE PASS COUNT
                                          ;CHECK FOR EXIT TO ACT-11
                                          ;RESTART TEST

                                .SBTTL    END OF PASS ROUTINE

                                ;;*****************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO CYCLE

003662                          $EOP:
003662  000005                            RESET
003664  005237  001324                    INC     $PASS              ; INCREMENT THE PASS COUNT
003670  105037  001203                    CLRB    $ERFLG             ; CLEAR ERROR FLAG
003674  104401  007620                    TYPE    ,MEPASS            ; TYPE END PASS.
003700  104401  007745                    TYPE    ,MCSRX             ; TYPE "CSR"
003704  104417  004104                    CNVRT   ,XCSR              ; SHOW IT.
003710  104401  007753                    TYPE    ,MVECX             ; TYPE VECTOR.
003714  104417  004112                    CNVRT   ,XVEC              ; SHOW IT.
003720  104401  007761                    TYPE    ,MPASSX            ; TYPE " PASSES "
003724  104417  004120                    CNVRT   ,XPASS             ; SHOW IT.
003730  104401  007772                    TYPE    ,MERRX             ; TYPE " ERRORS "
003734  104417  004126                    CNVRT   ,XERR              ; SHOW IT.
003740  013700  001504                    MOV     MILK,R0            ; SET POINTER TO PASSCNT.
003744  013720  001324                    MOV     $PASS,(R0)+        ; SAVE THE PASS COUNT.
003750  013720  001212                    MOV     $ERTTL,(R0)+       ; SAVE ERROR COUNT
003754  013777  002060  176074            MOV     KMRLVL,@KMRVEC     ; RESTORE THE RECEIVER INTERRUPT VECTOR.
003762  005077  176072                    CLR     @KMRLVL            ; RESTORE RECEIVER LEVEL
003766  013777  002064  176066            MOV     KMTLVL,@KMTVEC     ; RESTORE THE TRANSMIT INTERRUPT VECTOR.
003774  005077  176064                    CLR     @KMTLVL            ; RESTORE TRANSMITTER LEVEL
004000  005337  001476                    DEC     SAVNUM             ; ALL DEVICE TESTED?
004004  001035                            BNE     $DOAGN             ; BRANCH IF NO.
004006  112737  000377  001511            MOVB    #377,QV.FLG        ; SET QUICK VERIFY FLAG.
004014  013737  001472  001476            MOV     KMNUM,SAVNUM       ; RESTORE DEVICE COUNT.
004022  005037  001216                    CLR     $ERRPC             ; CLEAR LAST ERROR PC
004026  005037  001310                    CLR     $TIMES             ;;ZERO THE NUMBER OF ITERATIONS
004032  005237  001324                    INC     $PASS              ;;INCREMENT THE PASS NUMBER
004036  042737  100000  001324            BIC     #100000,$PASS      ;;DON'T ALLOW A NEG. NUMBER
004044  005327                            DEC     (PC)+              ;;LOOP?
004046  000001                  $EOPCT:   .WORD   1
004050  003013                            BGT     $DOAGN             ;;YES
004052  012737                            MOV     (PC)+,@(PC)+       ;;RESTORE COUNTER
004054  000001                  $ENDCT:   .WORD   1
004056  004046                            $EOPCT
004060  013700  000042          $GET42:   MOV     @#42,R0            ;;GET MONITOR ADDRESS
004064  001405                            BEQ     $DOAGN             ;;BRANCH IF NO MONITOR
004066  000005                            RESET                      ;;CLEAR THE WORLD
004070  004710                  $ENDAD:   JSR     PC,(R0)            ;;GO TO MONITOR
004072  000240                            NOP                        ;;SAVE ROOM
004074  000240                            NOP                        ;;FOR
004076  000240                            NOP                        ;;ACT11
004100                          $DOAGN:
004100  000137                            JMP     @(PC)+             ;;RETURN
```

```
004102  011460                          $RTNAD: .WORD   CYCLE
004104  000001                          XCSR:   1
004106     006     002                          .BYTE   6,2
004110  002066                                  KMCSR
004112  000001                          XVEC:   1
004114     004     002                          .BYTE   4,2
004116  002056                                  KMRVEC
004120  000001                          XPASS:  1
004122     006     002                          .BYTE   6,2
004124  001324                                  $PASS
004126  000001                          XERR:   1
004130     006     002                          .BYTE   6,2
004132  001212                                  $ERTTL

                                                ;SCOPE LOOP AND INTERATION HANDLER
                                                ;---------------------------------

                                        .SBTTL  SCOPE HANDLER ROUTINE

                                        ;;*************************************************************
                                        ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                        ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                        ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                        ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                        ;*SW14=1         LOOP ON TEST
                                        ;*SW11=1         INHIBIT ITERATIONS
                                        ;*CALL
                                        ;*       SCOPE           ;;SCOPE=IOT

004134                                  $SCOPE:
004134  005037  001216                          CLR     $ERRPC                  ; CLEAR LAST ERROR PC
004140  023716  013734                          CMP     TST1+2,(SP)             ; IS THIS TEST #1 ?
004144  001413                                  BEQ     $XTSTR                  ; IF SO DON'T LOOP.
004146  000406                          TTST:   BR      1$                      ;
004150  105777  175070                          TSTB    @$TKS                   ; KEYBOARD DONE ?
004154  100067                                  BPL     $OVER                   ; IF NO DONT WAIT.
004156  017766  175064  177776                  MOV     @$TKB,-2(SP)            ;
004164  032777  040000  175046          1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
004172  001060                                  BNE     $OVER           ;;YES IF SW14=1
                                        ;#####START OF CODE FOR THE XOR TESTER#####
004174  000416                          $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
004176  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
004202  012737  004222  000004                  MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
004210  005737  177060                          TST     @#177060        ;;TIME OUT ON XOR?
004214  012637  000004                          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
004220  000436                                  BR      $SVLAD          ;;GO TO THE NEXT TEST
004222  022626                          5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
004224  012637  000004                          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
004230  000441                                  BR      $OVER           ;;LOOP ON THE PRESENT TEST
004232                                  6$:;#####END OF CODE FOR THE XOR TESTER#####
004232  105737  001203                  2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
004236  001404                                  BEQ     3$              ;;BR IF NO
004240  105037  001203                  4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
004244  005037  001310                          CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
004250  032777  004000  174762          3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
```

```
004256  001011                                    BNE     1$                      ;;BR IF YES
004260  005737  001324                            TST     $PASS                   ;;IF FIRST PASS OF PROGRAM
004264  001406                                    BEQ     1$                      ;;      INHIBIT ITERATIONS
004266  005237  001204                            INC     $ICNT                   ;;INCREMENT ITERATION COUNT
004272  023737  001310  001204                    CMP     $TIMES,$ICNT            ;;CHECK THE NUMBER OF ITERATIONS MADE
004300  002015                                    BGE     $OVER                   ;;BR IF MORE ITERATION REQUIRED
004302  012737  000001  001204  1$:       MOV     #1,$ICNT                ;;REINITIALIZE THE ITERATION COUNTER
004310  013737  004362  001310            MOV     $MXCNT,$TIMES           ;;SET NUMBER OF ITERATIONS TO DO
004316  105237  001202          $SVLAD:   INCB    $TSTNM                  ;;COUNT TEST NUMBERS
004322  113737  001202  001322            MOVB    $TSTNM,$TESTN           ;;SET TEST NUMBER IN APT MAILBOX
004330  011637  001206                    MOV     (SP),$LPADR             ;;SAVE SCOPE LOOP ADDRESS
004334  013777  001202  174700  $OVER:    MOV     $TSTNM,@DISPLAY         ;;DISPLAY TEST NUMBER
004342  013716  001206                    MOV     $LPADR,(SP)             ;;FUDGE RETURN ADDRESS
004346  005037  001444                    CLR     LOCK                            ; RESET LOCK ON DATA.
004352  013701  002066                    MOV     KMCSR,R1                        ; R1 CONTAINS BASE KMC ADDRESS.
004356  000002                            RTI
004360  000406                  BRW:      .WORD   406
004362  000020                  $MXCNT:   20                              ;;MAX. NUMBER OF ITERATIONS

                                          ;CHECK FOR FREEZE ON CURRENT DATA
                                          ;---------------------------------
                                          ;
004364  004737  011212          .SCOP1:   JSR     PC,CKSWR                ;CHECK FOR SOFT SWR
004370  032777  001000  174642            BIT     #SW09,@SWR              ;IS SW09=1(SET)?
004376  001405                            BEQ     1$                      ;BR IF NOT SET.
004400  005737  001444                    TST     LOCK
004404  001402                            BEQ     1$
004406  013716  001444                    MOV     LOCK,(SP)               ;GOTO THE ADDRESS IN LOCK.
004412  000002                  1$:       RTI                             ;GO BACK.

                                          ;TELETYPE OUTPUT ROUTINE
                                          ;-----------------------
                                          ;

                                .SBTTL  TYPE ROUTINE

                                ;;************************************************************
                                ;;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                ;;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                ;;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                ;;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                ;;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                ;;*
                                ;;*CALL:
                                ;;*1) USING A TRAP INSTRUCTION
                                ;;*       TYPE    ,MESADR                 ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                ;;*OR
                                ;;*       TYPE
                                ;;*       MESADR
                                ;;*

004414  105737  001257          $TYPE:    TSTB    $TPFLG                  ;;IS THERE A TERMINAL?
004420  100002                            BPL     1$                      ;;BR IF YES
004422  000000                            HALT                            ;;HALT HERE IF NO TERMINAL
004424  000430                            BR      3$                      ;;LEAVE
004426  010046                  1$:       MOV     R0,-(SP)                ;;SAVE R0
004430  017600  000002                    MOV     @2(SP),R0               ;;GET ADDRESS OF ASCIZ STRING
```

```
004434  122737  000001  001336            CMPB    #APTENV,$ENV        ;;RUNNING IN APT MODE
004442  001011                            BNE     62$                 ;;NO,GO CHECK FOR APT CONSOLE
004444  132737  000100  001337            BITB    #APTSPOOL,$ENVM     ;;SPOOL MESSAGE TO APT
004452  001405                            BEQ     62$                 ;;NO,GO CHECK FOR CONSOLE
004454  010037  004464                    MOV     R0,61$              ;;SETUP MESSAGE ADDRESS FOR APT
004460  004737  004704                    JSR     PC,$ATY3            ;;SPOOL MESSAGE TO APT
004464  000000                    61$:    .WORD   0                   ;;MESSAGE ADDRESS
004466  132737  000040  001337    62$:    BITB    #APTCSUP,$ENVM      ;;APT CONSOLE SUPPRESSED
004474  001003                            BNE     60$                 ;;YES,SKIP TYPE OUT
004476  112046                    2$:     MOVB    (R0)+,-(SP)         ;;PUSH CHARACTER TO BE TYPED ONTO STACK
004500  001005                            BNE     4$                  ;;BR IF IT ISN'T THE TERMINATOR
004502  005726                            TST     (SP)+               ;;IF TERMINATOR POP IT OFF THE STACK
004504  012600                    60$:    MOV     (SP)+,R0            ;;RESTORE R0
004506  062716  000002            3$:     ADD     #2,(SP)             ;;ADJUST RETURN PC
004512  000002                            RTI                         ;;RETURN
004514  122716  000011            4$:     CMPB    #HT,(SP)            ;;BRANCH IF <HT>
004520  001430                            BEQ     8$
004522  122716  000200                    CMPB    #CRLF,(SP)          ;;BRANCH IF NOT <CRLF>
004526  001006                            BNE     5$
004530  005726                            TST     (SP)+               ;;POP  <CR><LF> EQUIV
004532  104401                            TYPE                        ;;TYPE A CR AND LF
004534  001313                            $CRLF
004536  105037  004672                    CLRB    $CHARCNT            ;;CLEAR CHARACTER COUNT
004542  000755                            BR      2$                  ;;GET NEXT CHARACTER
004544  004737  004626            5$:     JSR     PC,$TYPEC           ;;GO TYPE THIS CHARACTER
004550  123726  001256            6$:     CMPB    $FILLC,(SP)+        ;;IS IT TIME FOR FILLER CHARS.?
004554  001350                            BNE     2$                  ;;IF NO GO GET NEXT CHAR.
004556  013746  001254                    MOV     $NULL,-(SP)         ;;GET # OF FILLER CHARS. NEEDED
                                                                      ;;AND THE NULL CHAR.
004562  105366  000001            7$:     DECB    1(SP)               ;;DOES A NULL NEED TO BE TYPED?
004566  002770                            BLT     6$                  ;;BR IF NO--GO POP THE NULL OFF OF STACK
004570  004737  004626                    JSR     PC,$TYPEC           ;;GO TYPE A NULL
004574  105337  004672                    DECB    $CHARCNT            ;;DO NOT COUNT AS A COUNT
004600  000770                            BR      7$                  ;;LOOP

                                  ;HORIZONTAL TAB PROCESSOR

004602  112716  000040            8$:     MOVB    #' ,(SP)            ;;REPLACE TAB WITH SPACE
004606  004737  004626            9$:     JSR     PC,$TYPEC           ;;TYPE A SPACE
004612  132737  000007  004672            BITB    #7,$CHARCNT         ;;BRANCH IF NOT AT
004620  001372                            BNE     9$                  ;;TAB STOP
004622  005726                            TST     (SP)+               ;;POP SPACE OFF STACK
004624  000724                            BR      2$                  ;;GET NEXT CHARACTER
004626  105777  174416            $TYPEC: TSTB    @$TPS               ;;WAIT UNTIL PRINTER IS READY
004632  100375                            BPL     $TYPEC
004634  116677  000002  174410            MOVB    2(SP),@$TPB         ;;LOAD CHAR TO BE TYPED INTO DATA REG.
004642  122766  000015  000002            CMPB    #CR,2(SP)           ;;IS CHARACTER A CARRIAGE RETURN?
004650  001003                            BNE     1$                  ;;BRANCH IF NO
004652  105037  004672                    CLRB    $CHARCNT            ;;YES--CLEAR CHARACTER COUNT
004656  000406                            BR      $TYPEX              ;;EXIT
004660  122766  000012  000002    1$:     CMPB    #LF,2(SP)           ;;IS CHARACTER A LINE FEED?
004666  001402                            BEQ     $TYPEX              ;;BRANCH IF YES
004670  105227                            INCB    (PC)+               ;;COUNT THE CHARACTER
004672  000000                    $CHARCNT:.WORD  0                   ;;CHARACTER COUNT STORAGE
004674  000207                    $TYPEX: RTS     PC
```

```
                                            .SBTTL  APT COMMUNICATIONS ROUTINE

                                            ;;*****************************************************************
004676  112737  000001  005142  $ATY1:  MOVB    #1,$FFLG           ;;TO REPORT FATAL ERROR
004704  112737  000001  005140  $ATY3:  MOVB    #1,$MFLG           ;;TO TYPE A MESSAGE
004712  000403                          BR      $ATYC
004714  112737  000001  005142  $ATY4:  MOVB    #1,$FFLG           ;;TO ONLY REPORT FATAL ERROR
004722                                  $ATYC:
004722  010046                          MOV     R0,-(SP)           ;;PUSH R0 ON STACK
004724  010146                          MOV     R1,-(SP)           ;;PUSH R1 ON STACK
004726  105737  005140                  TSTB    $MFLG              ;;SHOULD TYPE A MESSAGE?
004732  001450                          BEQ     5$                 ;;IF NOT:  BR
004734  122737  000001  001336          CMPB    #APTENV,$ENV       ;;OPERATING UNDER APT?
004742  001031                          BNE     3$                 ;;IF NOT:  BR
004744  132737  000100  001337          BITB    #APTSPOOL,$ENVM    ;;SHOULD SPOOL MESSAGES?
004752  001425                          BEQ     3$                 ;;IF NOT:  BR
004754  017600  000004                  MOV     @4(SP),R0          ;;GET MESSAGE ADDR.
004760  062766  000002  000004          ADD     #2,4(SP)                   ;;BUMP RETURN ADDR.
004766  005737  001316          1$:     TST     $MSGTYPE           ;;SEE IF DONE W/ LAST XMISSION?
004772  001375                          BNE     1$                 ;;IF NOT:  WAIT
004774  010037  001332                  MOV     R0,$MSGAD          ;;PUT ADDR IN MAILBOX
005000  105720                  2$:     TSTB    (R0)+              ;;FIND END OF MESSAGE
005002  001376                          BNE     2$
005004  163700  001332                  SUB     $MSGAD,R0          ;;SUB START OF MESSAGE
005010  006200                          ASR     R0                 ;;GET MESSAGE LNGTH IN WORDS
005012  010037  001334                  MOV     R0,$MSGLGT         ;;PUT LENGTH IN MAILBOX
005016  012737  000004  001316          MOV     #4,$MSGTYPE        ;;TELL APT TO TAKE MSG.
005024  000413                          BR      5$
005026  017637  000004  005052  3$:     MOV     @4(SP),4$          ;;PUT MSG ADDR IN JSR LINKAGE
005034  062766  000002  000004          ADD     #2,4(SP)                   ;;BUMP RETURN ADDRESS
005042  013746  177776                  MOV     177776,-(SP)       ;;PUSH 177776 ON STACK
005046  004737  004414                  JSR     PC,$TYPE           ;;CALL TYPE MACRO
005052  000000                  4$:     .WORD   0
005054                          5$:
005054  105737  005142          10$:    TSTB    $FFLG              ;;SHOULD REPORT FATAL ERROR?
005060  001416                          BEQ     12$                ;;IF NOT:  BR
005062  005737  001336                  TST     $ENV               ;;RUNNING UNDER APT?
005066  001413                          BEQ     12$                ;;IF NOT:  BR
005070  005737  001316          11$:    TST     $MSGTYPE           ;;FINISHED LAST MESSAGE?
005074  001375                          BNE     11$                ;;IF NOT:  WAIT
005076  017637  000004  001320          MOV     @4(SP),$FATAL      ;;GET ERROR #
005104  062766  000002  000004          ADD     #2,4(SP)                   ;;BUMP RETURN ADDR.
005112  005237  001316                  INC     $MSGTYPE           ;;TELL APT TO TAKE ERROR
005116  105037  005142          12$:    CLRB    $FFLG              ;;CLEAR FATAL FLAG
005122  105037  005141                  CLRB    $LFLG              ;;CLEAR LOG FLAG
005126  105037  005140                  CLRB    $MFLG              ;;CLEAR MESSAGE FLAG
005132  012601                          MOV     (SP)+,R1           ;;POP STACK INTO R1
005134  012600                          MOV     (SP)+,R0           ;;POP STACK INTO R0
005136  000207                          RTS     PC                 ;;RETURN
005140     000                  $MFLG:  .BYTE   0                  ;;MESSG. FLAG
005141     000                  $LFLG:  .BYTE   0                  ;;LOG FLAG
005142     000                  $FFLG:  .BYTE   0                  ;;FATAL FLAG
        005144                          .EVEN
        000200                  APTSIZE=200
        000001                  APTENV=001
        000100                  APTSPOOL=100
```

```
                000040                          APTCSUP=040
                                                        ;--------------------------

                                                .SBTTL  TTY INPUT ROUTINE

                                                ;;*************************************************************
                                                .ENABL  LSB

                                                .DSABL  LSB


                                                ;;*************************************************************
                                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                                ;*CALL:
                                                ;*      RDCHR                           ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                                ;*      RETURN HERE                     ;;CHARACTER IS ON THE STACK
                                                ;*                                      ;;WITH PARITY BIT STRIPPED OFF
                                                ;

        005144  011646                          $RDCHR: MOV     (SP),-(SP)              ;;PUSH DOWN THE PC
        005146  016666  000004  000002                  MOV     4(SP),2(SP)             ;;SAVE THE PS
        005154  105777  174064                  1$:     TSTB    @$TKS                   ;;WAIT FOR
        005160  100375                                  BPL     1$                      ;;A CHARACTER
        005162  117766  174060  000004                  MOVB    @$TKB,4(SP)             ;;READ THE TTY
        005170  042766  177600  000004                  BIC     #↑C<177>,4(SP)          ;;GET RID OF JUNK IF ANY
        005176  026627  000004  000023                  CMP     4(SP),#23               ;;IS IT A CONTROL-S?
        005204  001013                                  BNE     3$                      ;;BRANCH IF NO
        005206  105777  174032                  2$:     TSTB    @$TKS                   ;;WAIT FOR A CHARACTER
        005212  100375                                  BPL     2$                      ;;LOOP UNTIL ITS THERE
        005214  117746  174026                          MOVB    @$TKB,-(SP)             ;;GET CHARACTER
        005220  042716  177600                          BIC     #↑C177,(SP)             ;;MAKE IT 7-BIT ASCII
        005224  022627  000021                          CMP     (SP)+,#21               ;;IS IT A CONTROL-Q?
        005230  001366                                  BNE     2$                      ;;IF NOT DISCARD IT
        005232  000750                                  BR      1$                      ;;YES, RESUME
        005234  026627  000004  000140          3$:     CMP     4(SP),#140              ;;IS IT UPPER CASE?
        005242  002407                                  BLT     4$                      ;;BRANCH IF YES
        005244  026627  000004  000175                  CMP     4(SP),#175              ;;IS IT A SPECIAL CHAR?
        005252  003003                                  BGT     4$                      ;;BRANCH IF YES
        005254  042766  000040  000004                  BIC     #40,4(SP)               ;;MAKE IT UPPER CASE
        005262  000002                          4$:     RTI                             ;;GO BACK TO USER
                                                ;;*************************************************************
                                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                                ;*CALL:
                                                ;*      RDLIN                           ;;INPUT A STRING FROM THE TTY
                                                ;*      RETURN HERE                     ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                                ;*                                      ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

        005264  010346                          $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
        005266  005046                                  CLR     -(SP)                   ;;CLEAR THE RUBOUT KEY
        005270  012703  005520                  1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
        005274  022703  005527                  2$:     CMP     #$TTYIN+7,R3            ;;BUFFER FULL?
        005300  101456                                  BLOS    4$                      ;;BR IF YES
        005302  104402                                  RDCHR                           ;;GO READ ONE CHARACTER FROM THE TTY
        005304  112613                                  MOVB    (SP)+,(R3)              ;;GET CHARACTER
        005306  122713  000177                  10$:    CMPB    #177,(R3)               ;;IS IT A RUBOUT
        005312  001022                                  BNE     5$                      ;;BR IF NO
```

```
005314  005716                              TST     (SP)                    ;;IS THIS THE FIRST RUBOUT?
005316  001007                              BNE     6$                      ;;BR IF NO
005320  112737  000134  005516              MOVB    #'\,9$                  ;;TYPE A BACK SLASH
005326  104401  005516                      TYPE    ,9$
005332  012716  177777                      MOV     #-1,(SP)                ;;SET THE RUBOUT KEY
005336  005303                      6$:     DEC     R3                      ;;BACKUP BY ONE
005340  020327  005520                      CMP     R3,#$TTYIN              ;;STACK EMPTY?
005344  103434                              BLO     4$                      ;;BR IF YES
005346  111337  005516                      MOVB    (R3),9$                 ;;SETUP TO TYPEOUT THE DELETED CHAR.
005352  104401  005516                      TYPE    ,9$                     ;;GO TYPE
005356  000746                              BR      2$                      ;;GO READ ANOTHER CHAR.
005360  005716                      5$:     TST     (SP)                    ;;RUBOUT KEY SET?
005362  001406                              BEQ     7$                      ;;BR IF NO
005364  112737  000134  005516              MOVB    #'\,9$                  ;;TYPE A BACK SLASH
005372  104401  005516                      TYPE    ,9$
005376  005016                              CLR     (SP)                    ;;CLEAR THE RUBOUT KEY
005400  122713  000025              7$:     CMPB    #25,(R3)                ;;IS CHARACTER A CTRL U?
005404  001003                              BNE     8$                      ;;BR IF NO
005406  104401  005527                      TYPE    ,$CNTLU                 ;;TYPE A CONTROL "U"
005412  000726                              BR      1$                      ;;GO START OVER
005414  122713  000022              8$:     CMPB    #22,(R3)                ;;IS CHARACTER A "↑R"?
005420  001011                              BNE     3$                      ;;BRANCH IF NO
005422  105013                              CLRB    (R3)                    ;;CLEAR THE CHARACTER
005424  104401  001313                      TYPE    ,$CRLF                  ;;TYPE A "CR" & "LF"
005430  104401  005520                      TYPE    ,$TTYIN                 ;;TYPE THE INPUT STRING
005434  000717                              BR      2$                      ;;GO PICKUP ANOTHER CHACTER
005436  104401  001312              4$:     TYPE    ,$QUES                  ;;TYPE A '?'
005442  000712                              BR      1$                      ;;CLEAR THE BUFFER AND LOOP
005444  111337  005516              3$:     MOVB    (R3),9$                 ;;ECHO THE CHARACTER
005450  104401  005516                      TYPE    ,9$
005454  122723  000015                      CMPB    #15,(R3)+               ;;CHECK FOR RETURN
005460  001305                              BNE     2$                      ;;LOOP IF NOT RETURN
005462  105063  177777                      CLRB    -1(R3)                  ;;CLEAR RETURN (THE 15)
005466  104401  001314                      TYPE    ,$LF                    ;;TYPE A LINE FEED
005472  005726                              TST     (SP)+                   ;;CLEAN RUBOUT KEY FROM THE STACK
005474  012603                              MOV     (SP)+,R3                ;;RESTORE R3
005476  011646                              MOV     (SP),-(SP)              ;;ADJUST THE STACK AND PUT ADDRESS OF THE
005500  016666  000004  000002              MOV     4(SP),2(SP)             ;;       FIRST ASCII CHARACTER ON IT
005506  012766  005520  000004              MOV     #$TTYIN,4(SP)
005514  000002                              RTI                             ;;RETURN
005516     000                      9$:     .BYTE   0                       ;;STORAGE FOR ASCII CHAR. TO TYPE
005517     000                              .BYTE   0                       ;;TERMINATOR
005520  000007                      $TTYIN: .BLKB   7                       ;;RESERVE 7 BYTES FOR TTY INPUT
005527     136  006525  000012      $CNTLU: .ASCIZ  /↑U/<15><12>            ;;CONTROL "U"
005534  043536  005015     000      $CNTLG: .ASCIZ  /↑G/<15><12>            ;;CONTROL "G"
005541     015  051412  051127      $MSWR:  .ASCIZ  <15><12>/SWR = /
005546  036440  000040
005552  020040  042516  020127      $MNEW:  .ASCIZ  /  NEW = /
005560  020075     000
        005564                      .EVEN
                                    .SBTTL  READ AN OCTAL NUMBER FROM THE TTY

                                    ;;*************************************************************
                                    ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
                                    ;*CHANGE IT TO BINARY.
                                    ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
```

```
                                ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
                                ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
                                ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
                                ;*CALL:
                                ;*      RDOCT                   ;;READ AN OCTAL NUMBER
                                ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
                                ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT

005564  011646                  $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
005566  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
005574  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
005576  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
005600  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
005602  104403                  1$:     RDLIN                   ;;READ AN ASCIZ LINE
005604  012600                          MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
005606  010037  005712                  MOV     R0,5$           ;;AND SAVE IT
005612  005001                          CLR     R1              ;;CLEAR DATA WORD
005614  005002                          CLR     R2
005616  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
005620  001420                          BEQ     3$              ;;IF ZERO GET OUT
005622  122716  000060                  CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
005626  003026                          BGT     4$              ;;IS AN OCTAL DIGIT
005630  122716  000067                  CMPB    #'7,(SP)
005634  002423                          BLT     4$
005636  006301                          ASL     R1              ;;*2
005640  006102                          ROL     R2
005642  006301                          ASL     R1              ;;*4
005644  006102                          ROL     R2
005646  006301                          ASL     R1              ;;*8
005650  006102                          ROL     R2
005652  042716  177770                  BIC     #↑C7,(SP)       ;;STRIP THE ASCII JUNK
005656  062601                          ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
005660  000756                          BR      2$              ;;LOOP
005662  005726                  3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
005664  010166  000012                  MOV     R1,12(SP)       ;;SAVE THE RESULT
005670  010237  005722                  MOV     R2,$HIOCT
005674  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
005676  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
005700  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
005702  000002                          RTI                     ;;RETURN
005704  005726                  4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
005706  105010                          CLRB    (R0)            ;;SET A TERMINATOR
005710  104401                          TYPE                    ;;TYPE UP THRU THE BAD CHAR.
005712  000000                  5$:     .WORD   0
005714  104401  001312                  TYPE    ,$QUES          ;;"?" "CR" & "LF"
005720  000730                          BR      1$              ;;TRY AGAIN
005722  000000                  $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
                                ;
                                ;       INPUT OCTAL NUMBER ROUTINE
                                ;---------------------------------
                                ;
005724  010546                  $INPUT: MOV     R5,-(SP)                ; SAVE REGISTER R5.
005726  016605  000002                  MOV     2(SP),R5                ; GET FIRST PARAMETER ADDRESS.
005732  012537  005770                  MOV     (R5)+,WHAT              ; GET MESSAGE ADDRESS.
005736  012537  006050                  MOV     (R5)+,LOLIM             ; GET LOW LIMIT FOR THE  #
005742  012537  006052                  MOV     (R5)+,HILIM             ; GET HIGH LIMIT FOR THE #.
```

```
005746  012537  006054                  MOV     (R5)+,WHERE             ; GET ADDRESS OF INBUFFER
005752  112537  006056                  MOVB    (R5)+,LOBITS            ; GET LOWMASK BITS.
005756  112537  006057                  MOVB    (R5)+,ADRCNT            ; GET # OF #'S TO BE GENERATED.
005762  010566  000002                  MOV     R5,2(SP)                ; SAVE THE RETURN ADDRESS.
005766  104401                  INLP1:  TYPE                            ; TYPE THE MESSAGE.
005770  000000                  WHAT:   .WORD   0                       ;
005772  104404                          RDOCT                           ; READ OCTAL # FROM KEYBOARD.
005774  021637  006052                  CMP     (SP),HILIM              ; IS IT IN HIGH LIMIT?
006000  003003                          BGT     2$                      ; BRANCH IF NO.
006002  021637  006050                  CMP     (SP),LOLIM              ; IS IT MORE THAN LOW LIMIT.
006006  002005                          BGE     3$                      ; BRANCH IF YES.
006010  104401  001312          2$:     TYPE    ,$QUES                  ; TYPE  " ? "
006014  104401  001313                  TYPE    ,$CRLF                  ; TYPE <CR>,<LF>
006020  000762                          BR      INLP1                   ;
006022  013705  006054          3$:     MOV     WHERE,R5                ; GET BUFFER ADDRESS.
006026  011625                  4$:     MOV     (SP),(R5)+              ; SAVE THE # IN RIGHT PLACE.
006030  062716  000002                  ADD     #2,(SP)                 ; NEXT SEQUENTIAL NUMBER.
006034  105337  006057                  DECB    ADRCNT                  ; COUNT BY 1.
006040  001372                          BNE     4$                      ; BRANCH IF NOT DONE.
006042  005726                          TST     (SP)+                   ; POP THE STACK POINTER.
006044  012605                          MOV     (SP)+,R5                ; POP THE REG.5
006046  000002                          RTI
006050  000000                  LOLIM:  .WORD   0
006052  000000                  HILIM:  .WORD   0
006054  000000                  WHERE:  .WORD   0
006056     000                  LOBITS: .BYTE   0
006057     000                  ADRCNT: .BYTE   0


                                        ;  ADVANCE TO NEXT TEST HANDLER
                                        ;--------------------------------

006060  013716  001442          .ADVANCE:       MOV     NEXT,(SP)               ; CRUNCH STACK WITH ADDRESSOF SCOPE CALL
006064  005037  001444                  CLR     LOCK                    ; RESET TIGHT LOOP ADDRESS
006070  000002                          RTI                             ; CHECK TO SEE IF OLD TEST GETS REPEATED

                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5
                                        ;-------------------------------------

006072  016637  000004  001460  .SAV05: MOV     4(SP),SAVPC     ;SAVE R7 (PC)

                                        ;SAVE R0-R5

006100  010537  001274          SV05:   MOV     R5,$REG5        ;SAVE R5
006104  010437  001272                  MOV     R4,$REG4        ;SAVE R4
006110  010337  001270                  MOV     R3,$REG3        ;SAVE R3
006114  010237  001266                  MOV     R2,$REG2        ;SAVE R2
006120  010137  001264                  MOV     R1,$REG1        ;SAVE R1
006124  010037  001262                  MOV     R0,$REG0        ;SAVE R0
006130  000002                          RTI                     ;LEAVE.

                                        ;RESTORE R0-R5

006132  013700  001262          .RES05: MOV     $REG0,R0        ;RESTORE R0
006136  013701  001264                  MOV     $REG1,R1        ;RESTORE R1
006142  013702  001266                  MOV     $REG2,R2        ;RESTORE R2
006146  013703  001270                  MOV     $REG3,R3        ;RESTORE R3
```

```
006152  013704  001272                         MOV     $REG4,R4                ;RESTORE R4
006156  013705  001274                         MOV     $REG5,R5                ;RESTORE R5
006162  000002                                 RTI                             ;LEAVE

                                       ;       ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
                                       ;       ;-----------------------------------------------------------
                                       ;
006164  104401  001313                 .CONVR: TYPE     ,$CRLF
006170  010046                         .CNVRT: MOV     R0,-(SP)
006172  010146                                 MOV     R1,-(SP)
006174  010346                                 MOV     R3,-(SP)
006176  010446                                 MOV     R4,-(SP)
006200  010546                                 MOV     R5,-(SP)
006202  017601  000012                         MOV     @12(SP),R1
006206  062766  000002  000012                 ADD     #2,12(SP)
006214  012137  006406                         MOV     (R1)+,WRDCNT
006220  112137  006410                 1$:     MOVB    (R1)+,CHRCNT
006224  112137  006411                         MOVB    (R1)+,SPACNT
006230  013137  006412                         MOV     @(R1)+,BINWRD
006234  122737  000003  006410                 CMPB    #3,CHRCNT
006242  001003                                 BNE     2$
006244  042737  177400  006412                 BIC     #177400,BINWRD
006252  013704  006412                 2$:     MOV     BINWRD,R4
006256  113705  006410                         MOVB    CHRCNT,R5
006262  012700  011106                         MOV     #TEMP,R0
006266  010403                         3$:     MOV     R4,R3
006270  042703  177770                         BIC     #177770,R3
006274  062703  000060                         ADD     #060.R3
006300  110320                                 MOVB    R3,(R0)+
006302  000241                                 CLC
006304  006004                                 ROR     R4
006306  000241                                 CLC
006310  006004                                 ROR     R4
006312  000241                                 CLC
006314  006004                                 ROR     R4
006316  005305                                 DEC     R5
006320  001362                                 BNE     3$
006322  012703  011150                         MOV     #MDATA,R3
006326  114023                         4$:     MOVB    -(R0),(R3)+
006330  105337  006410                         DECB    CHRCNT
006334  001374                                 BNE     4$
006336  105737  006411                         TSTB    SPACNT
006342  001405                                 BEQ     6$
006344  112723  000040                 5$:     MOVB    #040,(R3)+
006350  105337  006411                         DECB    SPACNT
006354  001373                                 BNE     5$
006356  105013                         6$:     CLRB    (R3)
006360  104401  011150                         TYPE    ,MDATA
006364  005337  006406                         DEC     WRDCNT
006370  001313                                 BNE     1$
006372  012605                                 MOV     (SP)+,R5
006374  012604                                 MOV     (SP)+,R4
006376  012603                                 MOV     (SP)+,R3
006400  012601                                 MOV     (SP)+,R1
006402  012600                                 MOV     (SP)+,R0
006404  000002                                 RTI
```

```
006406  000000                          WRDCNT: 0
006410  000000                          CHRCNT: 0
        006411                          SPACNT=CHRCNT+1
006412  000000                          BINWRD: 0


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

                                        .SBTTL  TRAP DECODER

                                        ;;***************************************************************
                                        ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                        ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                        ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                        ;*GO TO THAT ROUTINE.

006414  010046                          $TRAP:  MOV     R0,-(SP)                ;;SAVE R0
006416  016600  000002                          MOV     2(SP),R0                ;;GET TRAP ADDRESS
006422  005740                                  TST     -(R0)                   ;;BACKUP BY 2
006424  111000                                  MOVB    (R0),R0                 ;;GET RIGHT BYTE OF TRAP
006426  006300                                  ASL     R0                      ;;POSITION FOR INDEXING
006430  016000  006450                          MOV     $TRPAD(R0),R0           ;;INDEX TO TABLE
006434  000200                                  RTS     R0                      ;;GO TO ROUTINE


                                        ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

006436  011646                          $TRAP2: MOV     (SP),-(SP)              ;;MOVE THE PC DOWN
006440  016666  000004  000002                  MOV     4(SP),2(SP)             ;;MOVE THE PSW DOWN
006446  000002                                  RTI                             ;;RESTORE THE PSW

                                        .SBTTL  TRAP TABLE

                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ;*BY THE "TRAP" INSTRUCTION.

                                        ;       ROUTINE
                                        ;       -------
006450  006436                          $TRPAD: .WORD   $TRAP2
006452  004414                                  $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE


006454  005144                                  $RDCHR  ;;CALL=RDCHR    TRAP+2(104402)  TTY TYPEIN CHARACTER ROUTINE
006456  005264                                  $RDLIN  ;;CALL=RDLIN    TRAP+3(104403)  TTY TYPEIN STRING ROUTINE
006460  005564                                  $RDOCT  ;;CALL=RDOCT    TRAP+4(104404)  READ AN OCTAL NUMBER FROM TTY
006462  004364                                  .SCOP1  ;;CALL=SCOP1    TRAP+5(104405)  CALL TO LOOP ON CURRENT DATA HANDLER
006464  006072                                  .SAV05  ;;CALL=SAV05    TRAP+6(104406)  CALL TO REGISTER SAVE ROUTINE
006466  006132                                  .RES05  ;;CALL=RES05    TRAP+7(104407)  CALL TO REGISTER RESTORE ROUTINE
006470  007362                                  .MSTCLR ;;CALL=MSTCLR   TRAP+10(104410) CALL TO ISSUE A MASTER CLEAR
006472  007332                                  .DELAY  ;;CALL=DELAY    TRAP+11(104411) CALL TO DELAY
006474  007400                                  .ROMCLK ;;CALL=ROMCLK   TRAP+12(104412) CALL TO CLOCK ROM ONCE
006476  007446                                  .DATACLK        ;;CALL=DATACLK  TRAP+13(104413) CALL TO CLOCK DATA
006500  007512                                  .TIMER  ;;CALL=TIMER    TRAP+14(104414) CALL TO DELAY A CLOCK TICK
```

```
006502  005724                                  $INPUT   ;;CALL=INPUT     TRAP+15(104415) CALL TO OCTAL # INPUT ROUTINE
006504  006164                                  .CONVRT  ;;CALL=CONVRT    TRAP+16(104416) CALL TO     .....
006506  006170                                  .CNVRT   ;;CALL=CNVRT     TRAP+17(104417) CALL TO     .......
006510  006060                                  .ADVANCE    ;;CALL=ADVANCE   TRAP+20(104420) CALL TO ADVANCE TO NEXT TEST
                                        ;
                                        ;--------------------------------------------------------------------
                                        ;:*******************************************************************
                                                ;ERROR HANDLER
                                                ;-------------

006512  004737  011212          $ERROR: JSR     PC,CKSWR                ;CHECK FOR SOFT SWR
006516  032777  010000  172514          BIT     #SW12,@SWR              ;BELL ON ERROR?
006524  001406                          BEQ     XBX                     ;BR IF NO BELL
006526  105777  172516                  TSTB    @$TPS                   ;TTY READY.
006532  100003                          BPL     XBX                     ;DON'T WAIT IF TTY NOT READY.
006534  112777  000207  172510          MOVB    #207,@$TPB              ;PUSH A BELL AT THE TTY.
006542  032777  020000  172470  XBX:    BIT     #SW13,@SWR              ;DELETE ERROR PRINT OUT?
006550  001107                          BNE     HALTS                   ;BR IF NO PRINT OUT WANTED.
006552  021637  001216                  CMP     (SP),$ERRPC             ;WAS THIS ERROR FOUND LAST TIME?
006556  001404                          BEQ     1$                      ;BR IF YES
006560  011637  001216                  MOV     (SP),$ERRPC             ;RECORD BEING HERE
006564  105037  001203                  CLRB    $ERFLG                  ;PREPARE HEADER
006570  104406                  1$:     SAV05                           ;SAVE ALL PROC REGISTERS
006572  011605                          MOV     (SP),R5                 ;GET THE PC OF ERROR
006574  162705  000002                  SUB     #2,R5                   ;GET ADDRESS OF TRAP CALL
006600  011504                          MOV     (R5),R4                 ;GET ERROR INSTRUCTION
006602  110437  001214                  MOVB    R4,$ITEMB               ; COPY ERROR # FOR APT HANDLING
006606  006304                          ASL     R4                      ;MULT BY TWO
006610  061504                          ADD     (R5),R4                 ;DOUBLE IT
006612  006304                          ASL     R4                      ;MULT AGAIN
006614  042704  177001                  BIC     #177001,R4              ;CLEAR JUNK
006620  062704  001512                  ADD     #$ERRTB,R4              ;GET POINTER
006624  012437  006740                  MOV     (R4)+,ERRMSG            ;GET ERROR MESSAGE
006630  012437  006752                  MOV     (R4)+,DATAHD            ;GET DATA HEADRER
006634  011437  006764                  MOV     (R4),DATABP             ;GET DATA TABLE
006640  105737  001203                  TSTB    $ERFLG                  ;TYPE HEADREER
006644  001403                          BEQ     TYPMSG                  ;BR IF YES
006646  005737  006764                  TST     DATABP                  ;DOES DATA TABLE EXIST?
006652  001040                          BNE     TYPDAT                  ;BR IF YES.
006654  104401  001313          TYPMSG: TYPE    ,$CRLF
006660  104401  001313                  TYPE    ,$CRLF
006664  005737  001444                  TST     LOCK
006670  001402                          BEQ     1$
006672  104401  010015                  TYPE    ,MASTEK
006676  104401  010003          1$:     TYPE    ,MTSTN
006702  104417  007120                  CNVRT   ,XTSTN                  ;SHOW IT
006706  104401  010072                  TYPE    ,MERRPC                 ;TYPE PC.
006712  104417  007112                  CNVRT   ,ERTABO                 ;SHOW IT
006716  104401  001313                  TYPE    ,$CRLF                  ;GIVE A CR/LF
006722  112737  177777  001203          MOVB    #-1,$ERFLG              ;NO MORE HEADER UNLESS NO DATA TABLE.
006730  005737  006740                  TST     ERRMSG                  ;IS THERE AN ERROR MESSAGE?
006734  001402                          BEQ     WRKO.FM                 ;BR IF NO.
006736  104401                          TYPE                            ;TYPE
006740  000000                  ERRMSG: 0                               ;    ERROR MESSAGE
006742                          WRKO.FM:                                ;
006742  005737  006752                  TST     DATAHD                  ;DATA HEADER?
```

```
006746  001402                                BEQ     TYPDAT            ;BR IF NO
006750  104401                                TYPE                      ;TYPE
006752  000000                      DATAHD:   0                         ;     DATA HEADER
006754  005737  006764              TYPDAT:   TST     DATABP            ;DATA TABLE?
006760  001402                                BEQ     RESREG            ;BR IF NO.
006762  104416                                CONVRT                    ;SHOW
006764  000000                      DATABP:   0                         ;     DATA TABLE
006766  104407                      RESREG:   RES05                     ;RESTORE PROC REGISTERS
006770  122737  000001  001336      HALTS:    CMPB    #APTENV,$ENV      ; IS APT RUNNING ?
006776  001007                                BNE     3$                ; SKIP APT CALL IF NOT.
007000  113737  001214  007012                MOVB    $ITEMB,6$         ; COPY ERROR #.
007006  004737  004714                        JSR     PC,$ATY4          ; CALL APT SERVICES.
007012  000000                      6$:       .WORD   0                 ; ERROR # GOES HERE.
007014  000777                      9$:       BR      9$                ; LOCK HERE.
007016  022737  004070  000042      3$:       CMP     #$ENDAD,@#42      ;IF ACT-11 AUTOMATIC MODE, HALT!!
007024  001403                                BEQ     1$
007026  005777  172206                        TST     @SWR              ;HALT ON ERROR?
007032  100005                                BPL     EXITER            ;BR IF NO HALT ON ERROR
007034  010046                      1$:       PUSHR0                    ;SAVE R0
007036  016600  000002                        MOV     2(SP),R0          ;SHOW ERROR PC IN DATA LIGHTS
007042  000000                                HALT                      ;HALT
007044  012600                                POPR0                     ;GET R0
007046  005237  001212              EXITER:   INC     $ERTTL            ;UPDATE ERROR COUNT
007052  032777  000400  172160                BIT     #SW08,@SWR        ;GOTO TOP OF TEST?
007060  001007                                BNE     1$                ;BR IF YES
007062  032777  002000  172150                BIT     #SW10,@SWR        ;GOTO NEXT TEST?
007070  001407                                BEQ     2$                ;BR IF NO
007072  013737  001442  001206                MOV     NEXT,$LPADR       ;SET FOR NEXT TEST
007100  012706  001200              1$:       MOV     #STACK,SP         ;RESET SP
007104  000177  172076                        JMP     @$LPADR           ;GOTO SPECIFIED TEST
007110  000002                      2$:       RTI                       ;$LPADR
007112  000001                      ERTAB0:   1
007114     006     002                        .BYTE   6,2
007116  001460                                SAVPC
007120  000001                      XTSTN:    1
007122     003     002                        .BYTE   3,2
007124  001202                                $TSTNM
                                              ;ENTER HERE ON POWER FAILURE
                                              ;---------------------------


                                    .SBTTL  POWER DOWN AND UP ROUTINES


                                    ;;**********************************************************************
                                    ;POWER DOWN ROUTINE
007126  012737  007316  000024      $PWRDN:   MOV     #$ILLUP,@#PWRVEC  ;;SET FOR FAST UP
007134  012737  000340  000026                MOV     #340,@#PWRVEC+2   ;;PRIO:7
007142  010046                                MOV     R0,-(SP)          ;;PUSH R0 ON STACK
007144  010146                                MOV     R1,-(SP)          ;;PUSH R1 ON STACK
007146  010246                                MOV     R2,-(SP)          ;;PUSH R2 ON STACK
007150  010346                                MOV     R3,-(SP)          ;;PUSH R3 ON STACK
007152  010446                                MOV     R4,-(SP)          ;;PUSH R4 ON STACK
007154  010546                                MOV     R5,-(SP)          ;;PUSH R5 ON STACK
007156  017746  172056                        MOV     @SWR,-(SP)        ;;PUSH @SWR ON STACK
007162  010637  007322                        MOV     SP,$SAVR6         ;;SAVE SP
007166  012737  007200  000024                MOV     #$PWRUP,@#PWRVEC  ;;SET UP VECTOR
007174  000000                                HALT
```

```
007176  000776                                  BR      .-2                 ;;HANG UP

                                        ;;*************************************************************
                                        ;POWER UP ROUTINE
007200  012737  007316  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC    ;;SET FOR FAST DOWN
007206  013706  007322                  MOV     $SAVR6,SP           ;;GET SP
007212  005037  007322                  CLR     $SAVR6              ;;WAIT LOOP FOR THE TTY
007216  005237  007322          1$:     INC     $SAVR6              ;;WAIT FOR THE INC
007222  001375                          BNE     1$                  ;;OF  WORD
007224  104401  007562                  TYPE    ,MPFAIL             ;
007230  104417  007324                  CNVRT   ,PFTAB              ;
007234  105037  001203                  CLRB    $ERFLG              ;CLEAR ERROR FLAG.
007240  005037  001216                  CLR     $ERRPC              ; CLEAR LAST ERROR PC
007244  013701  002066                  MOV     KMCSR,R1            ; RESTORE DEVICE ADDRESS.
007250  005011                          CLR     (R1)                ; CLEAR THE CSR.
007252  104410                          MSTCLR                      ;
007254  012677  171760                  MOV     (SP)+,@SWR          ;;POP STACK INTO @SWR
007260  012605                          MOV     (SP)+,R5            ;;POP STACK INTO R5
007262  012604                          MOV     (SP)+,R4            ;;POP STACK INTO R4
007264  012603                          MOV     (SP)+,R3            ;;POP STACK INTO R3
007266  012602                          MOV     (SP)+,R2            ;;POP STACK INTO R2
007270  012601                          MOV     (SP)+,R1            ;;POP STACK INTO R1
007272  012600                          MOV     (SP)+,R0            ;;POP STACK INTO R0
007274  012737  007126  000024          MOV     #$PWRDN,@#PWRVEC    ;;SET UP THE POWER DOWN VECTOR
007302  012737  000340  000026          MOV     #340,@#PWRVEC+2     ;;PRIO:7
007310  104401                          TYPE                        ;;REPORT THE POWER FAILURE
007312  007562                  $PWRMG: .WORD   MPFAIL              ;;POWER FAIL MESSAGE POINTER
007314  000002                          RTI
007316  000000                  $ILLUP: HALT                        ;;THE POWER UP SEQUENCE WAS STARTED
007320  000776                          BR      .-2                 ;; BEFORE THE POWER DOWN WAS COMPLETE
007322  000000                  $SAVR6: 0                           ;;PUT THE SP HERE

007324  000001                  PFTAB:  1
007326     003     002          .BYTE   3,2
007330  001202                          $TSTNM

007332                          .DELAY:
007332  012777  000020  172534          MOV     #20,@KMP04
007340  104412                          ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
007342  121111                          121111                      ;POKE CLOCK DELAY BIT
007344                          1$:
007344  104412                          ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
007346  121224                          121224                      ;PORT4←IBUS*11
007350  032777  000020  172516          BIT     #BIT4,@KMP04        ;IS CLOCK BIT SET?
007356  001772                          BEQ     1$                  ;BR IF NO
007360  000002                          RTI

007362                          .MSTCLR:
007362  152777  000100  172500          BISB    #BIT6,@KMCSRH       ;SET MASTER CLEAR
007370  142777  000300  172472          BICB    #BIT6!BIT7,@KMCSRH  ;CLEAR MASTER CLEAR AND RUN
007376  000002                          RTI                         ;RETURN

007400                          .ROMCLK:
007400  152777  000002  172462          BISB    #BIT1,@KMCSRH       ;SET ROMI
007406  013677  172464                  MOV     @(SP)+,@KMP06       ;LOAD INSTRUCTION IN SEL6
007412  062746  000002                  ADD     #2,-(SP)            ;ADJUST STACK
```

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     007416  032777  000100  171614             BIT     #SW06,@SWR        ;HALT IF SW06 =1
     007424  001401                             BEQ     1$                ;BR IF SW06 =0
     007426  000000                             HALT                      ;HALT BEFORE CLOCKING INSTRUCTION
     007430  152777  000003  172432  1$:        BISB    #BIT1!BIT0,@KMCSRH ;CLOCK INSTRUCTION
     007436  142777  000007  172424             BICB    #BIT2!BIT1!BIT0,@KMCSRH  ;CLEAR ROM0, ROM1, STEP
     007444  000002                             RTI

     007446                          .DATACLK:
     007446  013637  011106                     MOV     @(SP)+,TEMP       ;PUT TICK COUNT IN TEMP
     007452  062746  000002                     ADD     #2,-(SP)          ;ADJUST STACK
     007456  152777  000020  172404  1$:        BISB    #BIT4,@KMCSRH     ;SET STEP LU
     007464  027777  172376  172374             CMP     @KMCSR,@KMCSR     ;WASTE TIME
     007472  142777  000020  172370             BICB    #BIT4,@KMCSRH     ;CLEAR STEP LU
     007500  005337  011106                     DEC     TEMP              ;DEC TICK COUNT
     007504  001364                             BNE     1$                ;BR IF NOT DONE
     007506  000002                             RTI                       ;RETURN
     007510  000001                  3$:        .BLKW 1

     007512                          .TIMER:
     007512  013637  011106                     MOV     @(SP)+,TEMP       ;MOVE COUNT TO TEMP
     007516  062746  000002                     ADD     #2,-(SP)          ;ADJUST STACK
     007522                          1$:
     007522  104412                             ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
     007524  021364                             021364                    ;PORT4+IBUS* REG11
     007526  032777  000002  172340             BIT     #2,@KMP04         ;IS PGM CLOCK BIT CLEAR?
     007534  001772                             BEQ     1$                ;BR IF YES
     007536                          2$:
     007536  104412                             ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
     007540  021364                             021364                    ;PORT4+IBUS* REG11
     007542  032777  000002  172324             BIT     #2,@KMP04         ;IS PGM CLOCK BIT SET?
     007550  001372                             BNE     2$                ;BR IF YES
     007552  005337  011106                     DEC     TEMP              ;DEC COUNT
     007556  001361                             BNE     1$                ;BR IF NOT DONE
     007560  000002                             RTI                       ;RETURN

     007562  050200  051127  043040  MPFAIL:    .ASCIZ  <200>/PWR FAILED. RESTART AT TEST /
 (2) 007620  042600  042116  050040  MEPASS:    .ASCIZ  <200>/END PASS DZKCD  /
 (2) 007642  051200     000          MR:        .ASCIZ  <200>/R/
 (2) 007645     200  047516  042040  MERR2:     .ASCIZ  <200>/NO DEVICES PRESENT./
 (2) 007672  044600  051516  043125  MERR3:     .ASCIZ  <200>/INSUFFICIENT DATA!/
 (2) 007716  046200  041517  020113  MLOCK:     .ASCIZ  <200>/LOCK ON SELECTED TEST/
 (2) 007745     103  051123  020072  MCSRX:     .ASCIZ   /CSR: /
 (2) 007753     126  041505  020072  MVECX:     .ASCIZ  /VEC: /
 (2) 007761     120  051501  042523  MPASSX:    .ASCIZ  /PASSES: /
 (2) 007772  051105  047522  051522  MERRX:     .ASCIZ  /ERRORS: /
 (2) 010003     124  051505  020124  MTSTN:     .ASCIZ  /TEST NO: /
 (2) 010015     052     000          MASTEK:    .ASCIZ  /*/
 (2) 010017     200  042523  020124  MNEW:      .ASCIZ  <200>/SET SWITCH REG TO KMC11'S DESIRED ACTIVE./
 (2) 010072  041520  020072     000  MERRPC:    .ASCIZ  /PC: /
 (2) 010077     200  020040  020040  XHEAD:     .ASCII  <200>/             MAP OF KMC11 STATUS/
 (2) 010136  020200  020040  020040             .ASCII  <200>/             -------------------/
 (2) 010175     200  020040  041520             .ASCII  <200>/  PC      CSR     STAT1    STAT2    STAT3/
 (2) 010247     200  026455  026455             .ASCIZ  <200>/------  ------  ------   ------   ------/
 (2) 010323     200  047510  020127  NUM:       .ASCIZ  <200>/HOW MANY KMC11'S TO BE TESTED?/
 (2) 010363     200  051503  020122  CSR:       .ASCIZ  <200>/CSR ADDRESS?/
 (2) 010401     200  042526  052103  VEC:       .ASCIZ  <200>/VECTOR ADDRESS?/
```

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(2)  010422  041200  020122  051120  PRIO:   .ASCIZ  <200>/BR PRIORITY LEVEL? (4,5,6,7)?/
(2)  010461     200  044127  041511  MODU:   .ASCIZ  <200>/WHICH LINE UNIT? IF NONE TYPE "N", IF M8201 TYPE "1", IF M8202 TYP
(2)  010573     200  053523  052111  LINE:   .ASCIZ  <200>/SWITCH PAC#1 (DDCMP LINE #)?/
(2)  010631     200  053523  052111  BM:     .ASCIZ  <200>/SWITCH PAC#2 (BM873 BOOT ADD)?/
(2)  010671     200  051511  052040  CONN:   .ASCIZ  <200>/IS THE LOOP BACK CONNECTOR ON?/
(2)  010731     200  047516  042040  NOACT:  .ASCIZ  <200>/NO DEVICES ARE SELECTED/
(2)  010762  100200  046513  030503  CONERR: .ASCIZ  <200><200>/KMC11 AT NONSTANDARD ADDRESS  PC: /
(2)  011027     200  054105  042520  CNERR:  .ASCIZ  <200>/EXPECTED  FOUND/
(2)  011050  024040  046513  024503  KMCM:   .ASCIZ  / (KMC) /
(2)                                          .EVEN
(2)  011060  000005                          XSTATQ: 5
     011062     006     003                          .BYTE   6,3
     011064  001276                                  $TMP0
     011066     006     003                          .BYTE   6,3
     011070  001300                                  $TMP1
     011072     006     003                          .BYTE   6,3
     011074  001302                                  $TMP2
     011076     006     003                          .BYTE   6,3
     011100  001304                                  $TMP3
     011102     006     002                          .BYTE   6,2
     011104  001306                                  $TMP4
                                             .EVEN

                                                     ;BUFFERS FOR INPUT-OUTPUT

     011106  000000                          TEMP:   0
             011150                          .=.+40
     011150  000000                          MDATA:  0
             011212                          .=.+40



                                                     ;ROUTINE USED TO CHANGE SOFTWARE SWITCH
                                                     ;REGISTER USING THE CONSOLE TERMINAL
                                                     ;----------------------------------------

     011212  022737  000176  001240  CKSWR:  CMP     #SWREG,SWR      ;IS THE SOFT SWR BEING USED?
     011220  001075                          BNE     CKSWR5          ;BR IF NO
     011222  132737  000001  001336          BITB    #1,$ENV         ; IS IT RUNNING UNDER APT?
     011230  001071                          BNE     CKSWR5          ; EXIT IF YES.
     011232  022777  000007  170006          CMP     #7,@$TKB        ;WAS CTRL G TYPED? (7 BIT ASCII)
     011240  001404                          BEQ     1$              ;BR IF YES
     011242  022777  000207  167776          CMP     #207,@$TKB      ;WAS CTRL G TYPED? (8 BIT ASCII)
     011250  001061                          BNE     CKSWR5          ;BR IF NO
     011252  010246                  1$:     MOV     R2,-(SP)        ;STORE R2
     011254  010346                          MOV     R3,-(SP)        ;STORE R3
     011256  010446                          MOV     R4,-(SP)        ;STORE R4
     011260  012737  177777  011416          MOV     #-1,SWFLG       ;SET SOFT TYPE OUT FLAG
     011266  005002                  CKSWR1: CLR     R2              ;CLEAR NEW SWR CONTENTS
     011270  012704  177777                  MOV     #-1,R4          ;SET FLAG TO ALL ONES
     011274  104401  005541                  TYPE    ,$MSWR          ;TYPE "SWR= "
     011300  104417                  CKSWR2: CNVRT                   ;TYPE OUT PRESENT CONTENTS
     011302  011452                          SOFTSW                  ;OF SOFT SWITCH REGISTER
     011304  104401  005552          CKSWR3: TYPE    ,$MNEW          ;TYPE "NEW? "
     011310  004737  011420          CKSWR4: JSR     PC,INCHAR       ;GET RESPONSE
     011314  022703  000015                  CMP     #15,R3          ;WAS IT A CR?
     011320  001424                          BEQ     5$              ;BR IF YES
```

```
011322  022703  000012                    CMP     #12,R3              ;WAS IT A LF?
011326  001416                            BEQ     4$                  ;BR IF YES
011330  022703  000025                    CMP     #25,R3              ;WAS IT CTRL U?
011334  001754                            BEQ     CKSWR1              ;BR IF YES(START OVER)
011336  022703  000007                    CMP     #7,R3               ;IF CNTL G GET NEXT CHAR
011342  001762                            BEQ     CKSWR4
011344  005004                            CLR     R4                  ;IT MUST BE A DIGIT SO CLR FLAG
011346  042703  177770                    BIC     #177770,R3          ;ONLY 0-7 ARE LEGAL SO MASK OFF BITS
011352  006302                            ASL     R2                  ;SHIFT R2 3 TIMES
011354  006302                            ASL     R2
011356  006302                            ASL     R2
011360  050302                            BIS     R3,R2               ;ADD LAST DIGIT
011362  000752                            BR      CKSWR4              ;GET NEXT CHARACTER
011364  012766  002402  000006  4$:       MOV     #.START,6(SP)       ;LF WAS TYPED SO GO TO START
011372  005704                  5$:       TST     R4                  ;IS FLAG CLEAR?
011374  001002                            BNE     6$                  ;IF NOT DON'T CHANGE SOFT SWR
011376  010277  167636                    MOV     R2,@SWR             ;IF YES THEN WRITE NEW CONTENTS TO SOFT SWR
011402  005037  011416          6$:       CLR     SWFLG               ;CLEAR TYPEOUT FLAG
011406  012604                            MOV     (SP)+,R4            ;RESTORE R4
011410  012603                            MOV     (SP)+,R3            ;RESTORE R3
011412  012602                            MOV     (SP)+,R2            ;RESTORE R2
011414  000207                  CKSWR5:   RTS     PC                  ;RETURN

011416  000000                  SWFLG:    0

011420  105777  167620          INCHAR:   TSTB    @$TKS
011424  100375                            BPL     .-4
011426  017703  167614                    MOV     @$TKB,R3
011432  105777  167612                    TSTB    @$TPS
011436  100375                            BPL     .-4
011440  010377  167606                    MOV     R3,@$TPB
011444  042703  000200                    BIC     #BIT7,R3
011450  000207                            RTS     PC

011452  000001                  SOFTSW:   1
011454     006     002                    .BYTE   6,2
011456  000176                            SWREG
```

```

                                                      ;
                                                      ;ROUTINE USED TO "CYCLE" THROUGH UP TO 16 KMC11'S
                                                      ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
                                                      ;AND RUNS THE SPECIFIED KMC11'S.   THIS ROUTINE *MUST*
                                                      ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
                                                      ;SETUP NECESSARY.
                                                      ;

011460  005737  001470            CYCLE:  TST     KMACTV          ;ARE ANY KMC11'S TO BE TESTED?
011464  001004                            BNE     1$              ;BR IF OK.
011466  104401  010731                    TYPE    ,NOACT          ;NO KMC11'S SELECTED!!
011472  000000                            HALT                    ;STOP THE SHOW.
011474  000776                            BR      .-2             ;DISQUALIFY CONT. SW.
011476  000241                    1$:     CLC                     ;CLEAR PROC. CARRY BIT.
011500  006137  001500                    ROL     RUN             ;UPDATE POINTER
011504  005537  001500                    ADC     RUN             ;CATCH CARRY FROM RUN
011510  062737  000004  001504            ADD     #4,MILK         ;UPDATE POINTER
011516  062737  000010  001502            ADD     #10,CREAM       ;UPDATE ADDRESS POINTER.
011524  022737  002300  001502            CMP     #KM.MAP+200,CREAM
011532  001006                            BNE     2$              ;KEEP GOING; NOT ALL TESTED FOR.
011534  012737  002100  001502            MOV     #KM.MAP,CREAM   ;RESET ADDRESS POINTER.
011542  012737  002302  001504            MOV     #CNT.MAP,MILK   ;RESET PASS COUNT POINTER
011550  033737  001500  001470    2$:     BIT     RUN,KMACTV      ;IS THIS ONE ACTIVE?
011556  001747                            BEQ     1$              ;BR IF NO
011560  013700  001502                    MOV     CREAM,R0        ;GET ADDRESS POINTER
011564  013702  001504                    MOV     MILK,R2         ;GET PASS COUNT POINTER
011570  012037  002066                    MOV     (R0)+,KMCSR     ;LOAD SYSTEM CTRL. REG
011574  011037  002056                    MOV     (R0),KMRVEC     ;LOAD VECTOR
011600  042737  177000  002056            BIC     #177000,KMRVEC  ;CLEAR UNWANTED BITS
011606  012037  002050                    MOV     (R0)+,STAT1     ;LOAD STAT1
011612  012037  002052                    MOV     (R0)+,STAT2     ;LOAD STAT2
011616  012037  002054                    MOV     (R0)+,STAT3     ;LOAD STAT3
011622  012237  001324                    MOV     (R2)+,$PASS     ;LOAD PASS COUNT
011626  012237  001212                    MOV     (R2)+,$ERTTL    ;LOAD ERROR COUNT
011632  012700  000002                    MOV     #2,R0           ;SAVE CORE THIS WAY!
011636  013737  002066  002070            MOV     KMCSR,KMCSRH
011644  005237  002070                    INC     KMCSRH
011650  013737  002070  002072            MOV     KMCSRH,KMCTL
011656  005237  002072                    INC     KMCTL
011662  013737  002072  002074            MOV     KMCTL,KMP04
011670  060037  002074                    ADD     R0,KMP04
011674  013737  002074  002076            MOV     KMP04,KMP06
011702  060037  002076                    ADD     R0,KMP06

011706  013737  002056  002060            MOV     KMRVEC,KMRLVL   ;PTY LVL
011714  060037  002060                    ADD     R0,KMRLVL       ;
011720  013737  002060  002062            MOV     KMRLVL,KMTVEC   ;TX VEC
011726  060037  002062                    ADD     R0,KMTVEC       ;
011732  013737  002062  002064            MOV     KMTVEC,KMTLVL   ;TX LVL
011740  060037  002064                    ADD     R0,KMTLVL

011744  032737  000002  001446            BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED
011752  001447                            BEQ     7$              ;BR IF NO
011754                            4$:
011754  005737  000042                    TST     @#42            ;RUNNING IN AUTO MODE?
```

```
011760  001044                              BNE     7$                  ;BR IF YES
011762  104401  001313                      TYPE    ,$CRLF
011766  104415                              INPUT
011770  010003                              MTSTN
011772  000001                              1
011774  001000                              1000
011776  001202                              $STSTNM
012000     000                      .BYTE   0
012001     001                      .BYTE   1
012002  012700  013732                      MOV     #TST1,R0
012006  022710                      5$:     CMP     (PC)+,(R0)          ;CMP FIRST WORD TO 12737
012010  012737                              MOV     (PC)+,@(PC)+
012012  001020                              BNE     6$                  ;BR IF NOT SAME
012014  023760  001202  000002              CMP     $TSTNM,2(R0)        ;DOES $TSTNM MATCH?
012022  001014                              BNE     6$                  ;BR IF NO
012024  022760  001202  000004              CMP     #$TSTNM,4(R0)       ;IS LAST WORD OK?
012032  001010                              BNE     6$                  ;BR IF NO
012034  010037  001206                      MOV     R0,$LPADR           ;IT IS A LEGAL TEST SO DO IT
012040  104401  007642                      TYPE    ,MR
012044  042737  000002  001446              BIC     #SW01,STRTSW
012052  000412                              BR      8$
012054  005720                      6$:     TST     (R0)+               ;POP R0
012056  020027  020634                      CMP     R0,#TLAST+10        ;AT END YET?
012062  001351                              BNE     5$                  ;BR IF NO
012064  104401  001312                      TYPE    ,$QUES              ;YES ILLEGAL TEST NO.
012070  000731                              BR      4$                  ;TRY AGAIN

012072  012737  013732  001206      7$:     MOV     #TST1,$LPADR        ;PREPARE $LPADR ADDRESS
012100  013701  002066              8$:     MOV     KMCSR,R1            ;R1 = BASE KMC11 ADDRESS
012104  000177  167076                      JMP     @$LPADR             ;GO START TESTING.


                                            ;ROUTINE USED TO "AUTO SIZE" THE KMC11
                                            ;CSR AND VECTOR.
                                            ;NOTE:  THE CSR MAY BE ANY WHERE IN THE FLOATING
                                            ;       ADDRESS RANGE (160000:164000)
                                            ;       AND THE VECTOR MAY BE ANY WHERE IN THE
                                            ;       FLOATING VECTOR RANGE (300:770)
                                            ;

012110                              AUTO.SIZE:
012110  000005                              RESET                       ;INSURE A BUS INIT.
012112  012702  002100              CSRMAP: MOV     #KM.MAP,R2          ;LOAD MAP POINTER.
012116  005022                      1$:     CLR     (R2)+               ;ZERO ENTIRE MAP
012120  022702  002300                      CMP     #KM.END,R2          ;ALL DONE?
012124  001374                              BNE     1$                  ;BR IF NO
012126  005037  001472                      CLR     KMNUM               ;SET OCTAL NUMBER OF KMC11'S TO 0
012132  012702  002100                      MOV     #KM.MAP,R2          ;R2 POINTS TO KMC MAP
012136  005037  001470                      CLR     KMACTV              ;CLEAR ACTIVE
012142  032737  000001  001446              BIT     #SW00,STRTSW        ;QUESTIONS?
012150  001002                              BNE     .+6                 ;BR IF YES
012152  000137  012532                      JMP     7$                  ;IF NO SKIP QUESTIONS
012156  012737  000001  001306              MOV     #1,$TMP4            ;START WITH 1
012164  104415                              INPUT
012166  010323                              NUM
012170  000001                              1
```

```
012172  000020                            16.
012174  001302                            $TMP2
012176     000                            .BYTE   0
012177     001                            .BYTE   1
012200  013737  001302  001472            MOV     $TMP2,KMNUM       ;KMNUM = HOW MANY
012206  104401  001313          12$:      TYPE    ,$CRLF
012212  104416                            CONVRT                    ;TYPE WHICH KMC IS BEING DONE
012214  013164                            WHICH                     ;$TMP4 IS WHICH KMC
012216  005237  001306                    INC     $TMP4
012222  104415                            INPUT
012224  010363                            CSR
012226  160000                            160000
012230  164000                            164000
012232  001304                            $TMP3
012234     000                            .BYTE   0
012235     001                            .BYTE   1
012236  013722  001304                    MOV     $TMP3,(R2)+       ;STORE CSR IN MAP
012242  104415                            INPUT
012244  010401                            VEC
012246  000000                            0
012250  000776                            776
012252  001304                            $TMP3
012254     000                            .BYTE   0
012255     001                            .BYTE   1
012256  013712  001304                    MOV     $TMP3,(R2)        ;STORE VECTOR IN MAP
012262  104401                  10$:      TYPE
012264  010422                            PRIO                      ;ASK WHAT BR LEVEL
012266  004737  013456                    JSR     PC,INTTY          ;GET RESPONSE
012272  022703  000024                    CMP     #24,R3            ;
012276  101014                            BHI     50$               ;BR IF LESS THAN 4
012300  022703  000027                    CMP     #27,R3            ;
012304  103411                            BLO     50$               ;BR IF GREATER THAN 7
012306  012704  000011                    MOV     #11,R4            ;R4 = NUMBER OF SHIFTS
012312  006303                            ASL     R3                ;SHIFT R3 LEFT
012314  005304                            DEC     R4                ;DEC SHIFT COUNT
012316  001375                            BNE     .-4               ;BR IF NOT DONE
012320  042703  170777                    BIC     #170777,R3        ;BIC UNWANTED BITS
012324  050312                            BIS     R3,(R2)           ;PUT BR LEVEL IN STATUS MAP
012326  000403                            BR      8$                ;CONTINUE
012330  104401                  50$:      TYPE
012332  001312                            $QUES                     ;RESPONSE IS OUT OF LIMITS
012334  000752                            BR      10$               ;TRY AGAIN
012336                          8$:
012336                          9$:
012336  104401                  16$:      TYPE
012340  010461                            MODU                      ;ASK WHICH LINE UNIT
012342  004737  013456                    JSR     PC,INTTY          ;GET REPLY
012346  022703  000021                    CMP     #21,R3            ;"1"
012352  001417                            BEQ     30$
012354  022703  000022                    CMP     #22,R3            ;"2"
012360  001412                            BEQ     31$
012362  022703  000116                    CMP     #116,R3           ;"N"
012366  001403                            BEQ     32$
012370  104401                            TYPE
012372  001312                            $QUES                     ;IF NOT A 1,2 OR N TYPE "?"
012374  000760                            BR      16$               ;TRY AGIAN
```

```
012376  052722  010000          32$:    BIS     #BIT12,(R2)+        ;SET BIT 12 IN STAT2 IF NO LU
012402  022222                          CMP     (R2)+,(R2)+         ;POP OVER STAT2 AND STAT3
012404  000445                          BR      33$
012406  052712  020000          31$:    BIS     #BIT13,(R2)         ;SET BIT 13 IN STAT2 IF M8202
012412  104401                  30$:    TYPE
012414  010671                          CONN                        ;ASK IF LOOP-BACK IS ON
012416  004737  013456                  JSR     PC,INTTY            ;GET REPLY
012422  022703  000131                  CMP     #131,R3             ;Y
012426  001406                          BEQ     17$
012430  022703  000116                  CMP     #116,R3             ;N
012434  001406                          BEQ     18$
012436  104401                          TYPE
012440  001312                          $QUES                       ;IF NOT Y OR N TYPE "?"
012442  000763                          BR      30$                 ;TRY AGAIN
012444  052722  040000          17$:    BIS     #BIT14,(R2)+        ;TURNAROUND IS CONNECTED
012450  000402                          BR      19$
012452  042722  040000          18$:    BIC     #BIT14,(R2)+        ;NO TURNAROUND
012456                          19$:
012456  104415                          INPUT
012460  010573                          LINE
012462  000000                          0
012464  000377                          377
012466  001304                          $TMP3
012470     000                          .BYTE   0
012471     001                          .BYTE   1
012472  113722  001304                  MOVB    $TMP3,(R2)+         ;STORE SWITCH PAC IN MAP
012476  104415                          INPUT
012500  010631                          BM
012502  000000                          0
012504  000377                          377
012506  001304                          $TMP3
012510     000                          .BYTE   0
012511     001                          .BYTE   1
012512  113722  001304                  MOVB    $TMP3,(R2)+         ;STORE SWITCH PAC IN MAP
012516  005722                          TST     (R2)+               ;POP OVER STAT3
012520  005337  001302          33$:    DEC     $TMP2               ;DEC KMC COUNT
012524  001230                          BNE     12$                 ;BR IF MORE TO DO
012526  000137  013064                  JMP     13$                 ;CONTINUE
012532  012701  160000          7$:     MOV     #160000,R1          ;SET FOR FIRST ADDRESS TO BE TESTED
012536  012737  013156  000004          MOV     #6$,@#4             ;SET FOR NON-EXISTANT DEVICE TIME OUT
012544  005011                  2$:     CLR     (R1)                ;CLEAR SEL0
012546  005711                          TST     (R1)                ;IF KMC11 KMCSR S/B 0
012550  001135                          BNE     3$                  ;IF NO DEV ; TRAP TO 4. IF NO BIT 8 THEN NO KMC11
012552  005061  000006                  CLR     6(R1)               ;CLEAR SEL6
012556  005761  000006                  TST     6(R1)               ;IF KMC11 THEN KMRIC S/B =0!
012562  001130                          BNE     3$                  ;BR IF NOT KMC11
012564  012711  002000                  MOV     #BIT10,(R1)         ;SET ROMO
012570  005061  000004                  CLR     4(R1)               ;CLEAR SEL4
012574  012761  125252  000006          MOV     #125252,6(R1)       ;WRITE THIS TO SEL6
012602  052711  020000                  BIS     #BIT13,(R1)         ;WRITE IT!
012606  022761  125252  000004          CMP     #125252,4(R1)       ;WAS IT WRITTEN?
012614  001113                          BNE     3$                  ;IF NO IT IS NOT CRAM
                                ;AT THIS POINT IT IS ASSUMED THAT R1 HOLDS A KMC11 CSR ADDRESS.
012616                          21$:
012616  010122                  22$:    MOV     R1,(R2)+            ;STORE CSR IN CORE TABLE.
012620  012711  001000          15$:    MOV     #BIT9,(R1)          ;CLEAR LINE UNIT LOOP
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012624  005061  000004                     CLR     4(R1)                  ;CLEAR PORT4
012630  012761  122113  000006             MOV     #122113,6(R1)          ;LOAD INSTRUCTION (CLR DTR)
012636  052711  000400                     BIS     #BIT8,(R1)             ;CLOCK INSTRUCTION
012642  012761  021264  000006             MOV     #021264,6(R1)          ;LOAD INSTRUCTION
012650  052711  000400                     BIS     #BIT8,(R1)             ;CLOCK INSTRUCTION
012654  122761  000377  000004             CMPB    #377,4(R1)             ;IS IT ALL ONES?
012662  001003                             BNE     .+10                   ;BR IF NO
012664  052712  010000                     BIS     #BIT12,(R2)            ;IF YES, NO LINE UNIT, SET STATUS BIT
012670  000436                             BR      20$
012672  032761  000002  000004             BIT     #BIT1,4(R1)            ;IS SWITCH A ONE?
012700  001403                             BEQ     .+10                   ;BR IF M8201
012702  052712  060000                     BIS     #BIT13!BIT14,(R2)  ;M8202 ASSUME CONNECTOR
012706  000427                             BR      20$                    ;CONNECTOR ON)
012710  032761  000010  000004             E/T     #BIT3,4(R1)            ;IS MRDY SET
012716  001023                             BNE     20$                    ;BR IF M8201 NO CONNECTOR (ON LINE)
012720  012761  000100  000004             MOV     #BIT6,4(R1)            ;LOAD PORT4
012726  012761  122113  000006             MOV     #122113,6(R1)          ;LOAD INSTRUCTION
012734  052711  000400                     BIS     #BIT8,(R1)             ;CLOCK INSTRUCTION(SET DTR)
012740  012761  021264  000006             MOV     #021264,6(R1)          ;LOAD INSTRUCTION
012746  052711  000400                     BIS     #BIT8,(R1)             ;CLOCK INSTRUCTION(READ MODEM REG)
012752  032761  000010  000004             BIT     #BIT3,4(R1)            ;IS MRDY SET NOW?
012760  001402                             BEQ     20$                    ;BR IF NO CONNECTOR
012762  052712  040000                     BIS     #BIT14,(R2)            ;SET STATUS BIT FOR CONNECTOR
012766  005722                     20$:    TST     (R2)+                  ;POP POINTER
012770  012761  021324  000006             MOV     #021324,6(R1)          ;PUT INSTRUCTION IN PORT6
012776  012711  001400                     MOV     #BIT9!BIT8,(R1)        ;PORT4←LU 15
013002  156122  000004                     BISB    4(R1),(R2)+            ;STORE DDCMP LINE # IN TABLE
013006  012761  021344  000006             MOV     #021344,6(R1)          ;PORT6←INSTRUCTION
013014  012711  001400                     MOV     #BIT8!BIT9,(R1)        ;CLOCK INSTR.
013020  156122  000004                     BISB    4(R1),(R2)+            ;STORE BM873 ADD IN TABLE
013024  005722                             TST     (R2)+                  ;POP OVER STAT3
013026  005011                             CLR     (R1)                   ;CLEAR ROMI
013030  005237  001472                     INC     KMNUM                  ;UPDATE DEVICE COUNTER
013034  022737  000020  001472             CMP     #20,KMNUM              ;ARE MAX. NO. OF DEV FOUND?
013042  001410                             BEQ     13$                    ;YES DON'T LOOK FOR ANY MORE.
013044  005011                     3$:     CLR     (R1)                   ;CLEAR BIT 10
013046  005061  000006                     CLR     6(R1)                  ;CLEAR SEL 6
013052  062701  000010             14$:    ADD     #10,R1                 ;UPDATE CSR POINTER ADDRESS
013056  022701  164000                     CMP     #164000,R1
013062  001230                             BNE     2$                     ;BR IF MORE ADDRESS TO CHECK.
013064  005037  001470             13$:    CLR     KMACTV
013070  005737  001472                     TST     KMNUM                  ;WERE ANY KMC11'S FOUND AT ALL?
013074  001423                             BEQ     5$                     ;ERROR AUTO SIZER FOUND NO KMC11'S IN THIS SYS.
013076  013701  001472                     MOV     KMNUM,R1
013102  010137  001476                     MOV     R1,SAVNUM              ;SAVE NUMBER OF DEVICES
013106  000241                     4$:     CLC
013110  006137  001470                     ROL     KMACTV                 ;GENERATE ACTIVE REGISTER OF DEVICES.
013114  005237  001470                     INC     KMACTV                 ;SET THE BIT
013120  005301                             DEC     R1
013122  001371                             BNE     4$                     ;BR IF MORE TO GENERATE
013124  012737  000006  000004             MOV     #6,@#4                 ;RESTORE TRAP VECTOR
013132  013737  001470  001474             MOV     KMACTV,SAVACT          ;SAVE ACTIVE REGISTER
013140  000137  013172                     JMP     VECMAP                 ;GO FIND THE VECTOR NOW
013144  104401  007645             5$:     TYPE    ,MERR2                 ;NOTIFY OPR THAT NO KMC11'S FOUND.
013150  005000                             CLR     R0                     ;MAKE DATA LIGHTS ZERO
013152  000000                             HALT                           ;STOP THE SHOW
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013154  000776                             BR      .-2               ;DISABLE CONT. SW.
013156  012716  013052          6$:        MOV     #14$,(SP)         ;ENTERED BY NON-EXISTANT TIME-OUT.
013162  000002                             RTI                       ;RETURN TO MAINSTREAM

013164  000001                  WHICH:     1
013166     002     002                     .BYTE   2,2
013170  001306                             $TMP4

013172  032737  000001  001446  VECMAP:    BIT     #SW00,STRTSW
013200  001114                             BNE     5$
013202  012737  000340  000022             MOV     #340,@#22         ;SET IOT TRAP PRIO TO 7
013210  012737  013364  000020             MOV     #4$,@#20          ;SET IOT TRAP VECTOR
013216  012702  002100                     MOV     #KM.MAP,R2        ;SET SOFTWARE POINTER
013222  012700  000300                     MOV     #300,R0           ;FLOATING VECTORS START HERE.
013226  012701  000302                     MOV     #302,R1           ;PC OF IOT INSTR.
013232  010120                  1$:        MOV     R1,(R0)+          ;START FILLING VECTOR AREA
013234  012721  000004                     MOV     #4,(R1)+          ;WITH .+2; IOT
013240  022021                             CMP     (R0)+,(R1)+       ;ADD 2 TO R0 +R1
013242  020127  001000                     CMP     R1,#1000
013246  101771                             BLOS    1$                ;BR IF MORE TO FILL
013250  013737  001470  001276             MOV     KMACTV,$TMP0      ;STORE TEMPORALLY
013256  006037  001276          2$:        ROR     $TMP0             ;BRING OUT A BIT
013262  103063                             BCC     5$                ;BR IF ALL DONE
013264  012704  000012                     MOV     #12,R4            ;R4 IS INDEX REGISTER
013270  016437  013442  177776             MOV     BRLVL(R4),PS      ;SET PS TO 7
013276  011201                             MOV     (R2),R1
013300  012761  000200  000004             MOV     #200,4(R1)
013306  012711  001000                     MOV     #BIT9,(R1)        ;SET ROMI
013312  012761  121111  000006             MOV     #121111,6(R1)     ;PUT INSTRUCTION IN PORT6
013320  012711  001400                     MOV     #BIT9!BIT8,(R1)   ;FORCE AN INTERRUPT
013324  105200                  7$:        INCB    R0                ;STALL
013326  001376                             BNE     .-2               ;FOR TIME TO INTERUPT
013330  162704  000002                     SUB     #2,R4             ;GET NEXT LOWEST PS LEVEL
013334  001404                             BEQ     6$                ;BR IF R4 = 0
013336  016437  013442  177776             MOV     BRLVL(R4),PS      ;MOVE NEXT LOWER LEVEL IN PS
013344  000767                             BR      7$                ;BR TO DELAY
013346  052762  005300  000002  6$:        BIS     #5300,2(R2)       ;NO INTERUPT ASSUME 300 AT LEVEL 5 AND FIX KMC11 LATER
013354  005011                  3$:        CLR     (R1)              ;CLEAR ROMI
013356  062702  000010                     ADD     #10,R2            ;POP SOFTWARE POINTER
013362  000735                             BR      2$                ;KEEP GOING
013364  051662  000002          4$:        BIS     (SP),2(R2)        ;GET VECTOR ADDRESS
013370  042762  000007  000002             BIC     #7,2(R2)          ;CLEAR JUNK
013376  016405  013444                     MOV     BRLVL+2(R4),R5    ;GET BR LEVEL OF KMC11
013402  006305                             ASL     R5                ;SHIFT LEVEL 4 PLACES
013404  006305                             ASL     R5                ;TO THE LEFT FOR THE
013406  006305                             ASL     R5                ;STATUS TABLE
013410  006305                             ASL     R5
013412  042705  170777                     BIC     #170777,R5        ;CLEAR UNWANTED BITS
013416  050562  000002                     BIS     R5,2(R2)          ;PUT BR LEVEL IN STATUS TABLE
013422  022626                             CMP     (SP)+,(SP)+       ;POP IOT JUNK OFF STACK
013424  012716  013354                     MOV     #3$,(SP)          ;SET FOR RETURN
013430  000002                             RTI
013432  012737  004134  000020  5$:        MOV     #$SCOPE,@#20      ; RESTORE SCOPE VECTOR
013440  000207                             RTS     PC                ;ALL DONE WITH "AUTO SIZING"

013442  000000                  BRLVL:     PR0     ;LEVEL 0
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 2122  013444  000000                          PR0      ;LEVEL 0
 2123  013446  000200                          PR4      ;LEVEL 4
 2124  013450  000240                          PR5      ;LEVEL 5
 2125  013452  000300                          PR6      ;LEVEL 6
 2126  013454  000340                          PR7      ;LEVEL 7
 2127
 2128
 2129  013456  105777  165562          INTTY:  TSTB     @$TKS                  ;WAIT FOR DONE
 2130  013462  100375                          BPL      .-4
 2131  013464  017703  165556                  MOV      @$TKB,R3               ;PUT CHAR IN R3
 2132  013470  105777  165554                  TSTB     @$TPS                  ;WAIT UNTIL PRINTER IS READY
 2133  013474  100375                          BPL      .-4
 2134  013476  010377  165550                  MOV      R3,@$TPB               ;ECHO CHAR
 2135  013502  042703  000240                  BIC      #BIT7!BIT5,R3          ;MASK OFF LOWER CASE
 2136  013506  000207                          RTS      PC                     ;RETURN
 2137
 2138  013510                          APT.SIZE:
 2139  013510  000005                          RESET
 2140  013512  010046                          MOV      R0,-(SP)               ;;PUSH R0 ON STACK
 2141  013514  010146                          MOV      R1,-(SP)               ;;PUSH R1 ON STACK
 2142  013516  010246                          MOV      R2,-(SP)               ;;PUSH R2 ON STACK
 2143  013520  010346                          MOV      R3,-(SP)               ;;PUSH R3 ON STACK
 2144  013522  005037  013724                  CLR      VECTR                  ; CLEAR THE LOCAL VARIABLE
 2145  013526  005037  013730                  CLR      PRIRTY                 ; CLEAN UP LOCAL VARIABLE
 2146  013532  013700  001376                  MOV      $CDW1,R0               ; GET THE DEVICE COUNT
 2147  013536  010037  001476                  MOV      R0,SAVNUM              ; SAVE THE NO. OF DEVICES
 2148  013542  012701  001346                  MOV      #$MAMS1,R1             ; GET EXTRA INFO. BITS POINTER
 2149  013546  013737  001372  013726          MOV      $BASE,BASE             ; GET BASE CSR ADDRESS
 2150  013554  113737  001366  013724          MOVB     $VECT1,VECTR           ; GET THE VECTOR
 2151  013562  113737  001367  013730          MOVB     $VECT1+1,PRIRTY        ; GET THE PRIORITY
 2152  013570  013737  001374  001470          MOV      $DEVM,KMACTV           ; SAVE THE KMC'S SELECTED ACTIVE
 2153  013576  013737  001470  001474          MOV      KMACTV,SAVACT          ; SAVE THE ACTIVE REGISTER
 2154  013604  012702  001402                  MOV      #$DDW0,R2              ; GET ADDRESS OF FIRST DEVICE DESCRIPTOR WORD
 2155  013610  012703  002100                  MOV      #KM.MAP,R3             ; GET POINTER TO DEVICE MAP
 2156  013614  005023                  3$:     CLR      (R3)+                  ; CLEAR DEVICE MAP
 2157  013616  022703  002300                  CMP      #KM.END,R3             ; IS WHOLE DEV.MAP CLEARED?
 2158  013622  003374                          BGT      3$                     ; NO, THEN GO ON.
 2159  013624  012703  002100                  MOV      #KM.MAP,R3             ; RESTORE DEV.MAP POINTER.
 2160  013630  013723  013726          1$:     MOV      BASE,(R3)+             ; LOAD CSR ADDRESS
 2161  013634  112163  000001                  MOVB     (R1)+,1(R3)            ; GET EXTRA INFO. BITS
 2162  013640  006213                          ASR      (R3)                   ; SET IT IN RIGHT POSITION.
 2163  013642  006213                          ASR      (R3)                   ; SET IT IN RIGHT POSITION.
 2164  013644  053713  013730                  BIS      PRIRTY,(R3)            ; GET PRIORITY IN STAT1
 2165  013650  006313                          ASL      (R3)                   ; SET THEM IN RIGHT POSITION
 2166  013652  006313                          ASL      (R3)                   ;  "    "   "    "     "
 2167  013654  006313                          ASL      (R3)                   ;  "    "   "    "     "
 2168  013656  006313                          ASL      (R3)                   ;  "    "   "    "     "
 2169  013660  053723  013724                  BIS      VECTR,(R3)+            ; GET THE VECTOR IN STAT1.
 2170  013664  012223                          MOV      (R2)+,(R3)+            ; GET THE STAT2 FROM DDWXX
 2171  013666  005723                          TST      (R3)+                  ; SKIP OVER STAT3
 2172  013670  005300                          DEC      R0                     ; COUNT BY 1
 2173  013672  001407                          BEQ      2$                     ; ALL DONE?
 2174  013674  062737  000010  013726          ADD      #10,BASE               ; INCREMENT BASE CSR ADDRESS BY 10
 2175  013702  062737  000010  013724          ADD      #10,VECTR              ; INCREMENT VECTOR ADDRESS BY 10
 2176  013710  000747                          BR       1$                     ; SET THE NEXT MAP ENTRY
 2177  013712                          2$:
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 2178  013712  012603                          MOV     (SP)+,R3          ;;POP STACK INTO R3
 2179  013714  012602                          MOV     (SP)+,R2          ;;POP STACK INTO R2
 2180  013716  012601                          MOV     (SP)+,R1          ;;POP STACK INTO R1
 2181  013720  012600                          MOV     (SP)+,R0          ;;POP STACK INTO R0
 2182  013722  000207                          RTS     PC                ; RETURN
 2183  013724  000000                 VECTR:   .WORD   0
 2184  013726  000000                 BASE:    .WORD   0
 2185  013730  000000                 PRIRTY:  .WORD   0
 2186
 2187  013732                         ROMMAP:
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                                                 ;************************* TEST 1 *************************
                                                 ;*TEST OF BR RIGHT SHIFT
                                                 ;*VERIFY THAT A DEST OF BR RSH (011) OF A MICRO-INSTRUCTION
                                                 ;*SHIFTS THE RESULTING BR DATA RIGHT ONCE.
                                                 ;:*********************************************************

                                                 ;  TEST 1
                                                 ;-------------
                                         ;:***************************************************************
  013732  000004                         TST1:   SCOPE
  013734  012737  000001  001202                 MOV     #1,$TSTNM                     ; LOAD THE NO. OF THIS TEST
  013742  012737  014044  001442                 MOV     #TST2,NEXT                    ; POINT TO THE START OF NEXT TEST.
                                                                       ;R1 CONTAINS BASE KMC11 ADDRESS
  013750  104410                                 MSTCLR                ;MASTER CLEAR KMC11
  013752  013701  002066                         MOV     KMCSR,R1      ;R1 = KMC BASE ADDRESS
  013756  005011                                 CLR     (R1)          ;CLEAR SEL0
  013760  012705  052525                         MOV     #52525,R5     ;START WITH 125
  013764  010561  000004                         MOV     R5,4(R1)      ;PORT4←125
  013770  104412                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  013772  120500                                 120500                ;BR ← PORT4
  013774  104412                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  013776  061620                                 061620                ;BR RSH←BR, SHIFT BR RIGHT
  014000  104412                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  014002  061225                                 061225                ;PORT5←BR
  014004  006005                                 ROR     R5            ;R5 = "EXPECTED"
  014006  116104  000005                         MOVB    5(R1),R4      ;R4 = "FOUND"
  014012  120504                                 CMPB    R5,R4         ;DID BR SHIFT RIGHT ONCE?
  014014  001401                                 BEQ     1$            ;BR IF YES
  014016  104012                                 ERROR   12            ;BR RIGHT SHIFT ERROR
  014020                                 1$:
  014020  104412                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  014022  061620                                 061620                ;BR RSH←BR, SHFT BR RIGHT AGAIN
  014024  104412                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  014026  061225                                 061225                ;PORT5←BR
  014030  006005                                 ROR     R5            ;R5 = "EXPECTED"
  014032  116104  000005                         MOVB    5(R1),R4      ;R4 = "FOUND"
  014036  120504                                 CMPB    R5,R4         ;DID BR SHIFT RIGHT?
  014040  001401                                 BEQ     2$            ;BR IF YES
  014042  104012                                 ERROR   12            ;BR RIGHT SHIFT ERROR
  014044                                 2$:


                                                 ;************************* TEST 2 *************************
                                                 ;*IOP CRAM WRITE/READ TEST
                                                 ;*FLOAT A 1 THROUGH EACH CRAM LOCATION
                                                 ;:*********************************************************

                                                 ;  TEST 2
                                                 ;-------------
                                         ;:***************************************************************
  014044  000004                         TST2:   SCOPE
  014046  012737  000002  001202                 MOV     #2,$TSTNM                     ; LOAD THE NO. OF THIS TEST
  014054  012737  014150  001442                 MOV     #TST3,NEXT                    ; POINT TO THE START OF NEXT TEST.
```

```
014062  012737  014076  001444          MOV     #3$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014070  005000                          CLR     R0              ;R0 = CRAM ADDRESS
014072  012702  000001          1$:     MOV     #1,R2           ;R2 = WRITE DATA
014076                          2$:
014076  012711  002000          3$:     MOV     #BIT10,(R1)     ;SET ROMO
014102  010061  000004                  MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
014106  010261  000006                  MOV     R2,6(R1)        ;LOAD SEL6 WITH WRITE DATA
014112  052711  020000                  BIS     #BIT13,(R1)     ;WRITE SEL6 INTO CRAM
014116  016104  000004                  MOV     4(R1),R4        ;READ CRAM INTO "FOUND"
014122  020204                          CMP     R2,R4           ;IS DATA CORRECT?
014124  001401                          BEQ     4$              ;BR IF OK
014126  104001                          ERROR   1               ;ERROR
014130  104405                  4$:     SCOP1
014132  000241                          CLC                     ;CLEAR CARRY
014134  006102                          ROL     R2              ;SHIFT WRITE DATA
014136  001357                          BNE     2$              ;BR IF NOT DONE THIS ADDRESS
014140  005200                          INC     R0              ;BUMP TO NEXT CRAM ADDRESS
014142  022700  002000                  CMP     #2000,R0        ;DONE YET?
014146  001351                          BNE     1$              ;BR IF NO
014150                          5$:


                                        ;*****************   TEST 3 ******************
                                        ;*IOP CRAM WRITE/READ TEST
                                        ;*FLOAT A 0 THROUGH EACH CRAM LOCATION
                                        ;;*****************************************

                                        ;  TEST 3
                                        ;______________
                                ;;*******************************************
014150  000004                  TST3:   SCOPE
014152  012737  000003  001202          MOV     #3,$TSTNM               ; LOAD THE NO. OF THIS TEST
014160  012737  014262  001442          MOV     #TST4,NEXT              ; POINT TO THE START OF NEXT TEST.
014166  012737  014206  001444          MOV     #3$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014174  104410                          MSTCLR                  ;MASTER CLEAR KMC11
014176  005000                          CLR     R0              ;R0 = CRAM ADDRESS
014200  012702  000001          1$:     MOV     #1,R2           ;R2 = WRITE DATA
014204                          2$:
014204  005102                          COM     R2              ;MAKE IT A FLOATING ZERO
014206  012711  002000          3$:     MOV     #BIT10,(R1)     ;SET ROMO
014212  010061  000004                  MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
014216  010261  000006                  MOV     R2,6(R1)        ;LOAD SEL6 WITH WRITE DATA
014222  052711  020000                  BIS     #BIT13,(R1)     ;WRITE SEL6 INTO CRAM
014226  016104  000004                  MOV     4(R1),R4        ;READ CRAM INTO "FOUND"
014232  020204                          CMP     R2,R4           ;IS DATA CORRECT?
014234  001401                          BEQ     4$              ;BR IF OK
014236  104001                          ERROR   1               ;ERROR
014240  104405                  4$:     SCOP1
014242  005102                          COM     R2              ;BACK TO FLOATING ONE
014244  000241                          CLC                     ;CLEAR CARRY
014246  006102                          ROL     R2              ;SHIFT WRITE DATA
014250  001355                          BNE     2$              ;BR IF NOT DONE THIS ADDRESS
014252  005200                          INC     R0              ;BUMP TO NEXT CRAM ADDRESS
014254  022700  002000                  CMP     #2000,R0        ;DONE YET?
```

```
014260  001347                          BNE     1$                      ;BR IF NO
014262                          5$:



                                        ;**************************** TEST 4 ****************************
                                        ;*IOP CRAM DUAL ADDRESSING TEST
                                        ;*WRITE EACH ADDRESS INTO ITSELF,READ EACH
                                        ;*ADDRESS TO VERIFY CORRECT ADDRESSING
                                        ;;*****************************************************************

                                        ;  TEST 4
                                        ;--------------

                                ;;****************************************************************
014262  000004                  TST4:   SCOPE
014264  012737  000004  001202          MOV     #4,$TSTNM                       ; LOAD THE NO. OF THIS TEST
014272  012737  014432  001442          MOV     #TST5,NEXT                      ; POINT TO THE START OF NEXT TEST.
014300  012737  014312  001444          MOV     #1$,LOCK                        ; ADDRESS FOR LOCK ON DATA.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
014306  104410                          MSTCLR                          ;MASTER CLEAR KMC11
014310  005000                          CLR     R0                      ;R0 =CRAM ADDRESS
014312  010002                  1$:     MOV     R0,R2                   ;SAVE R2 FOR TYPEOUT
014314  012711  002000                  MOV     #BIT10,(R1)             ;SET ROMO
014320  010061  000004                  MOV     R0,4(R1)                ;WRITE ADDRESS TO SEL4
014324  010061  000006                  MOV     R0,6(R1)                ;LOAD SEL6 WITH WRITE DATA
014330  052711  020000                  BIS     #BIT13,(R1)             ;WRITE CRAM
014334  005061  000006                  CLR     6(R1)                   ;CLEAR SEL 6
014340  016104  000006                  MOV     6(R1),R4                ;SHOULD READ BACK OWN ADDRESS
014344  020004                          CMP     R0,R4                   ;IS DATA CORRECT?
014346  001401                          BEQ     2$                      ;BR IF YES
014350  104001                          ERROR   1                       ;DATA ERROR
014352  104405                  2$:     SCOP1                           ;LOOP TO 1$ IF SW09=1
014354  005200                          INC     R0                      ;BUMP TO NEXT ADDRESS
014356  022700  002000                  CMP     #2000,R0                ;DONE WRITING YET?
014362  001353                          BNE     1$                      ;BR IF NO
014364  005000                          CLR     R0                      ;RESTART AT ADDRESS 0
014366  012737  014374  001444          MOV     #3$,LOCK                ;NEW SCOP1
014374  010002                  3$:     MOV     R0,R2                   ;SAVE R2 FOR TYPEOUT
014376  012711  002000                  MOV     #BIT10,(R1)             ;SET ROMO
014402  010061  000004                  MOV     R0,4(R1)                ;SEL4 = CRAM ADDRESS
014406  016104  000006                  MOV     6(R1),R4                ;READ CRAM INTO "FOUND"
014412  020004                          CMP     R0,R4                   ;IS DATA CORRECT?
014414  001401                          BEQ     4$                      ;BR IF YES
014416  104002                          ERROR   2                       ;DUAL ADDRESSING ERROR
014420  104405                  4$:     SCOP1                           ;LOOP TO 3$ IF SW09=1
014422  005200                          INC     R0                      ;BUMP TO NEXT ADDRESS
014424  022700  002000                  CMP     #2000,R0                ;DONE WRITING YET?
014430  001361                          BNE     3$                      ;BR IF NO
014432                          5$:



                                        ;**************************** TEST 5 ****************************
                                        ;*IOP CRAM READ TEST
                                        ;*THIS TEST WRITES THE CRAM WITH THE CROM MICRO-CODE MAP
                                        ;*THEN READS IT BACK AND COMPARES EACH ADDRESS WITH THE
                                        ;*DUPLICATE OF THE CROM MICRO-CODE.
                                        ;;*****************************************************************
```

```

                                                   ;  TEST 5
                                                   ;--------------

                                         ;;*************************************************************
014432  000004                           TST5:     SCOPE
014434  012737  000005  001202                     MOV     #5,$TSTNM                       ; LOAD THE NO. OF THIS TEST
014442  012737  014542  001442                     MOV     #TST6,NEXT                      ; POINT TO THE START OF NEXT TEST.
014450  012737  014474  001444                     MOV     #1$,LOCK                        ; ADDRESS FOR LOCK ON DATA.
                                                                                     ;R1 CONTAINS BASE KMC11 ADDRESS
014456  104410                                     MSTCLR                            ;MASTER CLEAR KMC11
014460  005011                                     CLR     (R1)                      ;CLEAR RUN
014462  004737  021140                             JSR     PC,WROM                   ;WRITE CRAM WITH MAP
014466  012700  013732                             MOV     #ROMMAP,R0                ;SOFTWARE POINTER TO CROM DUPLICATE
014472  005002                                     CLR     R2                        ;R2 = CROM ADDRESS
014474  010261  000004                   1$:       MOV     R2,4(R1)                  ;WRITE CROM ADDRESS TO SEL4
014500  012711  002000                             MOV     #BIT10,(R1)               ;SET CROM0
014504  011005                                     MOV     (R0),R5                   ;PUT "EXPECTED" IN R5
014506  016104  000006                             MOV     6(R1),R4                  ;PUT "FOUND" IN R4
014512  020504                                     CMP     R5,R4                     ;COMPARE HARD ROM TO SOFT DUPLICATE
014514  001401                                     BEQ     2$                        ;BR IF OK
014516  104003                                     ERROR   3                         ;CRAM READ ERROR!
014520  005011                           2$:       CLR     (R1)                      ;CLR  BIT10
014522  005061  000006                             CLR     6(R1)                     ;CLEAR SEL6
014526  104405                                     SCOP1                             ;LOOP TO 1$ IF SW09=1
014530  005202                                     INC     R2                        ;INC TO NEXT CROM ADDRESS
014532  005720                                     TST     (R0)+                     ;POP R0 BY 2
014534  022702  002000                             CMP     #2000,R2                  ;DONE 1K YET?
014540  001355                                     BNE     1$                        ;BR IF NO
014542                                   3$:


                                                   ;*************************** TEST 6 ***************************
                                                   ;*IOP MAIN MEMORY TEST
                                                   ;*FLOAT A 1 THROUGH ALL MAIN MEMORY LOCATIONS
                                                   ;;************************************************************

                                                   ;  TEST 6
                                                   ;--------------

                                         ;;*************************************************************
014542  000004                           TST6:     SCOPE
014544  012737  000006  001202                     MOV     #6,$TSTNM                       ; LOAD THE NO. OF THIS TEST
014552  012737  014720  001442                     MOV     #TST7,NEXT                      ; POINT TO THE START OF NEXT TEST.
014560  012737  014600  001444                     MOV     #65$,LOCK                       ; ADDRESS FOR LOCK ON DATA.
                                                                                     ;R1 CONTAINS BASE KMC11 ADDRESS
014566  104410                                     MSTCLR                            ;MASTER CLEAR KMC11
014570  005037  021012                             CLR     FLAG                      ;START WITH ADDRESS 0
014574  012700  000001                   1$:       MOV     #1,R0                     ;START WITH BIT 0
014600  042737  000377  014632           65$:      BIC     #377,66$                          ;CLEAR ADDRESS FIELD OF INSTRUCTION
014606  042737  000003  014636                     BIC     #3,68$                    ;CLEAR ADDRESS FIELD OF INSTRUCTION
014614  153737  021012  014632                     BISB    FLAG,66$                          ;ADD ADDRESS TO INSTRUCTION
014622  153737  021013  014636                     BISB    FLAG+1,68$                ;ADD ADDRESS TO INSTRUCTION
014630  104412                                     ROMCLK                            ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014632  010000                           66$:      010000                            ;LOAD MAR LO WITH ADDRESS IN FLAG
014634  104412                                     ROMCLK                            ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014636  004000                           68$:      004000                            ;LOAD MAR HI
014640  010061  000004                             MOV     R0,4(R1)                  ;WRITE PATTERN IN PORT4
```

```
014644  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014646  122500                          122500                          ;MOVE PORT4 TO MEMORY
014650  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014652  040620                          040620                          ;MOVE MEMORY TO BR
014654  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014656  061225                          61225                           ;MOVE BR TO PORT5
014660  010005                          MOV     R0,R5                   ;PUT "EXPECTED" IN R5
014662  116104  000005                  MOVB    5(R1),R4                ;PUT "FOUND" IN R4
014666  120504                          CMPB    R5,R4                   ;DATA CORRECT?
014670  001401                          BEQ     67$                     ;BR IF YES
014672  104010                          ERROR   10                      ;DATA ERROR
014674  104405                  67$:    SCOPI                           ;SW09=1?
014676  000241                          CLC                             ;CLEAR CARRY
014700  106100                          ROLB    R0                      ;SHIFT BIT IN R0
014702  001336                          BNE     65$                     ;DONE IF R0=0
014704  005237  021012                  INC     FLAG                    ;NEXT ADDRESS
014710  022737  002000  021012          CMP     #2000,FLAG              ;LAST ADDRESS?
014716  001326                          BNE     1$                      ;BR IF NO
014720                          2$:



                                        ;*************************** TEST 7 **************************
                                        ;*IOP MAIN MEMORY TEST
                                        ;*FLOAT A 0 THROUGH ALL MAIN MEMORY LOCATIONS
                                        ;:*************************************************************

                                        ;  TEST 7
                                        ;--------------

                                ;:**************************************************************************
014720  000004                  TST7:   SCOPE
014722  012737  000007  001202          MOV     #7,$TSTNM                       ; LOAD THE NO. OF THIS TEST
014730  012737  015102  001442          MOV     #TST10,NEXT                     ; POINT TO THE START OF NEXT TEST.
014736  012737  014760  001444          MOV     #65$,LOCK                       ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014744  104410                          MSTCLR                          ;MASTER CLEAR KMC11
014746  005037  021012                  CLR     FLAG                    ;START WITH ADDRESS 0
014752  012700  000001          1$:     MOV     #1,R0                   ;START WITH BIT 0
014756  005100                  64$:    COM     R0                      ;CHANGE TO FLOATING 0
014760  042737  000377  015012  65$:    BIC     #377,66$                        ;CLEAR ADDRESS FIELD OF INSTRUCTION
014766  042737  000003  015016          BIC     #3,68$                  ;CLEAR ADDRESS FIELD OF INSTRUCTION
014774  153737  021012  015012          BISB    FLAG,66$                        ;ADD ADDRESS TO INSTRUCTION
015002  153737  021013  015016          BISB    FLAG+1,68$              ;ADD ADDRESS TO INSTRUCTION
015010  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015012  010000                  66$:    010000                          ;LOAD MAR LO WITH ADDRESS IN FLAG
015014  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015016  004000                  68$:    004000                          ;LOAD MAR HI
015020  010061  000004                  MOV     R0,4(R1)                ;WRITE PATTERN IN PORT4
015024  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015026  122500                          122500                          ;MOVE PORT4 TO MEMORY
015030  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015032  040620                          040620                          ;MOVE MEMORY TO BR
015034  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015036  061225                          61225                           ;MOVE BR TO PORT5
015040  010005                          MOV     R0,R5                   ;PUT "EXPECTED" IN R5
015042  116104  000005                  MOVB    5(R1),R4                ;PUT "FOUND" IN R4
015046  120504                          CMPB    R5,R4                   ;DATA CORRECT?
```

```
015050  001401                          BEQ     67$             ;BR IF YES
015052  104010                          ERROR   10              ;DATA ERROR
015054  104405                  67$:    SCOP1                   ;SW09=1?
015056  005100                          COM     R0              ;CHANGE TO FLOATING 1
015060  000241                          CLC                     ;CLEAR CARRY
015062  106100                          ROLB    R0              ;SHIFT BIT IN R0
015064  001334                          BNE     64$             ;DONE IF R0=0
015066  005237  021012                  INC     FLAG            ;NEXT ADDRESS
015072  022737  002000  021012          CMP     #2000,FLAG      ;LAST ADDRESS?
015100  001324                          BNE     1$              ;BR IF NO
015102                          2$:


                                        ;*************************** TEST 10 ***************************
                                        ;*IOP MAIN MEMORY DUAL ADDRESSING TEST
                                        ;*LOAD EACH MEMORY LOCATION WITH ITS OWN ADDRESS
                                        ;*READ BACK EACH LOCATION TO VERIFY CORRECT ADDRESSING
                                        ;:**************************************************************

                                        ;  TEST 10
                                        ;--------------
                                ;;***********************************************************
015102  000004                  TST10:  SCOPE
015104  012737  000010  001202          MOV     #10,$TSTNM                  ; LOAD THE NO. OF THIS TEST
015112  012737  015372  001442          MOV     #TST11,NEXT                 ; POINT TO THE START OF NEXT TEST.
015120  012737  015134  001444          MOV     #1$,LOCK                    ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
015126  104410                          MSTCLR                  ;MASTER CLEAR KMC11
015130  005037  021012                  CLR     FLAG            ;START AT ADDRESS 0
015134  013702  021012          1$:     MOV     FLAG,R2         ;PUT DATA IN R2
015140  042737  000377  015172          BIC     #377,2$         ;CLEAR ADDRESS FIELD OF INSTRUCTION
015146  042737  000003  015176          BIC     #3,7$           ;CLEAR ADDRESS FIELD OF INSTRUCTION
015154  153737  021012  015172          BISB    FLAG,2$         ;ADD ADDRESS TO INSTRUCTION
015162  153737  021013  015176          BISB    FLAG+1,7$       ;ADD ADDRESS TO INSTRUCTION
015170  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015172  010000                  2$:     010000                  ;LOAD MAR LO
015174  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015176  004000                  7$:     004000                  ;LOAD MAR HI
015200  010261  000004                  MOV     R2,4(R1)
015204  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015206  122500                          122500                  ;MOVE PORT4 TO MEMORY
015210  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015212  040620                          040620                  ;MOVE MEMORY TO THE BR
015214  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015216  061225                          61225                   ;MOV BR TO PORT5
015220  010205                          MOV     R2,R5           ;PUT "EXPECTED" IN R5
015222  116104  000005                  MOVB    5(R1),R4        ;PUT "FOUND" IN R4
015226  120504                          CMPB    R5,R4           ;DATA CORRECT?
015230  001401                          BEQ     3$              ;BR IF YES
015232  104010                          ERROR   10              ;DATA ERROR
015234  104405                  3$:     SCOP1                   ;SW09=1?
015236  005237  021012                  INC     FLAG            ;NEXT ADDRESS
015242  022737  002000  021012          CMP     #2000,FLAG      ;LAST ADDRESS
015250  001331                          BNE     1$              ;BR IF NO
015252  012737  015264  001444          MOV     #4$,LOCK        ;NEW SCOPE 1
015260  005037  021012                  CLR     FLAG            ;RESTART AT ADDRESS 0
```

```
015264  013702  021012          4$:     MOV     FLAG,R2                 ;PUT DATA IN R2
015270  042737  000377  015322          BIC     #377,5$                 ;CLEAR ADDRESS FIELD OF INSTRUCTION
015276  042737  000003  015326          BIC     #3,8$                   ;CLEAR ADDRESS FIELD OF INSTRUCTION
015304  153737  021012  015322          BISB    FLAG,5$                 ;ADD ADDRESS TO INSTRUCTION
015312  153737  021013  015326          BISB    FLAG+1,8$               ;ADD ADDRESS TO INSTRUCTION
015320  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015322  010000                  5$:     010000                          ;LOAD THE MAR LO
015324  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015326  004000                  8$:     004000                          ;LOAD MAR HI
015330  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015332  040620                          040620                          ;MOVE MEMORY TO THE BR
015334  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015336  061225                          61225                           ;MOV BR TO PORTS
015340  010205                          MOV     R2,R5                   ;PUT "EXPECTED" IN R5
015342  116104  000005                  MOVB    5(R1),R4                ;PUT "FOUND" IN R4
015346  120504                          CMPB    R5,R4                   ;DATA CORRECT?
015350  001401                          BEQ     6$                      ;BR IF YES
015352  104010                          ERROR   10                      ;ADDRESSING ERROR
015354  104405                  6$:     SCOP1                           ;SW09=1?
015356  005237  021012                  INC     FLAG                    ;NEXT ADDRESS
015362  022737  002000  021012          CMP     #2000,FLAG              ;IS IT THE LAST
015370  001335                          BNE     4$                      ;BR IF NO
015372                          9$:


                                        ;*************************** TEST 11 ***************************
                                        ;*IOP MAR TEST
                                        ;*PERFORM DUAL ADDRESSING TEST
                                        ;*USING MAR AUTO-INC FEATURE
                                        ;:**************************************************************

                                        ;  TEST 11
                                        ;-------------
                                ;;*****************************************************************
015372  000004                  TST11:  SCOPE
015374  012737  000011  001202          MOV     #11,$TSTNM              ; LOAD THE NO. OF THIS TEST
015402  012737  015476  001442          MOV     #TST12,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
015410  104410                          MSTCLR                          ;MASTER CLEAR KMC11
015412  005002                          CLR     R2                      ;START WITH A ZERO
015414  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015416  010000                          010000                          ;LOAD MAR WITH A ZERO
015420  010261  000004          1$:     MOV     R2,4(R1)                ;WRITE DATA TO PORT4
015424  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015426  136500                          136500                          ;MEM←PORT4, AUTO-INC MAR
015430  005202                          INC     R2                      ;INCREMENT DATA
015432  022702  002000                  CMP     #2000,R2                ;DONE YET?
015436  001370                          BNE     1$                      ;BR IF NO
015440  005002                          CLR     R2                      ;RESTART WITH A ZERO
015442  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015444  010000                          010000                          ;LOAD MAR WITH A ZERO
015446                          2$:
015446  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015450  055224                          055224                          ;MOVE MEM TO PORT4
015452  010205                          MOV     R2,R5                   ;PUT "EXPECTED" IN R5
015454  016104  000004                  MOV     4(R1),R4                ;PUT "FOUND" IN R4
```

```
015460  120504                                  CMPB    R5,R4           ;DATA CORRECT?
015462  001401                                  BEQ     3$              ;BR IF YES
015464  104011                                  ERROR   11              ;MAR ERROR
015466  005202                          3$:     INC     R2              ;NEXT ADDRESS
015470  022702  002000                          CMP     #2000,R2        ;DONE YET?
015474  001364                                  BNE     2$              ;BR IF NO
015476                                  4$:



                                        ;*************************** TEST 12 **************************
                                        ;*IOP (CRAM) OOT BITS TEST
                                        ;*LOAD MAR WITH A 0 INC MAR UNTIL IT OVERFLOWS (2000 TIMES)
                                        ;*VERIFY THAT IBUS* 10 BITS IS SET ONLY WHEN MAR BIT 8 IS A ONE
                                        ;*AND THAT IBUS* 10 BIT6 IS SET ON MAR OVERFLOW(2000)
                                        ;:*************************************************************

                                        ;  TEST 12
                                        ;--------------

                                ;;*************************************************************
015476  000004                  TST12:  SCOPE
015500  012737  000012  001202          MOV     #12,$TSTNM                      ; LOAD THE NO. OF THIS TEST
015506  012737  015674  001442          MOV     #TST13,NEXT                     ; POINT TO THE START OF NEXT TEST.
015514  012737  015532  001444          MOV     #1$,LOCK                        ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
015522  104410                          MSTCLR                  ;MASTER CLEAR KMC11
015524  005002                          CLR     R2              ;R2=SAME AS MAR CONTENTS
015526  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015530  010000                          010000                  ;MAR←0
015532                          1$:
015532  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015534  121204                          121204                  ;PORT4=IBUS* 10
015536  005005                          CLR     R5              ;R5="EXPECTED"
015540  032702  000400                  BIT     #BIT8,R2        ;IS BIT8 SET IN MAR?
015544  001402                          BEQ     .+6             ;BR IF NO
015546  012705  000040                  MOV     #BIT5,R5        ;IF YES THEN SET BIT5
015552  016104  000004                  MOV     4(R1),R4        ;R4="FOUND"
015556  042704  177637                  BIC     #177637,R4      ;CLEAR UNWANTED BITS
015562  020504                          CMP     R5,R4           ;BITS 5&6 SHOULD BE CLEAR
015564  001401                          BEQ     .+4             ;BR IF OK
015566  104007                          ERROR   7               ;ERROR BITS 5&6 NOT CLEAR
015570  104405                          SCOP1                   ;LOOP TO 11$ IF SW09=1
015572  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015574  014000                          014000                  ;INC MAR
015576  005202                          INC     R2              ;BUMP MEM ADDRESS
015600  022702  002000                  CMP     #2000,R2        ;OVERFLOWED YET?
015604  001352                          BNE     1$              ;BR IF NO
015606  005037  001444                  CLR     LOCK            ;NO MORE SCOP1
015612  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015614  121204                          121204                  ;PART4←IBUS* 10
015616  012705  000100                  MOV     #BIT6,R5        ;R5="EXPECTED"
015622  016104  000004                  MOV     4(R1),R4        ;R4="FOUND"
015626  042704  177637                  BIC     #177637,R4      ;CLEAR UNWANTED BITS
015632  020504                          CMP     R5,R4           ;BIT6 SHOULD BE SET
015634  001401                          BEQ     .+4             ;BR IF OK
015636  104007                          ERROR   7               ;ERROR, BIT6 NOT SET
015640  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
015642  010000                                  010000                  ;MAR←0
015644  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015646  004000                                  004000                  ;MAR HI←0
015650  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015652  121204                                  121204                  ;PORT4←IBUS# 10
015654  005005                                  CLR     R5              ;R5="EXPECTED"
015656  016104  000004                          MOV     4(R1),R4        ;R4="FOUND"
015662  042704  177637                          BIC     #177637,R4      ;CLEAR UNWANTED BITS
015666  020504                                  CMP     R5,R4           ;BITS 5&6 SHOULD BE CLEAR
015670  001401                                  BEQ     .+4             ;BR IF OK
015672  104007                                  ERROR   7               ;ERROR 5&6 NOT BOTH CLEAR
015674                                  2$:


                                                ;************************** TEST 13 **************************
                                                ;*CRAM TEST OF JUMP(I) NEVER MICRO-PROCESSOR INSTRUCTION.
                                                ;*PERFORM THE JUMP INSTRUCTION
                                                ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                                ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                                ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                                ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                                ;*THE CRAM PC IS CORRECT. IF THE CRAM PC IS NOT RIGHT,
                                                ;*THEN PORT4 CONTAINS A 37
                                                ;:***********************************************************

                                                ;  TEST 13
                                                ;--------------

                                        ;;*********************************************************
015674  000004                          TST13:  SCOPE
015676  012737  000013  001202                  MOV     #13,$TSTNM               ; LOAD THE NO. OF THIS TEST
015704  012737  016060  001442                  MOV     #TST14,NEXT              ; POINT TO THE START OF NEXT TEST.
015712  012737  015726  001444                  MOV     #1$,LOCK                 ; ADDRESS FOR LOCK ON DATA.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
015720  104410                                  MSTCLR                  ;MASTER CLEAR KMC11
015722  004737  021202                          JSR     PC,MEMSET       ;SET MEM AND RAM
015726                                  1$:
015726  004737  021014                          JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
015732  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015734  100400                                  100400                  ;START AT ROM PC=0
015736  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015740  114377                                  114377!<400*0>          ;JUMP TO ROM PC OF 1777
015742  004737  021106                          JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
015746  000001                                  1                       ;EXPECTED DATA
015750  120504                                  CMPB    R5,R4           ;IS ROM PC CORRECT?
015752  001401                                  BEQ     2$              ;BR IF YES
015754  104005                                  ERROR   5               ;ERROR, CRAM PC IS WRONG
015756  104405                          2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
015760  012737  015766  001444                  MOV     #3$,LOCK        ;NEW SCOP1
015766                                  3$:
015766  004737  021014                          JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
015772  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015774  100403                                  100403                  ;START AT ROM PC=3
015776  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016000  100000                                  100000!<400*0>  ;JUMP TO ROM PC OF 0
016002  004737  021106                          JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016006  000004                                  4                       ;EXPECTED DATA
```

```
016010  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016012  001401                          BEQ     4$              ;BR IF YES
016014  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016016  104405                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
016020  012737  016026  001444          MOV     #5$,LOCK        ;NEW SCOP1
016026                          5$:
016026  004737  021014                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
016032  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016034  100406                          100406                  ;START AT ROM PC=6
016036  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016040  104125                          104125!<400*0>          ;JUMP TO ROM PC OF 525
016042  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016046  000007                          7                       ;EXPECTED DATA
016050  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016052  001401                          BEQ     6$              ;BR IF YES
016054  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016056  104405                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1


                                        ;************************** TEST 14 **************************
                                        ;*CRAM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
                                        ;*PERFORM THE JUMP INSTRUCTION
                                        ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                        ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                        ;*THEN PORT4 WILL CONTAIN A 37
                                        ;*************************************************************

                                        ;  TEST 14
                                        ;--------------

                                ;;*******************************************************************
016060  000004                  TST14:  SCOPE
016062  012737  000014  001202          MOV     #14,$TSTNM              ; LOAD THE NO. OF THIS TEST
016070  012737  016230  001442          MOV     #TST15,NEXT             ; POINT TO THE START OF NEXT TEST.
016076  012737  016112  001444          MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
016104  104410                          MSTCLR                  ;MASTER CLEAR KMC11
016106  004737  021202                  JSR     PC,MEMSET       ;SET MEM AND RAM
016112                          1$:
016112  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016114  100400                          100400                  ;START AT ROM PC=0
016116  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016120  114777                          114377!<400*1>          ;JUMP TO ROM PC OF 1777
016122  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016126  000377                          377                     ;EXPECTED DATA
016130  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016132  001401                          BEQ     2$              ;BR IF YES
016134  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016136  104405                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
016140  012737  016146  001444          MOV     #3$,LOCK        ;NEW SCOP1
016146                          3$:
016146  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016150  100403                          100403                  ;START AT ROM PC=3
016152  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
016154  100400                          100000!<400*1>   ;JUMP TO ROM PC OF 0
016156  004737  021106                  JSR     PC,RAMDAT               ;R4=CRAM PC (LSB 8 BITS)
016162  000000                          0                               ;EXPECTED DATA
016164  120504                          CMPB    R5,R4                   ;IS ROM PC CORRECT?
016166  001401                          BEQ     4$                      ;BR IF YES
016170  104005                          ERROR   5                       ;ERROR, CRAM PC IS WRONG
016172  104405                  4$:     SCOP1                           ;LOOP TO 3$ IF SW09=1
016174  012737  016202  001444          MOV     #5$,LOCK                ;NEW SCOP1
016202                          5$:
016202  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016204  100406                          100406                          ;START AT ROM PC=6
016206  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016210  104525                          104125!<400*1>                  ;JUMP TO ROM PC OF 525
016212  004737  021106                  JSR     PC,RAMDAT               ;R4=CRAM PC (LSB 8 BITS)
016216  000125                          125                             ;EXPECTED DATA
016220  120504                          CMPB    R5,R4                   ;IS ROM PC CORRECT?
016222  001401                          BEQ     6$                      ;BR IF YES
016224  104005                          ERROR   5                       ;ERROR, CRAM PC IS WRONG
016226  104405                  6$:     SCOP1                           ;LOOP TO 5$ IF SW59=1


                                        ;*************************** TEST 15 ****************************
                                        ;*CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
                                        ;*SET THE C BIT, PERFORM THE JUMP INSTRUCTION,
                                        ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                        ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                        ;*THEN PORT4 WILL CONTAIN A 37
                                        ;:***************************************************************

                                        ;  TEST 15
                                        ;--------------

                                ;:****************************************************************
016230  000004                  TST15:  SCOPE
016232  012737  000015  001202          MOV     #15,$TSTNM              ; LOAD THE NO. OF THIS TEST
016240  012737  016414  001442          MOV     #TST16,NEXT             ; POINT TO THE START OF NEXT TEST.
016246  012737  016262  001444          MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
016254  104410                          MSTCLR                          ;MASTER CLEAR KMC11
016256  004737  021202                  JSR     PC,MEMSET               ;SET MEM AND RAM
016262                          1$:
016262  004737  021062                  JSR     PC,SETC ;SET THE C BIT'
016266  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016270  100400                          100400                          ;START AT ROM PC=0
016272  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016274  115377                          114377!<400*2>                  ;JUMP TO ROM PC OF 1777
016276  004737  021106                  JSR     PC,RAMDAT               ;R4=CRAM PC (LSB 8 BITS)
016302  000377                          377                             ;EXPECTED DATA
016304  120504                          CMPB    R5,R4                   ;IS ROM PC CORRECT?
016306  001401                          BEQ     2$                      ;BR IF YES
016310  104005                          ERROR   5                       ;ERROR, CRAM PC IS WRONG
016312  104405                  2$:     SCOP1                           ;LOOP TO 1$ IF SW09=1
016314  012737  016322  001444          MOV     #3$,LOCK                ;NEW SCOP1
016322                          3$:
```

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016322  004737  021062                  JSR     PC,SETC ;SET THE C BIT'
016326  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016330  100403                          100403                  ;START AT ROM PC=3
016332  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016334  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
016336  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016342  000000                          0                       ;EXPECTED DATA
016344  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016346  001401                          BEQ     4$              ;BR IF YES
016350  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016352  104405                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
016354  012737  016362  001444          MOV     #5$,LOCK        ;NEW SCOPI
016362                          5$:
016362  004737  021062                  JSR     PC,SETC ;SET THE C BIT'
016366  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016370  100406                          100406                  ;START AT ROM PC=6
016372  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016374  105125                          104125!<400*2>          ;JUMP TO ROM PC OF 525
016376  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016402  000125                          125                     ;EXPECTED DATA
016404  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016406  001401                          BEQ     6$              ;BR IF YES
016410  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016412  104405                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1


                                        ;*************************** TEST 16 ***************************
                                        ;*CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
                                        ;*SET THE Z BIT, PERFORM THE JUMP INSTRUCTION,
                                        ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                        ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                        ;*THEN PORT4 WILL CONTAIN A 37
                                        ;*****************************************************************

                                        ;  TEST 16
                                        ;-------------
                                ;;*******************************************************************
016414  000004                  TST16:  SCOPE
016416  012737  000016  001202          MOV     #16,$TSTNM              ; LOAD THE NO. OF THIS TEST
016424  012737  016600  001442          MOV     #TST17,NEXT             ; POINT TO THE START OF NEXT TEST.
016432  012737  016446  001444          MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
016440  104410                          MSTCLR                  ;MASTER CLEAR KMC11
016442  004737  021202                  JSR     PC,MEMSET       ;SET MEM AND RAM
016446                          1$:
016446  004737  021100                  JSR     PC,SETZ ;SET THE Z BIT'
016452  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016454  100400                          100400                  ;START AT ROM PC=0
016456  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016460  115777                          114377!<400*3>          ;JUMP TO ROM PC OF 1777
016462  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016466  000377                          377                     ;EXPECTED DATA
016470  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
```

```
016472  001401                                    BEQ     2$                 ;BR IF YES
016474  104005                                    ERROR   5                  ;ERROR, CRAM PC IS WRONG
016476  104405                            2$:     SCOP1                      ;LOOP TO 1$ IF SW09=1
016500  012737  016506  001444                    MOV     #3$,LOCK           ;NEW SCOP1
016506                                    3$:
016506  004737  021100                            JSR     PC,SETZ ;SET THE Z BIT'
016512  104412                                    ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016514  100403                                    100403                     ;START AT ROM PC=3
016516  104412                                    ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016520  101400                                    100000!<400*3>  ;JUMP TO ROM PC OF 0
016522  004737  021106                            JSR     PC,RAMDAT          ;R4=CRAM PC (LSB 8 BITS)
016526  000000                                    0                          ;EXPECTED DATA
016530  120504                                    CMPB    R5,R4              ;IS ROM PC CORRECT?
016532  001401                                    BEQ     4$                 ;BR IF YES
016534  104005                                    ERROR   5                  ;ERROR, CRAM PC IS WRONG
016536  104405                            4$:     SCOP1                      ;LOOP TO 3$ IF SW09=1
016540  012737  016546  001444                    MOV     #5$,LOCK           ;NEW SCOP1
016546                                    5$:
016546  004737  021100                            JSR     PC,SETZ ;SET THE Z BIT'
016552  104412                                    ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016554  100406                                    100406                     ;START AT ROM PC=6
016556  104412                                    ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016560  105525                                    104125!<400*3>             ;JUMP TO ROM PC OF 525
016562  004737  021106                            JSR     PC,RAMDAT          ;R4=CRAM PC (LSB 8 BITS)
016566  000125                                    125                        ;EXPECTED DATA
016570  120504                                    CMPB    R5,R4              ;IS ROM PC CORRECT?
016572  001401                                    BEQ     6$                 ;BR IF YES
016574  104005                                    ERROR   5                  ;ERROR, CRAM PC IS WRONG
016576  104405                            6$:     SCOP1                      ;LOOP TO 5$ IF SW59=1


                                                  ;*************************** TEST 17 ***************************
                                                  ;*CRAM TEST OF JUMP(I) ON BRO SET MICRO-PROCESSOR INSTRUCTION.
                                                  ;*SET THE BRO BIT, PERFORM THE JUMP INSTRUCTION.
                                                  ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                                  ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                                  ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                                  ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                                  ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                                  ;*THEN PORT4 WILL CONTAIN A 37
                                                  ;*************************************************************

                                                  ;  TEST 17
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                                          ;;*************************************************************
016600  000004                            TST17:  SCOPE
016602  012737  000017  001202                    MOV     #17,$TSTNM             ; LOAD THE NO. OF THIS TEST
016610  012737  016764  001442                    MOV     #TST20,NEXT            ; POINT TO THE START OF NEXT TEST.
016616  012737  016632  001444                    MOV     #1$,LOCK               ; ADDRESS FOR LOCK ON DATA.
                                                                             ;R1 CONTAINS BASE KMC11 ADDRESS
016624  104410                                    MSTCLR                     ;MASTER CLEAR KMC11
016626  004737  021202                            JSR     PC,MEMSET          ;SET MEM AND RAM
016632                                    1$:
016632  004737  021032                            JSR     PC,SETBRO          ;SET THE BRO BIT'
016636  104412                                    ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016640  100400                                    100400                     ;START AT ROM PC=0
```

```
016642  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016644  116377                          114377!<400*4>          ;JUMP TO ROM PC OF 1777
016646  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016652  000377                          377                     ;EXPECTED DATA
016654  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016656  001401                          BEQ     2$              ;BR IF YES
016660  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016662  104405                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
016664  012737  016672  001444          MOV     #3$,LOCK        ;NEW SCOP1
016672                          3$:
016672  004737  021032                  JSR     PC,SETBRO       ;SET THE BRO BIT'
016676  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016700  100403                          100403                  ;START AT ROM PC=3
016702  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016704  102000                          100000!<400*4>   ;JUMP TO ROM PC OF 0
016706  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016712  000000                          0                       ;EXPECTED DATA
016714  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016716  001401                          BEQ     4$              ;BR IF YES
016720  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016722  104405                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
016724  012737  016732  001444          MOV     #5$,LOCK        ;NEW SCOP1
016732                          5$:
016732  004737  021032                  JSR     PC,SETBRO       ;SET THE BRO BIT'
016736  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016740  100406                          100406                  ;START AT ROM PC=6
016742  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016744  106125                          104125!<400*4>          ;JUMP TO ROM PC OF 525
016746  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
016752  000125                          125                     ;EXPECTED DATA
016754  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
016756  001401                          BEQ     6$              ;BR IF YES
016760  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
016762  104405                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1


                                        ;************************** TEST 20 ***************************
                                        ;*CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
                                        ;*SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
                                        ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                        ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                        ;*THEN PORT4 WILL CONTAIN A 37
                                        ;:*************************************************************

                                        ;  TEST 20
                                        ;--------------
                                ;;*****************************************************************
016764  000004                  TST20:  SCOPE
016766  012737  000020  001202          MOV     #20,$TSTNM              ; LOAD THE NO. OF THIS TEST
016774  012737  017150  001442          MOV     #TST21,NEXT             ; POINT TO THE START OF NEXT TEST.
017002  012737  017016  001444          MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
017010  104410                          MSTCLR                  ;MASTER CLEAR KMC11
```

```
 017012  004737  021202                  JSR     PC,MEMSET          ;SET MEM AND RAM
 017016                         1$:
 017016  004737  021040                  JSR     PC,SETBR1          ;SET THE BR1 BIT'
 017022  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017024  100400                          100400                     ;START AT ROM PC=0
 017026  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017030  116777                          114377!<400*5>             ;JUMP TO ROM PC OF 1777
 017032  004737  021106                  JSR     PC,RAMDAT          ;R4=CRAM PC (LSB 8 BITS)
 017036  000377                          377                        ;EXPECTED DATA
 017040  120504                          CMPB    R5,R4              ;IS ROM PC CORRECT?
 017042  001401                          BEQ     2$                 ;BR IF YES
 017044  104005                          ERROR   5                  ;ERROR, CRAM PC IS WRONG
 017046  104405                 2$:      SCOP1                      ;LOOP TO 1$ IF SW09=1
 017050  012737  017056  001444          MOV     #3$,LOCK           ;NEW SCOP1
 017056                         3$:
 017056  004737  021040                  JSR     PC,SETBR1          ;SET THE BR1 BIT'
 017062  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017064  100403                          100403                     ;START AT ROM PC=3
 017066  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017070  102400                          100000!<400*5>   ;JUMP TO ROM PC OF 0
 017072  004737  021106                  JSR     PC,RAMDAT          ;R4=CRAM PC (LSB 8 BITS)
 017076  000000                          0                          ;EXPECTED DATA
 017100  120504                          CMPB    R5,R4              ;IS ROM PC CORRECT?
 017102  001401                          BEQ     4$                 ;BR IF YES
 017104  104005                          ERROR   5                  ;ERROR, CRAM PC IS WRONG
 017106  104405                 4$:      SCOP1                      ;LOOP TO 3$ IF SW09=1
 017110  012737  017116  001444          MOV     #5$,LOCK           ;NEW SCOP1
 017116                         5$:
 017116  004737  021040                  JSR     PC,SETBR1          ;SET THE BR1 BIT'
 017122  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017124  100406                          100406                     ;START AT ROM PC=6
 017126  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017130  106525                          104125!<400*5>             ;JUMP TO ROM PC OF 525
 017132  004737  021106                  JSR     PC,RAMDAT          ;R4=CRAM PC (LSB 8 BITS)
 017136  000125                          125                        ;EXPECTED DATA
 017140  120504                          CMPB    R5,R4              ;IS ROM PC CORRECT?
 017142  001401                          BEQ     6$                 ;BR IF YES
 017144  104005                          ERROR   5                  ;ERROR, CRAM PC IS WRONG
 017146  104405                 6$:      SCOP1                      ;LOOP TO 5$ IF SW59=1


                                         ;****************************** TEST 21 ******************************
                                         ;*CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
                                         ;*SET THE BR4 BIT, PERFORM THE JUMP INSTRUCTION
                                         ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                         ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                         ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                         ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                         ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                         ;*THEN PORT4 WILL CONTAIN A 37
                                         ;:***********************************************************************

                                         ;  TEST 21
                                         ;_______________
                                ;;************************************************************************
 017150  000004                 TST21:   SCOPE
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017152  012737  000021  001202          MOV     #21,$TSTNM                 ; LOAD THE NO. OF THIS TEST
017160  012737  017334  001442          MOV     #TST22,NEXT                ; POINT TO THE START OF NEXT TEST.
017166  012737  017202  001444          MOV     #1$,LOCK                   ; ADDRESS FOR LOCK ON DATA.
                                                                           ;R1 CONTAINS BASE KMC11 ADDRESS
017174  104410                          MSTCLR                             ;MASTER CLEAR KMC11
017176  004737  021202                  JSR     PC,MEMSET                  ;SET MEM AND RAM
017202                          1$:
017202  004737  021046                  JSR     PC,SETBR4                  ;SET THE BR4 BIT'
017206  104412                          ROMCLK                             ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017210  100400                          100400                             ;START AT ROM PC=0
017212  104412                          ROMCLK                             ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017214  117377                          114377!<400*6>                     ;JUMP TO ROM PC OF 1777
017216  004737  021106                  JSR     PC,RAMDAT                  ;R4=CRAM PC (LSB 8 BITS)
017222  000377                          377                                ;EXPECTED DATA
017224  120504                          CMPB    R5,R4                      ;IS ROM PC CORRECT?
017226  001401                          BEQ     2$                         ;BR IF YES
017230  104005                          ERROR   5                          ;ERROR, CRAM PC IS WRONG
017232  104405                  2$:     SCOP1                              ;LOOP TO 1$ IF SW09=1
017234  012737  017242  001444          MOV     #3$,LOCK                   ;NEW SCOP1
017242                          3$:
017242  004737  021046                  JSR     PC,SETBR4                  ;SET THE BR4 BIT'
017246  104412                          ROMCLK                             ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017250  100403                          100403                             ;START AT ROM PC=3
017252  104412                          ROMCLK                             ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017254  103000                          100000!<400*6>    ;JUMP TO ROM PC OF 0
017256  004737  021106                  JSR     PC,RAMDAT                  ;R4=CRAM PC (LSB 8 BITS)
017262  000000                          0                                  ;EXPECTED DATA
017264  120504                          CMPB    R5,R4                      ;IS ROM PC CORRECT?
017266  001401                          BEQ     4$                         ;BR IF YES
017270  104005                          ERROR   5                          ;ERROR, CRAM PC IS WRONG
017272  104405                  4$:     SCOP1                              ;LOOP TO 3$ IF SW09=1
017274  012737  017302  001444          MOV     #5$,LOCK                   ;NEW SCOP1
017302                          5$:
017302  004737  021046                  JSR     PC,SETBR4                  ;SET THE BR4 BIT'
017306  104412                          ROMCLK                             ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017310  100406                          100406                             ;START AT ROM PC=6
017312  104412                          ROMCLK                             ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017314  107125                          104125!<400*6>                     ;JUMP TO ROM PC OF 525
017316  004737  021106                  JSR     PC,RAMDAT                  ;R4=CRAM PC (LSB 8 BITS)
017322  000125                          125                                ;EXPECTED DATA
017324  120504                          CMPB    R5,R4                      ;IS ROM PC CORRECT?
017326  001401                          BEQ     6$                         ;BR IF YES
017330  104005                          ERROR   5                          ;ERROR, CRAM PC IS WRONG
017332  104405                  6$:     SCOP1                              ;LOOP TO 5$ IF SW59=1



                                        ;****************************** TEST 22 *******************************
                                        ;*CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
                                        ;*SET THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
                                        ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                        ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                        ;*THEN PORT4 WILL CONTAIN A 37
                                        ;:***********************************************************************
```

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                                                  ;  TEST 22
                                                  ;--------------
                                         ;;*************************************************************
        017334  000004                   TST22:   SCOPE
        017336  012737  000022  001202            MOV     #22,$TSTNM              ; LOAD THE NO. OF THIS TEST
        017344  012737  017520  001442            MOV     #TST23,NEXT             ; POINT TO THE START OF NEXT TEST.
        017352  012737  017366  001444            MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
        017360  104410                            MSTCLR                  ;MASTER CLEAR KMC11
        017362  004737  021202                    JSR     PC,MEMSET       ;SET MEM AND RAM
        017366                           1$:
        017366  004737  021054                    JSR     PC,SETBR7       ;SET THE BR7 BIT'
        017372  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
        017374  100400                            100400                  ;START AT ROM PC=0
        017376  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
        017400  117777                            114377!<400*7>          ;JUMP TO ROM PC OF 1777
        017402  004737  021106                    JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
        017406  000377                            377                     ;EXPECTED DATA
        017410  120504                            CMPB    R5,R4           ;IS ROM PC CORRECT?
        017412  001401                            BEQ     2$              ;BR IF YES
        017414  104005                            ERROR   5               ;ERROR, CRAM PC IS WRONG
        017416  104405                   2$:      SCOP1                   ;LOOP TO 1$ IF SW09=1
        017420  012737  017426  001444            MOV     #3$,LOCK        ;NEW SCOP1
        017426                           3$:
        017426  004737  021054                    JSR     PC,SETBR7       ;SET THE BR7 BIT'
        017432  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
        017434  100403                            100403                  ;START AT ROM PC=3
        017436  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
        017440  103400                            100000!<400*7>  ;JUMP TO ROM PC OF 0
        017442  004737  021106                    JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
        017446  000000                            0                       ;EXPECTED DATA
        017450  120504                            CMPB    R5,R4           ;IS ROM PC CORRECT?
        017452  001401                            BEQ     4$              ;BR IF YES
        017454  104005                            ERROR   5               ;ERROR, CRAM PC IS WRONG
        017456  104405                   4$:      SCOP1                   ;LOOP TO 3$ IF SW09=1
        017460  012737  017466  001444            MOV     #5$,LOCK        ;NEW SCOP1
        017466                           5$:
        017466  004737  021054                    JSR     PC,SETBR7       ;SET THE BR7 BIT'
        017472  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
        017474  100406                            100406                  ;START AT ROM PC=6
        017476  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
        017500  107525                            104125!<400*7>          ;JUMP TO ROM PC OF 525
        017502  004737  021106                    JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
        017506  000125                            125                     ;EXPECTED DATA
        017510  120504                            CMPB    R5,R4           ;IS ROM PC CORRECT?
        017512  001401                            BEQ     6$              ;BR IF YES
        017514  104005                            ERROR   5               ;ERROR, CRAM PC IS WRONG
        017516  104405                   6$:      SCOP1                   ;LOOP TO 5$ IF SW59=1


                                                  ;************************* TEST 23 **************************
                                                  ;*CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
                                                  ;*CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
                                                  ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                                  ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
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                                               ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                               ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                               ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
                                               ;*THEN PORT4 CONTAINS A 37
                                               ;:**********************************************************


                                               ;  TEST 23
                                               ;-------------

                                        ;;*********************************************************
017520  000004                          TST23:  SCOPE
017522  012737  000023  001202                  MOV     #23,$TSTNM              ; LOAD THE NO. OF THIS TEST
017530  012737  017704  001442                  MOV     #TST24,NEXT             ; POINT TO THE START OF NEXT TEST.
017536  012737  017552  001444                  MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                       ;R1 CONTAINS BASE KMC11 ADDRESS
017544  104410                                  MSTCLR                 ;MASTER CLEAR KMC11
017546  004737  021202                          JSR     PC,MEMSET      ;SET MEM AND RAM
017552                                  1$:
017552  004737  021014                          JSR     PC,CLRALL      ;CLEAR ALL  CONDITIONS
017556  104412                                  ROMCLK                 ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017560  100400                                  100400                 ;START AT ROM PC=0
017562  104412                                  ROMCLK                 ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017564  115377                                  114377!<400*2>         ;JUMP TO ROM PC OF 1777
017566  004737  021106                          JSR     PC,RAMDAT      ;R4=CRAM PC (LSB 8 BITS)
017572  000001                                  1                      ;EXPECTED DATA
017574  120504                                  CMPB    R5,R4          ;IS ROM PC CORRECT?
017576  001401                                  BEQ     2$             ;BR IF YES
017600  104005                                  ERROR   5              ;ERROR, CRAM PC IS WRONG
017602  104405                          2$:     SCOP1                  ;LOOP TO 1$ IF SW09=1
017604  012737  017612  001444                  MOV     #3$,LOCK       ;NEW SCOP1
017612                                  3$:
017612  004737  021014                          JSR     PC,CLRALL      ;CLEAR ALL  CONDITIONS
017616  104412                                  ROMCLK                 ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017620  100403                                  100403                 ;START AT ROM PC=3
017622  104412                                  ROMCLK                 ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017624  101000                                  100000!<400*2>  ;JUMP TO ROM PC OF 0
017626  004737  021106                          JSR     PC,RAMDAT      ;R4=CRAM PC (LSB 8 BITS)
017632  000004                                  4                      ;EXPECTED DATA
017634  120504                                  CMPB    R5,R4          ;IS ROM PC CORRECT?
017636  001401                                  BEQ     4$             ;BR IF YES
017640  104005                                  ERROR   5              ;ERROR, CRAM PC IS WRONG
017642  104405                          4$:     SCOP1                  ;LOOP TO 3$ IF SW09=1
017644  012737  017652  001444                  MOV     #5$,LOCK       ;NEW SCOP1
017652                                  5$:
017652  004737  021014                          JSR     PC,CLRALL      ;CLEAR ALL  CONDITIONS
017656  104412                                  ROMCLK                 ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017660  100406                                  100406                 ;START AT ROM PC=6
017662  104412                                  ROMCLK                 ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017664  105125                                  104125!<400*2>         ;JUMP TO ROM PC OF 525
017666  004737  021106                          JSR     PC,RAMDAT      ;R4=CRAM PC (LSB 8 BITS)
017672  000007                                  7                      ;EXPECTED DATA
017674  120504                                  CMPB    R5,R4          ;IS ROM PC CORRECT?
017676  001401                                  BEQ     6$             ;BR IF YES
017700  104005                                  ERROR   5              ;ERROR, CRAM PC IS WRONG
017702  104405                          6$:     SCOP1                  ;LOOP TO 5$ IF SW59=1
```

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                                                  ;************************** TEST 24 **************************
                                                  ;*CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
                                                  ;*CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
                                                  ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                                  ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                                  ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                                  ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                                  ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
                                                  ;*THEN PORT4 CONTAINS A 37
                                                  ;:************************************************************

                                                  ;   TEST 24
                                                  ;_____________
                                          ;;*****************************************************
 017704  000004                           TST24:  SCOPE
 017706  012737  000024  001202                   MOV     #24,$TSTNM              ; LOAD THE NO. OF THIS TEST
 017714  012737  020070  001442                   MOV     #TST25,NEXT             ; POINT TO THE START OF NEXT TEST.
 017722  012737  017736  001444                   MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
 017730  104410                                   MSTCLR                  ;MASTER CLEAR KMC11
 017732  004737  021202                           JSR     PC,MEMSET       ;SET MEM AND RAM
 017736                                   1$:
 017736  004737  021014                           JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
 017742  104412                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017744  100400                                   100400                  ;START AT ROM PC=0
 017746  104412                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 017750  115777                                   114377!<400*3>          ;JUMP TO ROM PC OF 1777
 017752  004737  021106                           JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
 017756  000001                                   1                       ;EXPECTED DATA
 017760  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
 017762  001401                                   BEQ     2$              ;BR IF YES
 017764  104005                                   ERROR   5               ;ERROR, CRAM PC IS WRONG
 017766  104405                           2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
 017770  012737  017776  001444                   MOV     #3$,LOCK        ;NEW SCOP1
 017776                                   3$:
 017776  004737  021014                           JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
 020002  104412                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 020004  100403                                   100403                  ;START AT ROM PC=3
 020006  104412                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 020010  101400                                   100000!<400*3>  ;JUMP TO ROM PC OF 0
 020012  004737  021106                           JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
 020016  000004                                   4                       ;EXPECTED DATA
 020020  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
 020022  001401                                   BEQ     4$              ;BR IF YES
 020024  104005                                   ERROR   5               ;ERROR, CRAM PC IS WRONG
 020026  104405                           4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
 020030  012737  020036  001444                   MOV     #5$,LOCK        ;NEW SCOP1
 020036                                   5$:
 020036  004737  021014                           JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
 020042  104412                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 020044  100406                                   100406                  ;START AT ROM PC=6
 020046  104412                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 020050  105525                                   104125!<400*3>          ;JUMP TO ROM PC OF 525
 020052  004737  021106                           JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
 020056  000007                                   7                       ;EXPECTED DATA
 020060  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
```

```
020062  001401                          BEQ     6$              ;BR IF YES
020064  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
020066  104405                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1



                                        ;*************************** TEST 25 ***************************
                                        ;*CRAM TEST OF JUMP(I) ON BRO SET MICRO-PROCESSOR INSTRUCTION.
                                        ;*CLEAR THE BRO BIT, PERFORM THE JUMP INSTRUCTION,
                                        ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                        ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
                                        ;*THEN PORT4 CONTAINS A 37
                                        ;:**************************************************************

                                        ;   TEST 25
                                        ;--------------
                                ;;****************************************************************
020070  000004                  TST25:  SCOPE
020072  012737  000025  001202          MOV     #25,$TSTNM              ; LOAD THE NO. OF THIS TEST
020100  012737  020254  001442          MOV     #TST26,NEXT             ; POINT TO THE START OF NEXT TEST.
020106  012737  020122  001444          MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
020114  104410                          MSTCLR                  ;MASTER CLEAR KMC11
020116  004737  021202                  JSR     PC,MEMSET       ;SET MEM AND RAM
020122                          1$:
020122  004737  021014                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020126  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020130  100400                          100400                  ;START AT ROM PC=0
020132  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020134  116377                          114377!<400*4>          ;JUMP TO ROM PC OF 1777
020136  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
020142  000001                          1                       ;EXPECTED DATA
020144  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
020146  001401                          BEQ     2$              ;BR IF YES
020150  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
020152  104405                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
020154  012737  020162  001444          MOV     #3$,LOCK        ;NEW SCOP1
020162                          3$:
020162  004737  021014                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020166  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020170  100403                          100403                  ;START AT ROM PC=3
020172  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020174  102000                          100000!<400*4>  ;JUMP TO ROM PC OF 0
020176  004737  021106                  JSR     PC,RAMDAT       ;P4=CRAM PC (LSB 8 BITS)
020202  000004                          4                       ;EXPECTED DATA
020204  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
020206  001401                          BEQ     4$              ;BR IF YES
020210  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
020212  104405                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
020214  012737  020222  001444          MOV     #5$,LOCK        ;NEW SCOP1
020222                          5$:
020222  004737  021014                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020226  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020230  100406                          100406                  ;START AT ROM PC=6
```

```
020232  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020234  106125                          104125!<400*4>          ;JUMP TO ROM PC OF 525
020236  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
020242  000007                          7                       ;EXPECTED DATA
020244  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
020246  001401                          BEQ     6$              ;BR IF YES
020250  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
020252  104405                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1


                                        ;**************************** TEST 26 ****************************
                                        ;*CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
                                        ;*CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
                                        ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                        ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
                                        ;*THEN PORT4 CONTAINS A 37
                                        ;:****************************************************************

                                        ;  TEST 26
                                        ;-------------
                                ;;*************************************************************
020254  000004                  TST26:  SCOPE
020256  012737  000026  001202          MOV     #26,$TSTNM                   ; LOAD THE NO. OF THIS TEST
020264  012737  020440  001442          MOV     #TST27,NEXT                  ; POINT TO THE START OF NEXT TEST.
020272  012737  020306  001444          MOV     #1$,LOCK                     ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
020300  104410                          MSTCLR                  ;MASTER CLEAR KMC11
020302  004737  021202                  JSR     PC,MEMSET       ;SET MEM AND RAM
020306                          1$:
020306  004737  021014                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020312  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020314  100400                          100400                  ;START AT ROM PC=0
020316  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020320  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
020322  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
020326  000001                          1                       ;EXPECTED DATA
020330  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
020332  001401                          BEQ     2$              ;BR IF YES
020334  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
020336  104405                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
020340  012737  020346  001444          MOV     #3$,LOCK        ;NEW SCOP1
020346                          3$:
020346  004737  021014                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020352  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020354  100403                          100403                  ;START AT ROM PC=3
020356  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020360  102400                          100000!<400*5>  ;JUMP TO ROM PC OF 0
020362  004737  021106                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
020366  000004                          4                       ;EXPECTED DATA
020370  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
020372  001401                          BEQ     4$              ;BR IF YES
020374  104005                          ERROR   5               ;ERROR, CRAM PC IS WRONG
020376  104405                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
```

```
020400  012737  020406  001444           MOV     #5$,LOCK        ;NEW SCOP1
020406                           5$:
020406  004737  021014                   JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020412  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020414  100406                           100406                  ;START AT ROM PC=6
020416  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020420  106525                           104125!<400*5>          ;JUMP TO ROM PC OF 525
020422  004737  021106                   JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
020426  000007                           7                       ;EXPECTED DATA
020430  120504                           CMPB    R5,R4           ;IS ROM PC CORRECT?
020432  001401                           BEQ     6$              ;BR IF YES
020434  104005                           ERROR   5               ;ERROR, CRAM PC IS WRONG
020436  104405                   6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1



                                         ;*************************** TEST 27 ***************************
                                         ;*CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
                                         ;*CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
                                         ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                         ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                         ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                         ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                         ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
                                         ;*THEN PORT4 CONTAINS A 37
                                         ;:**************************************************************

                                         ;  TEST 27
                                         ;--------------
                                 ;;**********************************************************************
020440  000004                   TST27:  SCOPE
020442  012737  000027  001202           MOV     #27,$TSTNM                      ; LOAD THE NO. OF THIS TEST
020450  012737  020624  001442           MOV     #TST30,NEXT                     ; POINT TO THE START OF NEXT TEST.
020456  012737  020472  001444           MOV     #1$,LOCK                        ; ADDRESS FOR LOCK ON DATA.
                                                                 ;R1 CONTAINS BASE KMC11 ADDRESS
020464  104410                           MSTCLR                  ;MASTER CLEAR KMC11
020466  004737  021202                   JSR     PC,MEMSET       ;SET MEM AND RAM
020472                           1$:
020472  004737  021014                   JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020476  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020500  100400                           100400                  ;START AT ROM PC=0
020502  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020504  117377                           114377!<400*6>          ;JUMP TO ROM PC OF 1777
020506  004737  021106                   JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
020512  000001                           1                       ;EXPECTED DATA
020514  120504                           CMPB    R5,R4           ;IS ROM PC CORRECT?
020516  001401                           BEQ     2$              ;BR IF YES
020520  104005                           ERROR   5               ;ERROR, CRAM PC IS WRONG
020522  104405                   2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
020524  012737  020532  001444           MOV     #3$,LOCK        ;NEW SCOP1
020532                           3$:
020532  004737  021014                   JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
020536  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020540  100403                           100403                  ;START AT ROM PC=3
020542  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020544  103000                           100000!<400*6>  ;JUMP TO ROM PC OF 0
020546  004737  021106                   JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
```

```
020552  000004                           4                        ;EXPECTED DATA
020554  120504                           CMPB    R5,R4            ;IS ROM PC CORRECT?
020556  001401                           BEQ     4$               ;BR IF YES
020560  104005                           ERROR   5                ;ERROR, CRAM PC IS WRONG
020562  104405                   4$:     SCOP1                    ;LOOP TO 3$ IF SW09=1
020564  012737  020572  001444           MOV     #5$,LOCK         ;NEW SCOP1
020572                           5$:
020572  004737  021014                   JSR     PC,CLRALL        ;CLEAR ALL  CONDITIONS
020576  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020600  100406                           100406                   ;START AT ROM PC=6
020602  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020604  107125                           104125!<400*6>           ;JUMP TO ROM PC OF 525
020606  004737  021106                   JSR     PC,RAMDAT        ;R4=CRAM PC (LSB 8 BITS)
020612  000007                           7                        ;EXPECTED DATA
020614  120504                           CMPB    R5,R4            ;IS ROM PC CORRECT?
020616  001401                           BEQ     6$               ;BR IF YES
020620  104005                           ERROR   5                ;ERROR, CRAM PC IS WRONG
020622  104405                   6$:     SCOP1                    ;LOOP TO 5$ IF SW59=1


                                         ;**************************** TEST 30 ****************************
                                         ;*CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
                                         ;*CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
                                         ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
                                         ;*IN THE LOCATION IT IS AT, THIS INSTRUCTION LOADS THE
                                         ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                         ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
                                         ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
                                         ;*THEN PORT4 CONTAINS A 37
                                         ;:****************************************************************

                                         ;  TEST 30
                                         ;--------------

                                 ;;**************************************************************
020624  000004                   TST30:  SCOPE
020626  012737  000030  001202           MOV     #30,$TSTNM               ; LOAD THE NO. OF THIS TEST
020634  012737  003662  001442           MOV     #$EOP,NEXT               ; POINT TO THE END OF PASS HANDLER.
020642  012737  020656  001444           MOV     #1$,LOCK                 ; ADDRESS FOR LOCK ON DATA.
                                                                  ;R1 CONTAINS BASE KMC11 ADDRESS
020650  104410                           MSTCLR                   ;MASTER CLEAR KMC11
020652  004737  021202                   JSR     PC,MEMSET        ;SET MEM AND RAM
020656                           1$:
020656  004737  021014                   JSR     PC,CLRALL        ;CLEAR ALL  CONDITIONS
020662  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020664  100400                           100400                   ;START AT ROM PC=0
020666  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020670  117777                           114377!<400*7>           ;JUMP TO ROM PC OF 1777
020672  004737  021106                   JSR     PC,RAMDAT        ;R4=CRAM PC (LSB 8 BITS)
020676  000001                           1                        ;EXPECTED DATA
020700  120504                           CMPB    R5,R4            ;IS ROM PC CORRECT?
020702  001401                           BEQ     2$               ;BR IF YES
020704  104005                           ERROR   5                ;ERROR, CRAM PC IS WRONG
020706  104405                   2$:     SCOP1                    ;LOOP TO 1$ IF SW09=1
020710  012737  020716  001444           MOV     #3$,LOCK         ;NEW SCOP1
020716                           3$:
020716  004737  021014                   JSR     PC,CLRALL        ;CLEAR ALL  CONDITIONS
```

```
020722  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020724  100403                          100403                          ;START AT ROM PC=3
020726  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020730  103400                          100000!<400*7>  ;JUMP TO ROM PC OF 0
020732  004737  021106                  JSR     PC,RAMDAT               ;R4=CRAM PC (LSB 8 BITS)
020736  000004                          4                               ;EXPECTED DATA
020740  120504                          CMPB    R5,R4                   ;IS ROM PC CORRECT?
020742  001401                          BEQ     4$                      ;BR IF YES
020744  104005                          ERROR   5                       ;ERROR, CRAM PC IS WRONG
020746  104405                  4$:     SCOP1                           ;LOOP TO 3$ IF SW09=1
020750  012737  020756  001444          MOV     #5$,LOCK                ;NEW SCOP1
020756                          5$:
020756  004737  021014                  JSR     PC,CLRALL               ;CLEAR ALL  CONDITIONS
020762  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020764  100406                          100406                          ;START AT ROM PC=6
020766  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020770  107525                          104125!<400*7>                  ;JUMP TO ROM PC OF 525
020772  004737  021106                  JSR     PC,RAMDAT               ;R4=CRAM PC (LSB 8 BITS)
020776  000007                          7                               ;EXPECTED DATA
021000  120504                          CMPB    R5,R4                   ;IS ROM PC CORRECT?
021002  001401                          BEQ     6$                      ;BR IF YES
021004  104005                          ERROR   5                       ;ERROR, CRAM PC IS WRONG
021006  104405                  6$:     SCOP1                           ;LOOP TO 5$ IF SW59=1
021010  104420                          ADVANCE                         ; ADVANCE TO NEXT TEST




                                        ;BUFFER AREA
                                        ;-----------

021012  000000                  FLAG:   0


                                ;SUBROUTINES
                                ;-----------

021014                          CLRALL:
                                        ;THIS SUBROUTINE CLEARS THE C&Z BITS AND THE BR

021014  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021016  000400                          000400                          ;BR←0
021020  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021022  063220                          063220                          ;SP(0)←BR
021024  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021026  060400                          060400                          ;BR←SP(0)+BR
021030  000207                          RTS     PC


021032                          SETBR0:
                                        ;THIS SUBROUTINE SETS BR0 BIT

021032  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021034  000401                          000401                          ;BR←001
021036  000207                          RTS     PC
```

```
021040                      SETBR1:
                                        ;THIS SUBROUTINE SETS BR1 BIT

021040  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021042  000402                          000402                  ;BR←002
021044  000207                          RTS     PC


021046                      SETBR4:
                                        ;THIS SUBROUTINE SETS BR4 BIT

021046  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021050  000420                          000420                  ;BR←020
021052  000207                          RTS     PC


021054                      SETBR7:
                                        ;THIS SUBROUTINE SETS BR7 BIT

021054  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021056  000600                          000600                  ;BR←200
021060  000207                          RTS     PC


021062                      SETC:
                                        ;THIS SUBROUTINE SETS THE C BIT

021062  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021064  000777                          000777                  ;BR←377
021066  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021070  063220                          063220                  ;SP(0)←BR
021072  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021074  060400                          060400                  ;BR←SP(0)+BR
021076  000207                          RTS     PC


021100                      SETZ:
                                        ;THIS SUBROUTINE SETS THE Z BIT

021100  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021102  000777                          000777                  ;BR←377
021104  000207                          RTS     PC


021106                      RAMDAT:
                                        ;THIS SUBROUTINE LOADS R4 WITH THE LOWEST
                                        ;8 BITS OF THE CRAM PC.

021106  017605  000000                  MOV     @(SP),R5        ;GOOD DATA
021112  062716  000002                  ADD     #2,(SP)         ;ADJUST STACK
021116  005011                          CLR     (R1)            ;CLEAR BIT10
021120  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION IN CRAM THAT WAS
                                                                ;JUMPED TO, IT LOADS BR WITH ROM PC
021124  005011                          CLR     (R1)            ;CLR BIT8
021126  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021130  061225                          061225                  ;MOV BR TO PORT 5
```

```
021132  116104  000005                    MOVB    5(R1),R4          ;PUT "FOUND" IN R4
021136  000207                            RTS     PC                ;RETURN

021140                          WROM:
                                          ;THIS SUBROUTINE WRITES THE ROMMAP INTO THE CRAM

                                ;         BIT     #BIT15,STAT1      ;BE SURE KMC HAS CRAM
                                ;         BEQ     2$                ;SKIP IF NO CRAM
021140  005000                            CLR     R0                ;R0=CRAM ADDRESS
021142  012702  013732                    MOV     #ROMMAP,R2        ;R2 POINTS TO ROMMAP
021146  012711  002000          1$:       MOV     #BIT10,(R1)       ;SET ROMO
021152  010061  000004                    MOV     R0,4(R1)          ;LOAD CRAM ADDRESS
021156  012261  000006                    MOV     (R2)+,6(R1)       ;LOAD WORD TO BE WRITTEN
021162  052711  020000                    BIS     #BIT13,(R1)       ;WRITE IT!
021166  005200                            INC     R0                ;NEXT ADDRESS
021170  022700  002000                    CMP     #2000,R0          ;DONE YET?
021174  001364                            BNE     1$                ;BR IF NO
021176  005011                            CLR     (R1)              ;CLEAR SEL0
021200  000207                  2$:       RTS     PC                ;RETURN


021202                          MEMSET:
                                          ;THIS SUBROUTINE LOADS CRAM WITH SPECIAL INSTRUCTIONS
                                          ;FOR THE CRAM JUMP TEST. ALL CRAM LOCATIONS ARE LOADED
                                          ;WITH INSTRUCTIONS THAT MOVE A 37 TO THE BR, EXCEPT THE
                                          ;FOLLOWING CRAM ADDRESSES: 0,1,4,7,525,1777. THESE LOCATIONS
                                          ;CONTAIN INTRUCTIONS WHICH LOAD THE BR WITH THE LOWEST
                                          ;8 BITS OF THAT CRAM ADDRESS.

021202  005000                            CLR     R0                ;R0 = CRAM ADDRESS
021204  012711  002000          1$:       MOV     #BIT10,(R1)       ;SET ROMO
021210  010061  000004                    MOV     R0,4(R1)          ;LOAD CRAM ADDRESS
021214  012761  000437  000006            MOV     #437,6(R1)        ;LOAD INSTRUCTION
021222  052711  020000                    BIS     #BIT13,(R1)       ;WRITE INSTRUCTION IN CRAM
021226  005200                            INC     R0                ;NEXT ADDRESS
021230  022700  002000                    CMP     #2000,R0          ;DONE YET?
021234  001363                            BNE     1$                ;BR IF NO
021236  005000                            CLR     R0                ;INDEX REGISTER
021240  012711  002000          2$:       MOV     #BIT10,(R1)       ;SET ROMO
021244  016061  021300  000004            MOV     CRAMA(R0),4(R1)   ;LOAD CRAM ADDRESS IN SEL4
021252  016061  021314  000006            MOV     INSTU(R0),6(R1)   ;LOAD INSTRUCTIIN TO BE WRITTEN
021260  052711  020000                    BIS     #BIT13,(R1)       ;WRITE CRAM!
021264  005720                            TST     (R0)+             ;NEXT
021266  022700  000014                    CMP     #14,R0            ;DONE YET?
021272  001362                            BNE     2$                ;BR IF NO
021274  005011                            CLR     (R1)              ;CLEAR ALL BITS
021276  000207                            RTS     PC                ;RETURN

021300  000000  000001  000004  CRAMA:    .WORD   0,1,4,7,1777,525
021306  000007  001777  000525
021314  000400                  INSTU:    000400            ;BR←0
021316  000401                            000401            ;BR←1
021320  000404                            000404            ;BR←4
021322  000407                            000407            ;BR←7
021324  000777                            000777            ;BR←377
021326  000525                            000525            ;BR←125
```

```
        021330  041600  040522  020115  EM1:      .ASCIZ   <200>/CRAM DATA ERROR/
        021351     200  051103  046501  EM2:      .ASCIZ   <200>/CRAM DUAL ADDRESSING ERROR/
        021405     200  052512  050115  EM3:      .ASCIZ   <200>/JUMP ERROR/
        021421     200  042117  020124  EM4:      .ASCIZ   <200>/ODT ERROR IN IBUS# REG10/
        021453     200  047511  020120  EM5:      .ASCIZ   <200>/IOP MAIN MEMORY TEST/
        021501     200  047511  020120  EM6:      .ASCIZ   <200>/IOP MAR TEST/
        021517     200  051102  051040  EM7:      .ASCIZ   <200>/BR RIGHT SHIFT TEST/

        021544  042600  050130  041505  DH1:      .ASCIZ   <200>/EXPECTED  FOUND  ADDRESS/
        021576  042600  050130  041505  DH2:      .ASCIZ   <200>/EXPECTED  FOUND/
                021620                  .EVEN

        021620  000003                  DT1:      3
        021622     006     004                    .BYTE    6,4
        021624  001266                            $REG2
        021626     006     004                    .BYTE    6,4
        021630  001272                            $REG4
        021632     004     002                    .BYTE    4,2
        021634  001262                            $REG0
        021636  000003                  DT2:      3
        021640     006     004                    .BYTE    6,4
        021642  001274                            $REG5
        021644     006     004                    .BYTE    6,4
        021646  001272                            $REG4
        021650     004     002                    .BYTE    4,2
        021652  001266                            $REG2
        021654  000002                  DT3:      2
        021656     003     007                    .BYTE    3,7
        021660  001274                            $REG5
        021662     003     002                    .BYTE    3,2
        021664  001272                            $REG4
        021666  000003                  DT4:      3
        021670     003     010                    .BYTE    3,10
        021672  001274                            $REG5
        021674     003     004                    .BYTE    3,4
        021676  001272                            $REG4
        021700     004     002                    .BYTE    4,2
        021702  021012                            FLAG
        021704  000003                  DT5:      3
        021706     003     010                    .BYTE    3,10
        021710  001274                            $REG5
        021712     003     004                    .BYTE    3,4
        021714  001272                            $REG4
        021716     004     002                    .BYTE    4,2
        021720  001266                            $REG2


        021722                          CORMAX:
                000001                  .END
```

```
ABASE = 000000        268      309
ACDW1 = 000000        268      311
ACDW2 = 000000        268      312
ACPUOP= 000000        268      283
ADDW0 = 000000        268      313
ADDW1 = 000000        268      314
ADDW10= 000000        268      323
ADDW11= 000000        268      324
ADDW12= 000000        268      325
ADDW13= 000000        268      326
ADDW14= 000000        268      327
ADDW15= 000000        268      328
ADDW2 = 000000        268      315
ADDW3 = 000000        268      316
ADDW4 = 000000        268      317
ADDW5 = 000000        268      318
ADDW6 = 000000        268      319
ADDW7 = 000000        268      320
ADDW8 = 000000        268      321
ADDW9 = 000000        268      322
ADEVCT= 000000        268      274
ADEVM = 000000        268      310
ADRCNT  006057       1334*    1349*    1358#
ADVANC= 104420       1503#    3499
AENV  = 000002          1#     268      279
AENVM = 000000        268      280
AFATAL= 000000        268      271
AMADR1= 000000        268      296
AMADR2= 000000        268      300
AMADR3= 000000        268      303
AMADR4= 000000        268      306
AMAMS1= 000000        268      290
AMAMS2= 000000        268      298
AMAMS3= 000000        268      301
AMAMS4= 000000        268      304
AMSGAD= 000000        268      276
AMSGLG= 000000        268      277
AMSGTY= 000000        268      270
AMTYP1= 000000        268      291
AMTYP2= 000000        268      299
AMTYP3= 000000        268      302
AMTYP4= 000000        268      305
APASS = 000000        268      273
APRIOR= 000000        268
APTCSU= 000040       1059     1164#
APTENV= 000001       1052     1120     1162#    1564
APTSIZ= 000200       1161#
APTSPO= 000100       1054     1122     1163#
APT.SI  013510        727     2138#
ASWREG= 000000        268      281
ATESTN= 000000        268      272
AUDONE  003354        764      785      824#
AUNIT = 000000        268      275
AUSTRT  003126        763#
AUSWR = 000000        268      282
AUTO.S  012110        725     1882#
```

```
DZKCD   MACY11 27(1006)  12-MAY-77  18:42  PAGE 75
DZKCD.P11    21-MAR-77 17:24         CROSS REFERENCE TABLE -- USER SYMBOLS

AVECT1= 000000            268     307
AVECT2= 000000            268     308
BASE    013726          2149*    2160    2174*   2184#
BINWRD  006412          1406*    1409*   1410    1447#
BIT0  = 000001           129#    1671    1672
BIT00 = 000001           119#     129
BIT01 = 000002           118#     128
BIT02 = 000004           117#     127
BIT03 = 000010           116#     126
BIT04 = 000020           115#     125
BIT05 = 000040           114#     124
BIT06 = 000100           113#     123
BIT07 = 000200           112#     122
BIT08 = 000400           111#     121
BIT09 = 001000           110#     120
BIT1  = 000002           128#     732    1665    1671    1672    2019
BIT10 = 002000           109#    2000    2249    2285    2321    2337    2371    3598    3618    3626
BIT11 = 004000           108#     995
BIT12 = 010000           107#    1954    2017
BIT13 = 020000           106#    1957    2003    2021    2252    2288    2324    3601    3621    3629
BIT14 = 040000           105#     193     977    1968    1970    2021    2032
BIT15 = 100000           104#     672
BIT2  = 000004           127#     732     873    1672
BIT3  = 000010           126#    2023    2030
BIT4  = 000020           125#    1655    1678    1680
BIT5  = 000040           124#    2135    2614
BIT6  = 000100           123#    1660    1661    2025    2629
BIT7  = 000200           122#    1661    1780    2135
BIT8  = 000400           121#    2012    2014    2027    2029    2035    2038    2095    2612    3583
BIT9  = 001000           120#    2009    2035    2038    2093    2095
BM      010631          1703#    1981
BPTVEC= 000014           136#
BRLVL   013442          2090     2100    2108    2121#
BRW     004360           878     1012#
CHRCNT  006410          1404*    1407    1411    1427*   1445#   1446
CKSWR   011212           703     1018    1510    1728#
CKSWR1  011266          1740#    1752
CKSWR2  011300          1743#
CKSWR3  011304          1745#
CKSWR4  011310          1746#    1754    1761
CKSWR5  011414          1729     1731    1735    1770#
CLKX    001452           343#
CLRALL  021014          2672     2685    2698    3157    3170    3183    3218    3231    3244    3279    3292    3305    3340
                        3353     3366    3401    3414    3427    3462    3475    3488    3512#
CNERR   011027           797     1703#
CNT.MA  002302           357      552#    671     673     675    1808
CNVRT = 104417           794      903     905     907     909    1502#   1545    1547    1622    1743
CONERR  010762           792     1703#
CONN    010671          1703#    1959
CONTAB  003330           801      803#
CONVRT= 104416           744      800    1501#   1561    1904
CORMAX  021722          3646#
CR    = 000015            44#    1098    1108
CRAMA   021300          3627     3636#
CREAM   001502           356#     670*   1804*   1805    1807*   1811
CRLF  = 000200            45#    1069    1108
```

```
CSR       010363               1703#   1908
CSRMAP    012112               1884#
CYCLE     011460                879     940     1795#
DATABP    006764               1534*   1537    1559    1562#
DATACL= 104413                 1498#
DATAHD    006752               1533*   1555    1558#
DDISP = 177570                   51#    209#    238
DELAY = 104411                 1496#
DEVTAB    003342                767     814#
DH1       021544                388     391     394     403     406     3646#
DH2       021576                397     400     409     3646#
DISPLA    001242                238#    689*    695*    1007*
DISPRE    000174                199#    695
DSWR  = 177570                   50#    208#    237
DT1       021620                389     392     3646#
DT2       021636                395     3646#
DT3       021654                398     401     410     3646#
DT4       021666                404     3646#
DT5       021704                407     3646#
DZDME = ****** U                384
DZDMG = 000000                  384
EMTVEC= 000030                  139#
EM1       021330                387     393     3646#
EM2       021351                390     3646#
EM3       021405                396     3646#
EM4       021421                399     3646#
EM5       021453                402     3646#
EM6       021501                405     3646#
EM7       021517                408     3646#
ERCT00    002304                554#
ERCT01    002310                557#
ERCT02    002314                560#
ERCT03    002320                563#
ERCT04    002324                566#
ERCT05    002330                569#
ERCT06    002334                572#
ERCT07    002340                575#
ERCT10    002344                578#
ERCT11    002350                581#
ERCT12    002354                584#
ERCT13    002360                587#
ERCT14    002364                590#
ERCT15    002370                593#
ERCT16    002374                596#
ERCT17    002400                599#
ERR       003244                776     789#    793
ERRMSG    006740               1532*   1550    1553#
ERRPC     003322                795     806#
ERRVEC= 000004                  132#    982     983*    985*    988*
ERTABD    007112               1547    1587#
EXIT  = 000205                  159#
EXITER    007046               1573    1578#
FLAG      021012               2401*   2405    2406    2427*   2428    2447*   2452    2453    2475*   2476    2496*   2497    2500
                               2501    2519*   2520    2523*   2524    2527    2528    2543*   2544    3506#   3646
FLOAT     003156                769#    775
FY        003202                777#    781     786
```

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DZKCD    MACY11 27(1006)  12-MAY-77  18:42  PAGE 77                                                                  PAGE:  0095
DZKCD.P11     21-MAR-77 17:24          CROSS REFERENCE TABLE -- USER SYMBOLS

GNS     = ****** U      1486     1489     1490     1491     1492     1493     1494     1495     1496     1497     1498     1499     1500
                        1501     1502     1503
HALTS     006770        1517     1564#
HILIM     006052        1331*    1339     1355#
HT      = 000011          42#    1067     1108
INCHAR    011420        1746     1774#
INIFLG    001506         361#     698      728      735*
INLP1     005766        1336#    1345
INPUT   = 104415        1500#    1844     1895     1907     1915     1972     1980
INSTU     021314        3628     3638#
INTTY     013456        1925     1944     1960     2129#
IOTVEC= 000020           137#
KMACTV    001470         350#     712      837*     838     1795     1809     1890*    2050*    2056*    2057*    2061     2086     2152*
                        2153
KMCM      011050         803     1703#
KMCR00    002100         467#
KMCR01    002110         472#
KMCR02    002120         477#
KMCR03    002130         482#
KMCR04    002140         487#
KMCR05    002150         492#
KMCR06    002160         497#
KMCR07    002170         502#
KMCR10    002200         507#
KMCR11    002210         512#
KMCR12    002220         517#
KMCR13    002230         522#
KMCR14    002240         527#
KMCR15    002250         532#
KMCR16    002260         537#
KMCR17    002270         542#
KMCSR     002066         450#     763*     778      784*     813      943     1010     1625     1679     1813*    1822     1870     2205
KMCSRH    002070         451#    1660*    1661*    1665*    1671*    1672*    1678*    1680*    1822*    1823*    1824
KMCTL     002072         452#    1824*    1825*    1826
KMNUM     001472         351#     666      920     1888*    1902*    2042*    2043     2051     2053
KMP04     002074         453#    1649*    1655     1692     1697     1826*    1827*    1828
KMP06     002076         454#    1666*    1828*    1829*
KMRLVL    002060         447#     913      914*    1831*    1832*    1833
KMRVEC    002056         446#     913*     946     1814*    1815*    1831
KMS100    002102         468#
KMS101    002112         473#
KMS102    002122         478#
KMS103    002132         483#
KMS104    002142         488#
KMS105    002152         493#
KMS106    002162         498#
KMS107    002172         503#
KMS110    002202         508#
KMS111    002212         513#
KMS112    002222         518#
KMS113    002232         523#
KMS114    002242         528#
KMS115    002252         533#
KMS116    002262         538#
KMS117    002272         543#
KMS200    002104         469#
```

```
KMS201   002114          474#
KMS202   002124          479#
KMS203   002134          484#
KMS204   002144          489#
KMS205   002154          494#
KMS206   002164          499#
KMS207   002174          504#
KMS210   002204          509#
KMS211   002214          514#
KMS212   002224          519#
KMS213   002234          524#
KMS214   002244          529#
KMS215   002254          534#
KMS216   002264          539#
KMS217   002274          544#
KMS300   002106          470#
KMS301   002116          475#
KMS302   002126          480#
KMS303   002136          485#
KMS304   002146          490#
KMS305   002156          495#
KMS306   002166          500#
KMS307   002176          505#
KMS310   002206          510#
KMS311   002216          515#
KMS312   002226          520#
KMS313   002236          525#
KMS314   002246          530#
KMS315   002256          535#
KMS316   002266          540#
KMS317   002276          545#
KMTLVL   002064          449#     915      916*    1835*    1836*
KMTVEC   002062          448#     915*    1833*    1834*    1835
KM.END   002300          547#    1886     2157
KM.MAP   002100          356      466#     670      737      747     1805     1807     1884     1889     2078     2155     2159
LF     = 000012           43#    1102     1108
LINE     010573         1703#    1973
LOBITS   006056         1333*    1357#
LOCK     001444          337#    1009*    1021     1023     1364*    1541     2244*    2278*    2316*    2335*    2363*    2398*    2444*
                        2493*    2522*    2602*    2626*    2667*    2683*    2696*    2728*    2743*    2755*    2786*    2802*    2815*
                        2847*    2863*    2876*    2908*    2924*    2937*    2969*    2985*    2998*    3030*    3046*    3059*    3091*
                        3107*    3120*    3152*    3168*    3181*    3213*    3229*    3242*    3274*    3290*    3303*    3335*    3351*
                        3364*    3396*    3412*    3425*    3457*    3473*    3486*
LOKFLG   001510          363#
LOLIM    006050         1330*    1341     1354#
MASKX    001454          344#
MASTEK   010015         1543     1703#
MCSRX    007745          902     1703#
MDATA    011150         1425     1435     1720#
MEMLIM   001466          349#     861*
MEMSET   021202         2670     2731     2789     2850     2911     2972     3033     3094     3155     3216     3277     3338     3399
                        3460     3609#
MEPASS   007620          901     1703#
MERRPC   010072         1546     1703#
MERRX    007772          908     1703#
MERR2    007645         1703#    2063
```

```
MERR3    007672        834     1703#
MILK     001504        357#     671*     910     1803*    1808*    1812
MLOCK    007716        875     1703#
MNEW     010017        829     1703#
MODU     010461       1703#    1943
MPASSX   007761        906     1703#
MPFAIL   007562       1621     1638     1703#
MR       007642        882     1703#    1860
MRESET=  004000        159#
MSTCLR=  104410       1495#    1627     2204     2280     2318     2365     2400     2446     2495     2562     2604     2669     2730
                      2788     2849     2910     2971     3032     3093     3154     3215     3276     3337     3398     3459
MTITLE   001000        207#     702
MTSTN    010003       1544     1703#    1845
MVECX    007753        904     1703#
NEXT     001442        336#    1363     1583     2202*    2243*    2277*    2315*    2362*    2397*    2443*    2492*    2560*    2601*
                      2666*    2727*    2785*    2846*    2907*    2968*    3029*    3090*    3151*    3212*    3273*    3334*    3395*
                      3456*
NOACT    010731        714     1703#    1797
NODEV    003240        765      787#
NUM      010323       1703#    1896
OK       003220        779      782#     805
ONE      001464        348#
PACT00   002302        553#
PACT01   002306        556#
PACT02   002312        559#
PACT03   002316        562#
PACT04   002322        565#
PACT05   002326        568#
PACT06   002332        571#
PACT07   002336        574#
PACT10   002342        577#
PACT11   002346        580#
PACT12   002352        583#
PACT13   002356        586#
PACT14   002362        589#
PACT15   002366        592#
PACT16   002372        595#
PACT17   002376        598#
PARBIT=  040000        159#
PERFOR=  004537        159#
PFTAB    007324       1622     1644#
PIRQ   = 177772         49#
PIRQVE=  000240        143#
POPRO  = 012600        154#    1577
POP1SP=  005726        152#
POP2SP=  022626        156#
PRIO     010422       1703#    1924
PRIRTY   013730       2145*    2151*    2164     2185#
PR0    = 000000         66#    2121     2122
PR1    = 000040         67#
PR2    = 000100         68#
PR3    = 000140         69#
PR4    = 000200         70#    2123
PR5    = 000240         71#    2124
PR6    = 000300         72#    2125
PR7    = 000340         73#     178      180      182      184     2126
```

```
PS      = 177776        46#     47    663*    872*   2090*   2100*
PSW     = 177776        47#
PUSHR0= 010046         153#   1574
PUSH1S= 005746         151#
PUSH2S= 024646         155#
PWRVEC= 000024         138#  1600*   1601*   1610*   1616*   1635*   1636*
QV.FLG   001511        364#   669*    919*
RAMDAT   021106       2677    2690    2703    2737    2749    2761    2796    2809    2822    2857    2870    2883    2918
                      2931    2944    2979    2992    3005    3040    3053    3066    3101    3114    3127    3162    3175
                      3188    3223    3236    3249    3284    3297    3310    3345    3358    3371    3406    3419    3432
                      3467    3480    3493    3576#
RDCHR   = 104402      1216    1489#
RDLIN   = 104403      1289    1490#
RDOCT   = 104404      1338    1491#
RESREG   006766       1560    1563#
RESVEC= 000010         133#
RES05   = 104407      1494#   1563
ROMCLK= 104412        1497#   1650    1653    1690    1695    2209    2211    2213    2221    2223    2407    2409    2412
                      2414    2416    2454    2456    2459    2461    2463    2502    2504    2507    2509    2511    2529
                      2531    2533    2535    2564    2567    2573    2576    2606    2609    2621    2627    2635    2637
                      2639    2673    2675    2686    2688    2699    2701    2733    2735    2745    2747    2757    2759
                      2792    2794    2805    2807    2818    2820    2853    2855    2866    2868    2879    2881    2914
                      2916    2927    2929    2940    2942    2975    2977    2988    2990    3001    3003    3036    3038
                      3049    3051    3062    3064    3097    3099    3110    3112    3123    3125    3158    3160    3171
                      3173    3184    3186    3219    3221    3232    3234    3245    3247    3280    3282    3293    3295
                      3306    3308    3341    3343    3354    3356    3367    3369    3402    3404    3415    3417    3428
                      3430    3463    3465    3476    3478    3489    3491    3515    3517    3519    3527    3535    3543
                      3551    3559    3561    3563    3571    3586
ROMMAP   013732       2187#   2368    3597
RUN      001500        354#    672*   1801*   1802*   1809
SAVACT   001474        352#    832    2061*   2153*
SAVNUM   001476        353#    666*    917*    920*   2054*   2147*
SAVPC    001460        346#    793*    808    1370*   1589
SAVSP    001456        345#
SAV05   = 104406      1493#   1522
SCOP1   = 104405      1492#   2257    2293    2330    2343    2379    2423    2470    2518    2542    2620    2682    2695
                      2708    2742    2754    2766    2801    2814    2827    2862    2875    2888    2923    2936    2949
                      2984    2997    3010    3045    3058    3071    3106    3119    3132    3167    3180    3193    3228
                      3241    3254    3289    3302    3315    3350    3363    3376    3411    3424    3437    3472    3485
                      3498
SETBR0   021032       2913    2926    2939    3524#
SETBR1   021040       2974    2987    3000    3532#
SETBR4   021046       3035    3048    3061    3540#
SETBR7   021054       3096    3109    3122    3548#
SETC     021062       2791    2804    2817    3556#
SETZ     021100       2852    2865    2878    3568#
SOFTSW   011452       1744    1783#
SPACNT= 006411        1405*   1429    1432*   1446#
STACK   = 001200        37#    664     851    1584
STAT     001450        342#
STAT1    002050        439#   1816*
STAT2    002052        440#   1817*
STAT3    002054        441#   1818*
STKLMT= 177774          48#
STRTSW   001446        341#    704*    707*    708     710     724*    730     732     827     873     880    1838    1861*
                      1891    2074
```

```
SVOS    006100           1374#
SWFLG   011416            667*   1739*   1766*   1772#
SWR     001240            237#    688*    690     694*    704     832     837     977     995    1019    1511    1516    1572
                         1579    1581    1608    1628*   1668    1728    1765*
SWREG   000176            200#    683*    694    1728    1785
SW0   = 000001            101#
SW00  = 000001             91#    101     708     724    1891    2074
SW01  = 000002             90#    100     880    1838    1861
SW02  = 000004             89#     99
SW03  = 000010             88#     98     827
SW04  = 000020             87#     97
SW05  = 000040             86#     96
SW06  = 000100             85#     95    1668
SW07  = 000200             84#     94
SW08  = 000400             83#     93    1579
SW09  = 001000             82#     92    1019
SW1   = 000002            100#
SW10  = 002000             81#   1581
SW11  = 004000             80#
SW12  = 010000             79#   1511
SW13  = 020000             78#   1516
SW14  = 040000             77#
SW15  = 100000             76#
SW2   = 000004             99#
SW3   = 000010             98#
SW4   = 000020             97#
SW5   = 000040             96#
SW6   = 000100             95#
SW7   = 000200             94#
SW8   = 000400             93#
SW9   = 001000             92#
TBITVE= 000014            134#
TEMP    011106           1412    1676*   1681*   1687*   1699*   1718#
TIMER = 104414           1499#
TKVEC = 000060            141#
TLAST = 020624           1864    3507#
TPVEC = 000064            142#
TRAPVE= 000034            140#
TRTVEC= 000014            135#
TST1    013732            971    1851    1869    2200#
TST10   015102           2443    2490#
TST11   015372           2492    2558#
TST12   015476           2560    2599#
TST13   015674           2601    2664#
TST14   016060           2666    2725#
TST15   016230           2727    2783#
TST16   016414           2785    2844#
TST17   016600           2846    2905#
TST2    014044           2202    2241#
TST20   016764           2907    2966#
TST21   017150           2968    3027#
TST22   017334           3029    3088#
TST23   017520           3090    3149#
TST24   017704           3151    3210#
TST25   020070           3212    3271#
TST26   020254           3273    3332#
```

```
TST27    020440              3334     3393#
TST3     014150              2243     2275#
TST30    020624              3395     3454#    3507
TST31  = ****** U            3456
TST4     014262              2277     2313#
TST5     014432              2315     2360#
TST6     014542              2362     2395#
TST7     014720              2397     2441#
TTST     004146               876*     878*     973#
TWOSYN=  010000               159#
TYPDAT   006754              1538     1556     1559#
TYPE   = 104401               702      714      736      791      796      802      829      834      875      882      901      902      904
                              906      908     1072     1223     1229     1234     1238     1243     1244     1246     1249     1253     1318
                             1320     1336     1343     1344     1395     1435     1486#    1539     1540     1543     1544     1546     1548
                             1552     1557     1621     1637     1742     1745     1797     1843     1860     1866     1903     1923     1937
                             1942     1951     1958     1965     2063
TYPMSG   006654              1536     1539#
VEC      010401              1703#    1916
VECMAP   013172              2062     2074#
VECTR    013724              2144*    2150*    2169     2175*    2183#
WHAT     005770              1329*    1337#
WHERE    006054              1332*    1346     1356#
WHICH    013164              1905     2070#
WRDCNT   006406              1403*    1436*    1444#
WRKO.F   006742              1551     1554#
WROM     021140              2367     3591#
XBX      006542              1512     1514     1516#
XCSR     004104               903      941#
XERR     004126               909      950#
XHEAD    010077               736     1703#
XPASS    004120               907      947#
XSTATQ   011060               745     1703#
XTSTN    007120              1545     1590#
XVEC     004112               905      944#
ZERO     001462               347#
$APTHD   002034               421      427#
$ASTAT=  ****** U            1142     1157
$ATYC    004722              1113     1115#
$ATY1    004676              1111#
$ATY3    004704              1057     1112#
$ATY4    004714              1114#    1567
$AUTOB   001234               234#
$BASE    001372               309#    2149
$BDADR   001222               229#
$BDDAT   001226               231#
$CDW1    001376               311#    2146
$CDW2    001400               312#
$CHARC   004672              1074*    1084*    1091     1100*    1105#
$CKSWR=  ****** U            1489
$CMTAG   001200               217#
$CM1   = 000006               249#     250#     251#     252#     253#     254#     255#
$CM2   = 000014               249#     250#     251#     252#     253#     254#     255#
$CM3   = 000006               247#     249
$CM4   = 000005               255#     256#     257#     258#     259#     260#
$CNTLG   005534              1264#
$CNTLU   005527              1238     1263#
```

```
$COD   = ****** U                 1
$CPUOP  001344                  283#
$CRAP  = 177777                   1#  2189#  2192   2195#  2231#  2234   2236#  2265#  2268   2270#  2302#  2305   2308#
                               2348#  2351   2355#  2385#  2388   2390#  2431#  2434   2436#  2479#  2482   2485#  2547#
                               2550   2553#  2587#  2590   2594#  2648#  2651   2659#  2709#  2712   2720#  2767#  2770
                               2778#  2828#  2831   2839#  2889#  2892   2900#  2950#  2953   2961#  3011#  3014   3022#
                               3072#  3075   3083#  3133#  3136   3144#  3194#  3197   3205#  3255#  3258   3266#  3316#
                               3319   3327#  3377#  3380   3388#  3438#  3441   3449#
$CRLF   001313                  262#  1073   1108   1243   1263   1323   1344   1395   1539   1540   1548   1843   1903
$DDW0   001402                  313#  2154
$DDW1   001404                  314#
$DDW10  001426                  323#
$DDW11  001430                  324#
$DDW12  001432                  325#
$DDW13  001434                  326#
$DDW14  001436                  327#
$DDW15  001440                  328#
$DDW2   001406                  315#
$DDW3   001410                  316#
$DDW4   001412                  317#
$DDW5   001414                  318#
$DDW6   001416                  319#
$DDW7   001420                  320#
$DDW8   001422                  321#
$DDW9   001424                  322#
$DEVCT  001326                  274#
$DEVM   001374                  310#  2152
$DOAGN  004100                  918    927    932    938#
$ENDAD  004070                  191    700    934#  1570
$ENDCT  004054                  929#
$ENV    001336                  279#   681    717    719   1052   1120   1144   1564   1730
$ENVM   001337                  280#   722   1054   1059   1122
$EOP    003662                  897#  3456
$EOPCT  004046                  926#   930
$ERFLG  001203                  220#   668*   900*   962    991    993*  1014   1521*  1535   1549*  1623*
$ERMAX  001215                  226#  1014
$ERROR  006512                  181   1510#
$ERRPC  001216                  227#   677*   921*   970*  1518   1520*  1624*
$ERRTB  001512                  381#  1531
$ERTTL  001212                  224#   912    952   1578*  1820*
$ETABL  001336                  278#
$ETEND  001442                  331#   433
$FATAL  001320                  271#  1148*
$FFLG   005142                 1111*  1114*  1142   1151*  1159#
$FILLC  001256                  245#  1077   1108
$FILLS  001255                  244#  1108
$GDADR  001220                  228#
$GDDAT  001224                  230#
$GET42  004060                  931#
$GTSWR= ****** U               1488
$HD    = 000000                  11
$HIBTS  002034                  428#
$HIOCT  005722                 1311*  1322#
$ICNT   001204                  221#   999*  1000   1002*  1013
$ILLUP  007316                 1600   1616   1640#
$INPUT  005724                 1327#  1500
```

```
$INTAG   001235            235#
$ITEMB   001214            225#     1526*     1566
$LF      001314            263#     1108      1253      1263      1323
$LFLG    005141           1152*     1158#
$LPADR   001206            222#      679*      879*      883      1006*     1008      1013      1583*     1585      1859*     1869*     1871
$LPERR   001210            223#
$MADR1   001350            296#
$MADR2   001354            300#
$MADR3   001360            303#
$MADR4   001364            306#
$MAIL    001316            269#      429       433      1005      1052
$MAMS1   001346            290#     2148
$MAMS2   001352            298#
$MAMS3   001356            301#
$MAMS4   001362            304#
$MBADR   002036            429#
$MFLG    005140           1112*     1118      1153*     1157#
$MNEW    005552           1267#     1745
$MSGAD   001332            276#     1128*     1131
$MSGLG   001334            277#     1133*
$MSGTY   001316            270#     1126      1134*     1146      1150*
$MSWR    005541           1265#     1742
$MTYP1   001347            291#
$MTYP2   001353            299#
$MTYP3   001357            302#
$MTYP4   001363            305#
$MXCNT   004362           1003      1013#
$N     = 000030              1#     2189      2195      2197      2204#     2231      2236      2238      2246#     2265      2270      2272      2280
                          2281#     2302      2308      2310      2318      2319#     2348      2355      2357      2365      2366#     2385      2390
                          2392      2400      2401#     2431      2436      2438      2446      2447#     2479      2485      2487      2495      2496#
                          2547      2553      2555      2562      2563#     2587      2594      2596      2604      2605#     2648      2659      2661
                          2669      2670#     2709      2720      2722      2730      2731#     2767      2778      2780      2788      2789#     2828
                          2839      2841      2849      2850#     2889      2900      2902      2910      2911#     2950      2961      2963      2971
                          2972#     3011      3022      3024      3032      3033#     3072      3083      3085      3093      3094#     3133      3144
                          3146      3154      3155#     3194      3205      3207      3215      3216#     3255      3266      3268      3276      3277#
                          3316      3327      3329      3337      3338#     3377      3388      3390      3398      3399#     3438      3449      3451
                          3459      3460#     3507#
$NULL    001254            243#     1079      1108
$NWTST=  000000           2199#     2240#     2274#     2312#     2359#     2394#     2440#     2489#     2557#     2598#     2663#     2724#     2782#
                          2843#     2904#     2965#     3026#     3087#     3148#     3209#     3270#     3331#     3392#     3453#
$OVER    004334            975       978       989      1001      1007#
$PASS    001324            273#      899*      911       923*      924*      941       949       997      1014      1819*
$PASTM   002042            431#
$PWRDN   007126            179       665      1600#     1635
$PWRMG   007312           1638#
$PWRUP   007200           1610      1616#
$QUES    001312            261#     1108      1246      1263      1320      1323      1343      1866      1938      1952      1966
$RDCHR   005144           1183#     1489
$RDDEC=  ****** U         1492
$RDLIN   005264           1211#     1490
$RDOCT   005564           1284#     1491
$RDSZ =  000007           1204#
$REGAD   001260            247#
$REG0    001262            249#     1379*     1384      3646
$REG1    001264            250#      799*      811      1378*     1385
$REG2    001266            251#     1377*     1386      3646
```

```
$REG3   001270          252#   1376*   1387
$REG4   001272          253#   1375*   1388    3646
$REG5   001274          254#   1374*   1389    3646
$RTNAD  004102          940#
$R2A  = ****** U       1492
$S    = 000032            1#   2202    2204#   2243    2246#   2277    2281#   2315    2319#   2362    2366#   2397    2401#
                       2443    2447#   2492    2496#   2560    2563#   2601    2605#   2666    2670#   2727    2731#   2785
                       2789#   2846    2850#   2907    2911#   2968    2972#   3029    3033#   3090    3094#   3151    3155#
                       3212    3216#   3273    3277#   3334    3338#   3395    3399#   3456    3460#
$SAVRE= ****** U       1492
$SAVR6  007322         1609*   1617    1618*   1619*   1642#
$SCOPE  004134          177     969#   2118
$SETUP= 000000          922     970    1172    1269
$SVLAD  004316          986    1004#
$SVPC = 000040          189#    194
$SWR  = 164000            1#     11     260     261     894     922     933     939     941     963     964     965     966
                        977     989     991     992     993     994     995    1007    1013    1639    2201    2242    2276
                       2314    2361    2396    2442    2491    2559    2600    2665    2726    2784    2845    2906    2967
                       3028    3089    3150    3211    3272    3333    3394    3455
$SWREG  001340          281#    683
$SWRMK= 000000          966
$TESTN  001322          272#   1005*
$TIMES  001310          260#    922*    994*   1000    1003*   1013
$TKB    001246          240#    976    1170    1187    1193    1732    1734    1776    2131
$TKS    001244          239#    974    1170    1185    1191    1774    2129
$TMP0   001276          255#    738*   1705    2086*   2087*
$TMP1   001300          256#    739*   1707
$TMP2   001302          257#    741*    762*    789     798*   1709    1899    1902    1989*
$TMP3   001304          258#    742*   1711    1911    1914    1919    1922    1976    1979    1984    1987
$TMP4   001306          259#    743*   1713    1894*   1906*   2072
$TN   = 000031            1#     11    2199    2201#   2240    2242#   2274    2276#   2312    2314#   2359    2361#   2394
                       2396#   2440    2442#   2489    2491#   2557    2559#   2598    2600#   2663    2665#   2724    2726#
                       2782    2784#   2843    2845#   2904    2906#   2965    2967#   3026    3028#   3087    3089#   3148
                       3150#   3209    3211#   3270    3272#   3331    3333#   3392    3394#   3453    3455#
$TPB    001252          242#   1097*   1108    1515*   1779*   2134*
$TPFLG  001257          246#   1046    1108
$TPS    001250          241#   1095    1108    1513    1777    2132
$TRAP   006414          183    1463#
$TRAP2  006436         1474#   1485
$TRP  = 000021         1478#   1487#   1489    1490#   1491#   1492#   1493#   1494#   1495#   1496#   1497#   1498#   1499#
                       1500#   1501#   1502#   1503#   1504#
$TRPAD  006450         1468    1485#
$TSTM   002040          430#
$TSTNM  001202          219#    678*    962    1004*   1005    1007    1014    1592    1646    1848    1855    1857    2201*
                       2242*   2276*   2314*   2361*   2396*   2442*   2491*   2559*   2600*   2665*   2726*   2784*   2845*
                       2906*   2967*   3028*   3089*   3150*   3211*   3272*   3333*   3394*   3455*
$TTYIN  005520         1213    1214    1226    1244    1258    1262#
$TYPBN= ****** U       1487
$TYPDS= ****** U       1487
$TYPE   004414         1046#   1139    1478    1486
$TYPEC  004626         1076    1083    1090    1095#   1096
$TYPEX  004674         1101    1103    1106#
$TYPOC= ****** U       1487
$UNIT   001330          275#
$UNITM  002044          432#
$USWR   001342          282#
```

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$VECT1  001366             307#   2150    2151
$VECT2  001370             308#
$XTSTR  004174             972     980#
$Y    = 000000               1#    434#
$$GET4= 000000             933#
$40CAT= ****** U           977
.     = 021722             171#    173     176#    189     190#    192#    194#    198#    202#    206#    216#    264     350#
                           351#    352#    353#    362#    411#    417     418#    420#    422#    465#    467#    468#    469#
                           470#    472#    473#    474#    475#    477#    478#    479#    480#    482#    483#    484#    485#
                           487#    488#    489#    490#    492#    493#    494#    495#    497#    498#    499#    500#    502#
                           503#    504#    505#    507#    508#    509#    510#    512#    513#    514#    515#    517#    518#
                           519#    520#    522#    523#    524#    525#    527#    528#    529#    530#    532#    533#    534#
                           535#    537#    538#    539#    540#    542#    543#    544#    545#    706     716     823#    836
                           941    1013    1014    1108    1160#   1170    1262#   1263    1269#   1323    1612    1641    1684#
                          1719#   1721#   1775    1778    1799    1892    1933    2016    2020    2066    2097    2130    2133
                          2613    2618    2633    2645    3646#
.ADVAN  006060            1363#   1503
.BEGIN  003464             851#
.CNVRT  006170            1396#   1502
.CONVR  006164            1395#   1501
.DATAC  007446            1498    1675#
.DELAY  007332            1496    1648#
.MSTCL  007362            1495    1659#
.RES05  006132            1384#   1494
.ROMCL  007400            1497    1664#
.SAV05  006072            1370#   1493
.SCOP1  004364            1018#   1492
.START  002402             203     663#    679    1762
.TIMER  007512            1499    1686#
.$ASTA= ****** U          1112    1115
.$X   = 002034             417#    422
```

```
COMMEN     144#
ENDCOM     144#
ERROR       38#   2219    2229    2256    2292    2329    2342    2376    2422    2469    2517    2541    2582    2619    2634
           2646    2681    2694    2707    2741    2753    2765    2800    2813    2826    2861    2874    2887    2922    2935
           2948    2983    2996    3009    3044    3057    3070    3105    3118    3131    3166    3179    3192    3227    3240
           3253    3288    3301    3314    3349    3362    3375    3410    3423    3436    3471    3484    3497
ESCAPE     144#
GETPRI     144#
GETSWR     144#
HLT        157#
KMEND        1#    884
KMFRNT       1#
MULT       144#
NEWTST     144#   2199    2240    2274    2312    2359    2394    2440    2489    2557    2598    2663    2724    2782    2843
           2904    2965    3026    3087    3148    3209    3270    3331    3392    3453
POP        144#   1154    1155    1312    1628    1629    2177
PUSH       144#   1115    1117    1138    1286    1602    1608    2140
REPORT       1#    144#
SCOPE       39#   2200    2241    2275    2313    2360    2395    2441    2490    2558    2599    2664    2725    2783    2844
           2905    2966    3027    3088    3149    3210    3271    3332    3393    3454
SETPRI     144#
SETTRA    1478#   1489    1490    1491    1492    1493    1494    1495    1496    1497    1498    1499    1500    1501    1502
           1503
SETUP      144#
SKIP       144#
SLASH      144#
SPACE      144#
STARS      144#    187     212     264     267     414     416     423     892     959    1031    1110    1169    1175    1204
           1272    1457    1598    1614    2199    2240    2274    2312    2359    2394    2440    2489    2557    2598    2663
           2724    2782    2843    2904    2965    3026    3087    3148    3209    3270    3331    3392    3453
SWRSU      144#
TRMTRP    1478#
TYPBIN     144#
TYPDEC     144#
TYPNAM     144#
TYPNUM     144#
TYPOCS     144#
TYPOCT     144#
TYPTXT     144#
$AUTO        1#    748
$BRRSH       1#   2189
$BUFFE       1#   1715
$BYTE        1#
$CKDAT       1#
$COMP        1#
$CRAM        1#   2231    2265
$CRAMD       1#   2302
$CYCLE       1#   1786
$DATAF       1#
$EOP         1#    884
$ERTBL       1#    383
$EXER        1#
$FD          1#
$FINI        1#   3507
$GETPA       1#
$HALF        1#
```

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$HD           1#
$HEADE        1#      11
$IOPOD        1#    2587
$JUMP         1#    2648    2709    2767    2828    2889    2950    3011    3072    3133    3194    3255    3316    3377    3438
$LSTDA        1#
$MARHI        1#
$MEMFL        1#    2401    2447
$MEM0         1#    2431
$MEM1         1#    2385
$MEM2         1#    2479
$MEM3         1#    2547
$MOCK         1#
$MSG          1#    1703
$NONEX        1#
$ORUN         1#
$PASEN        1#     898
$PFAIL        1#    1593
$PROC         1#
$PROC1        1#
$QUEST        1#    1895    1907    1915    1972    1980
$RAMCL        1#    1647
$RCLK         1#    1650    1653    1690    1695    2209    2211    2213    2220    2223    2407    2409    2412    2414    2416
            2454    2456    2459    2461    2463    2502    2504    2507    2509    2511    2529    2531    2533    2535    2564
            2567    2573    2576    2606    2609    2621    2627    2635    2637    2639    2673    2675    2686    2688    2699
            2701    2733    2735    2745    2747    2757    2759    2792    2794    2805    2807    2818    2820    2853    2855
            2866    2868    2879    2881    2914    2916    2927    2929    2940    2942    2975    2977    2988    2990    3001
            3003    3036    3038    3049    3051    3062    3064    3097    3099    3110    3112    3123    3125    3158    3160
            3171    3173    3184    3186    3219    3221    3232    3234    3245    3247    3280    3282    3293    3295    3306
            3308    3341    3343    3354    3356    3367    3369    3402    3404    3415    3417    3428    3430    3463    3465
            3476    3478    3489    3491    3515    3517    3519    3527    3535    3543    3551    3559    3561    3563    3571
            3586
$RDROM        1#    2348
$ROMRD        1#
$ROVAR        1#     333
$SCADD        1#     970
$SCAD1        1#    1009
$SETUP        1#
$SIMBC        1#
$SKIPT        1#
$SOFTC        1#    1723
$TSTN         1#    2197    2238    2272    2310    2357    2392    2438    2487    2555    2596    2661    2722    2780    2841
            2902    2963    3024    3085    3146    3207    3268    3329    3390    3451
$UPADD        1#    1621
$VARIA        1#     205
$XZ           1#    2189    2195    2231    2236    2265    2270    2302    2308    2348    2355    2385    2390    2431    2436
            2479    2485    2547    2553    2587    2594    2648    2659    2709    2720    2767    2778    2828    2839    2889
            2900    2950    2961    3011    3022    3072    3083    3133    3144    3194    3205    3255    3266    3316    3327
            3377    3388    3438    3449
$$CMRE      210#     249     250     251     252     253     254
$$CMTM      210#     255     256     257     258     259
$$ESCA      144#
$$NEWT      144#    2199    2240    2274    2312    2359    2394    2440    2489    2557    2598    2663    2724    2782    2843
            2904    2965    3026    3087    3148    3209    3270    3331    3392    3453
$$SCOP        1#     953
$$SET      1478#    1489    1490    1491    1492    1493    1494    1495    1496    1497    1498    1499    1500    1501    1502
            1503
```

```
$$SKIP     144#
.EQUAT       1#      34
.HEADE       1#
.SETUP       1#
.$ACT1       1#     185
.$APTB       1#     265#
.$APTH       1#     412
.$APTY       1#    1108
.$CATC       1#
.$CMTA       1#     210
.$EOP        1#     890
.$ERRO       1#
.$ERRT       1#
.$POWE       1#    1596
.$RDOC       1#    1270
.$READ       1#    1167
.$SCOP       1#     957
.$TRAP       1#    1455
.$TYPE       1#    1029
.$TYPO       1#

. ABS.  021722      000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 DZKCD,DZKCD/SOL/CRF←DZKCD.MAC,DZKCD.P11/EQ:DZDMG
 RUN-TIME: 25 19 1 SECONDS
 RUN-TIME RATIO: 82/46=1.7
 CORE USED:  51K  (102 PAGES)


EOF1DZKCDASEQ                    00010000      770720           PDP10 411
```