PDP11

DDCMP MODE LINE UNIT

MD-11-DZKCE-A

EP-DZKCE-A-DL-A

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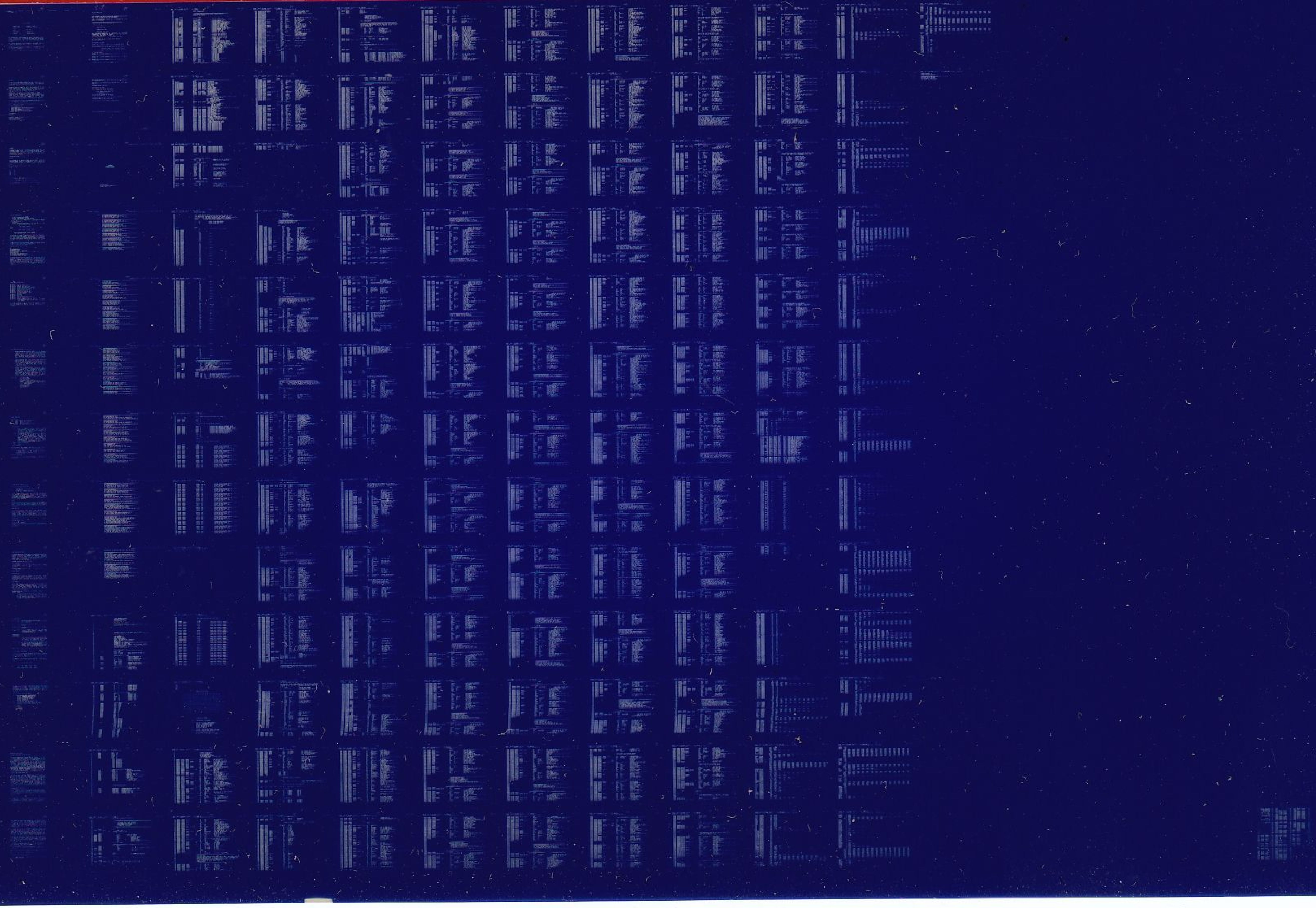

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZKCE-A-D
PRODUCT NAME:	DDCMP MODE LINE UNIT TESTS
DATE:	MAY 1977
MAINTAINER:	DIAGNOSTICS
AUTHOR:	DINESH GORADIA

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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 KMC-11 Line Unit (M8201 or M8202). It performs write/read tests on the KMC Line Unit registers. it checks for proper transmitter, receiver, and BCC operation in DDCMP mode. The modem signals are also checked. DZKCE requires a KMC Micro-Processor (M8204) to run. For best diagnosis a turn-around connector should be installed, however the diagnostic will run without it (some tests are skipped).

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 (cr equiilivalent)
KMC11-AN IOP (M8204)
KMC11-DA OR KMC11-MD OR KMC11-MA

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(SW03) 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 completly 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 IOP(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 DZKCE 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

Slpadr (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:   NOT USED
```

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 , 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.

8.5 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.

****

Note: for ipg's line unit m8202-ye users.

CABLE DATA TEST:[TEST 56 TEST 57]

THESE TESTS WON'T RUN RELIABLY ON LINE UNITS WITHOUT TERMINATING RESISTENCE.

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

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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
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MAINDEC-11-DZKCE-A
****

```
2265    **************************** TEST 1 *****************************
        OUT CONTROL REGISTER READ/ONLY TEST
        DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
        BITS ARE IN THE CORRECT STATE

2291    **************************** TEST 2 *****************************
        IN CONTROL REGISTER READ/ONLY TEST
        DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
        BITS ARE IN THE CORRECT STATE

2316    **************************** TEST 3 *****************************
        MODEM CONTROL REGISTER READ/ONLY TEST
        DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
        BITS ARE IN THE CORRECT STATE

2342    **************************** TEST 4 *****************************
        MAINTENANCE REGISTER READ/ONLY TEST
        DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
        BITS ARE IN THE CORRECT STATE

2372    **************************** TEST 5 *****************************
        LINE UNIT REGISTER WRITE/READ TEST
        SET BITS IN LU REGISTER 12, VERIFY IT IS SET
        CLEAR BITS IN LU REGISTER 12, VERIFY IT IS CLEAR

2415    **************************** TEST 6 *****************************
        LINE UNIT REGISTER WRITE/READ TEST
        SET BIT1 IN LU REGISTER 17, VERIFY IT IS SET
        CLEAR BIT1 IN LU REGISTER 17, VERIFY IT IS CLEAR

2458    **************************** TEST 7 *****************************
        LINE UNIT REGISTER WRITE/READ TEST
        FLOAT A 1 THROUGH LINE UNIT REGISTER 13
        FLOAT A 0 THROUGH LINE UNIT REGISTER 13

2517    **************************** TEST 10 *****************************
        LINE UNIT REGISTER WRITE/READ TEST
        FLOAT A 1 THROUGH LINE UNIT REGISTER 14
        FLOAT A 0 THROUGH LINE UNIT REGISTER 14
```

```
2570    *************************** TEST 11 ***************************
        SWITCH PAC TEST
        THIS TEST READS SWITCH PAC#1
        THIS SWITCH PAC CONTAINS THE DDCMP LINE #

2594    *************************** TEST 12 ***************************
        SWITCH PAC TEST
        THIS TEST READS SWITCH PAC#2
        THIS SWITCH PAC CONTAINS THE BM873 BOOT ADD

2618    *************************** TEST 13 ***************************
        LINE UNIT CLOCK TEST
        THIS TEST VERIFYS THAT THE LU INTERNAL CLOCK
        (BIT 1 IN LU-17) IS WORKING

2653    *************************** TEST 14 ***************************
        OUT DATA SILO TEST
        SET SOM AND LOAD OUT DATA SILO
        VERIFY THAT OCOR SET, INDICATING THAT THE
        CHARACTER IS AT THE BOTTOM OF THE OUT SILO

2687    *************************** TEST 15 ***************************
        DDCMP TEST OF RTS AND OUT ACTIVE
        SET SOM AND LOAD OUT DATA SILO
        SINGLE STEP 2 DATA CLOCKS, VERIFY
        THAT RTS AND ACTIVE ARE SET

2732    *************************** TEST 16 ***************************
        TEST OF OUT CLEAR
        SET SOM AND LOAD OUT DATA SILO
        SINGLE STEP DATA CLOCK, SET OUT CLEAR
        VERIFY THAT OCOR,RTS, AND ACTIVE ARE CLEARED

2790    *************************** TEST 17 ***************************
        DDCMP TRANSMITTER TEST
        SINGLE CLOCK THE CHARACTER 0
        VERIFY EACH BIT POSITION AS IT
        PASSES THE BIT WINDOW (SI BIT)
        ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE

2843    *************************** TEST 20 ***************************
        DDCMP TRANSMITTER TEST
        SINGLE CLOCK THE CHARACTER 125
        VERIFY EACH BIT POSITION AS IT
        PASSES THE BIT WINDOW (SI BIT)
        ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE

2896    *************************** TEST 21 ***************************
        DDCMP TRANSMITTER TEST
        SINGLE CLOCK THE CHARACTER 252
        VERIFY EACH BIT POSITION AS IT
        PASSES THE BIT WINDOW (SI BIT)
        ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
```

```
2949    *************************** TEST 22 ***************************
        DDCMP TRANSMITTER TEST
        SINGLE CLOCK THE CHARACTER 377
        VERIFY EACH BIT POSITION AS IT
        PASSES THE BIT WINDOW (SI BIT)
        ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE

3002    *************************** TEST 23 ***************************
        DDCMP TRANSMITTER TEST
        SINGLE CLOCK A BINARY COUNT PATTERN
        VERIFY EACH BIT POSITION AS IT
        PASSES THE BIT WINDOW (SI BIT)
        ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
        AND R5 CONTAINS THE CHARACTER THAT FAILED

3065    *************************** TEST 24 ***************************
        DDCMP STRIP SYNC TEST
        SET LU LOOP, SINGLE STEP 5 SYNCS,
        VERIFY THAT IN PCTIVE DOES NOT SET

3095    *************************** TEST 25 ***************************
        DDCMP IN ACTIVE TEST
        SET LU LOOP, SINGLE STEP 5 SYNCS AND A NON-SYNC (301)
        VERIFY THAT IN ACTIVE IS SET

3125    *************************** TEST 26 ***************************
        DDCMP IN ACTIVE TEST
        SET LU LOOP, SINGLE STEP 1 SYNC AND A NON-SYNC (301)
        VERIFY THAT IN ACTIVE DOES NOT SET

3155    *************************** TEST 27 ***************************
        DDCMP IN ACTIVE TEST
        SET LU LOOP, SINGLE STEP 2 SYNCS AND A NON-SYNC (301)
        VERIFY THAT IN ACTIVE IS SET

3185    *************************** TEST 30 ***************************
        IN CLEAR TEST
        SYNC UP RECEIVER AND TRANSMIT A CHARACTER
        WAIT FOR IN RDY, THEN SET IN CLEAR
        VERIFY THAT IN ACTIVE AND IN RDY ARE CLEARED

3236    *************************** TEST 31 ***************************
        DDCMP BASIC RECEICER TEST
        SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 0
        VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED

3275    *************************** TEST 32 ***************************
        DDCMP BASIC RECEICER TEST
        SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 125
        VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED
```

```
3314     *************************** TEST 33 ***************************
         DDCMP BASIC RECEICER TEST
         SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 252
         VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED

3353     *************************** TEST 34 ***************************
         DDCMP BASIC RECEICER TEST
         SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 377
         VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED

3392     *************************** TEST 35 ***************************
         DDCMP DATA TEST
         THIS TEST SINGLE STEPS A BINARY COUNT PATTERN
         CHECKING EACH CHARACTER AS IT IS RECEIVED

3433     *************************** TEST 36 ***************************
         DDCMP DATA TEST
         THIS TEST SINGLE STEPS A BINARY COUNT PATTERN
         CHECKING EACH CHARACTER AS IT IS RECEIVED
         THIS TEST IS EXACTLY THE SAME AS THE LAST TEST,
         EXCEPT LINE UNIT LOOP IS SET IN LU REGISTER 12

3479     *************************** TEST 37 ***************************
         TRANSMITTER MARK TEST
         SINGLE CLOCK 3 SYNCS AND A 301 AND 20 EXTRA
         CLOCK TICKS, VERIFY THAT A 301, A 377 AND A 377
         WERE RECEIVED INDICATING THAT THE TRANSMITTER WENT
         TO A MARK STATE FOR 16 BITS WHEN OUT SILO WAS EMPTY

3526     *************************** TEST 40 ***************************
         CABLE TURNAROUND TEST
         CLEAR LINE UNIT LOOP, SET DTR
         VERIFY THAT RING AND MODEM READY ARE SET
         CLEAR DTR, VERIFY THAT RING AND MRDY ARE CLEARED

3579     *************************** TEST 41 ***************************
         CABLE TURNAROUND TEST
         CLEAR LINE UNIT LOOP, LOAD OUT DATA SILO
         VERIFY THAT ALL MODEM SIGNALS ARE SET

3627     *************************** TEST 42 ***************************
         TEST OF CRC OPERATION
         USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
         0, VERIFY THE LSB OF THE BCC ON EACH SHIFT
         TEST TRANSMITTER FIRST THEN THE RECEIVER BCC

3704     *************************** TEST 43 ***************************
         TEST OF CRC OPERATION
         USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
         377, VERIFY THE LSB OF THE BCC ON EACH SHIFT
         TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
```

```
3781      ************************** TEST 44 ***************************
          TEST OF CRC OPERATION
          USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
          125, VERIFY THE LSB OF THE BCC ON EACH SHIFT
          TEST TRANSMITTER FIRST THEN THE RECEIVER BCC

3858      ************************** TEST 45 ***************************
          TEST OF CRC OPERATION
          USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
          252, VERIFY THE LSB OF THE BCC ON EACH SHIFT
          TEST TRANSMITTER FIRST THEN THE RECEIVER BCC

3935      ************************** TEST 46 ***************************
          TRANSMITTER CRC TEST
          USING THE CRC16 POLYNOMINAL, SINGLE CLOCK A BINARY
          COUNT PATTERN, VERIFY THE LSB OF THE TRANSMITTER BCC ON EACH SHIFT

4003      ************************** TEST 47 ***************************
          RECEIVER CRC TEST
          USING THE CRC16 POLYNOMINAL, SINGLE CLOCK A BINARY
          COUNT PATTERN, VERIFY THE LSB OF THE RECEIVER BCC ON EACH SHIFT

4071      ************************** TEST 50 ***************************
          TRANSMITTER DDCMP CRC TEST
          THIS TEST TRANSMITS A FOUR CHARACTER MESSAGE WITH CRC
          BOTH DATA AND THE BCC ARE VERIFIED IN THE BIT
          WINDOW. THE FOUR CHARACTERS ARE 0,125,252,377
          THE TRANSMITTER IS CHECKED FOR GOING TO A MARK STATE AFTER THE BCC

4174      ************************** TEST 51 ***************************
          RECEIVER DDCMP CRC TEST
          THIS TEST CLOCKS A FOUR CHARACTER MESSAGE WITH BCC
          AND VERIFYS CORRECT DATA RECEPTION AND BCC MATCH
          THE FOUR CHARACTER MESSAGE IS 0,125,252,377

4233      ************************** TEST 52 ***************************
          DDCMP EOM FUNCTION TEST
          THIS TEST LOADS OUT SILO WITH: 2 SYNCS,4 CHAR MESSAGE,EOM
          4 CHARACTER MESS,EOM. THE DATA STREAM IS CHECKED TO BE
          4 CHAR,BCC,4 CHAR,BCC,MARKS. THIS TEST VERIFYS THAT
          THE CHARCTERS LOADED WITH EOM SET ARE LOST
          ALL DATA AND BCC'S ARE CHECKED IN THE BIT WINDOW
          THE FOUR CHARACTER MESSAGE IS 0,125,252,377
          RECEIVED DATA IS VERIFIED, AND IN BCC MATCH IS CHECKED

4481      ************************** TEST 53 ***************************
          DDCMP EOM FUNCTION TEST
          THIS TEST LOADS OUT SILO WITH: 2 SYNCS,4 CHAR MESSAGE,EOM
          SOM,4 CHAR MESS,EOM. THE DATA STREAM IS CHECKED TO BE
          4 CHAR,BCC,4 CHAR,BCC,MARKS. THIS TEST VERIFYS THAT
          THE CHARCTERS LOADED WITH EOM SET ARE LOST
          ALSO THAT THE CHAR LOADED WITH SOM IS NOT IN THE BCC
          ALL DATA AND BCC'S ARE CHECKED IN THE BIT WINDOW
          THE FOUR CHARACTER MESSAGE IS 0,125,252,377
```

```
        RECEIVED DATA IS VERIFIED, AND IN BCC MATCH IS CHECKED

4761    *************************** TEST 54 ***************************
        EMPTY SILO TEST
        LOAD SILO WITH 2 SYNCS, 4 CHAR MESSAGE, SINGLE CLOCK
        UNTIL THE SILO IS EMPTY, LOAD 4 MORE CHARACTERS IN THE
        SILO. GIVE MORE TICKS, AND VERIFY THAT ONLY THE FIRST
        4 CHARACTER MESSAGE WAS RECEIVED AND THAT RTS IS CLEAR

4827    *************************** TEST 55 ***************************
        HALF DUPLEX TEST
        SET LINE UNIT LOOP AND HALF DUPLEX, SEND SYNCS AND A

4830    MESSAGE. VERIFY THAT IN-ACTIVE AND IN-READY ARE CLEAR

4864    *************************** TEST 56 ***************************
        DOCMP CABLE DATA TEST
        THIS TEST LOADS OUT SILO WITH THE FOLLOWING:
        4 SYNCS,16 CHAR,EOM,16 CHAR,EOM,16 CHAR,EOM
        THE 16 CHARACTERS INCLUDE A FLOATING ONE AND ZERO
        THE DATA IS TRANSMITTED OVER THE CABLE USING THE INTERNAL CLOCK
        RECEIVED DATA IS VERIFIED AS IS IN BCC MATCH
        LOOP-BACK CONNECTOR MUST BE ON TO RUN THIS TEST

4961    *************************** TEST 57 ***************************
        DOCMP CABLE DATA TEST
        THIS TEST LOADS OUT SILO WITH THE FOLLOWING:
        4 SYNCS,59 DATA CHARACTERS,EOM WITH GARBAGE CHARACTER
        THE DATA IS 'RANSM TTED OVER THE CABLE USING THE INTERNAL CLOCK
        RECEIVED DATA IS VERIFIED AS IS IN BCC MATCH
        LOOP-BACK CONNECTOK MUST BE ON TO RUN THIS TEST
```

```
                .TITLE  MAINDEC-11-DZKCE-A
                ;*COPYRIGHT (C) 1976
                ;*DIGITAL EQ'IPMENT 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-DZKCE-A   KMC11 DDCMP LINE UNIT TESTS
                ;*COPYRIGHT 1976, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                ;*-------------------------------------------------------------

                ;STARTING PROCEDURE
                ;LOAD PROGRAM
                ;LOAD ADDRE.. 000200
                ;SWR=0  AUTOSIZE KMC11
                ;SW07=1  USE CURRENT KMC11 PARAMETERS
                ;SW00=1  INPUT NEW KMC11 PARAMETERS
                ;PRESS START
                ;PROGRAM WILL TYPE "MAINDEC-11-DZKCE-A   KMC11 DDCMP LINE UNIT 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
```

```
000003          R3=     %3              ;;GENERAL REGISTER
000004          R4=     %4              ;;GENERAL REGISTER
000005          R5=     %5              ;;GENERAL REGISTER
000006          R6=     %6              ;;GENERAL REGISTER
000007          R7=     %7              ;;GENERAL REGISTER
000006          SP=     %6              ;;STACK POINTER
000007          PC=     %7              ;;PROGRAM COUNTER

                ;*PRIORITY LEVEL DEFINITIONS
000000          PR0=    0               ;;PRIORITY LEVEL 0
000040          PR1=    40              ;;PRIORITY LEVEL 1
000100          PR2=    100             ;;PRIORITY LEVEL 2
000140          PR3=    140             ;;PRIORITY LEVEL 3
000200          PR4=    200             ;;PRIORITY LEVEL 4
000240          PR5=    240             ;;PRIORITY LEVEL 5
000300          PR6=    300             ;;PRIORITY LEVEL 6
000340          PR7=    340             ;;PRIORITY LEVEL 7

                ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000          SW15=   100000
040000          SW14=   40000
020000          SW13=   20000
010000          SW12=   10000
004000          SW11=   4000
002000          SW10=   2000
001000          SW09=   1000
000400          SW08=   400
000200          SW07=   200
000100          SW06=   100
000040          SW05=   40
000020          SW04=   20
000010          SW03=   10
000004          SW02=   4
000002          SW01=   2
000001          SW00=   1
                .EQUIV  SW09,SW9
                .EQUIV  SW08,SW8
                .EQUIV  SW07,SW7
                .EQUIV  SW06,SW6
                .EQUIV  SW05,SW5
                .EQUIV  SW04,SW4
                .EQUIV  SW03,SW3
                .EQUIV  SW02,SW2
                .EQUIV  SW01,SW1
                .EQUIV  SW00,SW0

                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000          BIT15=  100000
040000          BIT14=  40000
020000          BIT13=  20000
010000          BIT12=  10000
004000          BIT11=  4000
002000          BIT10=  2000
001000          BIT09=  1000
000400          BIT08=  400
000200          BIT07=  200
```

```
        000100                  BIT06=  100
        000040                  BIT05=  40
        000020                  BIT04=  20
        000010                  BIT03=  10
        000004                  BIT02=  4
        000002                  BIT01=  2
        000001                  BIT00=  1
                                .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 INTERRUPTS
                                         ;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 HANDLEF
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   000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
         000040                          .=$SVPC                 ;; RESTORE PC

         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-DZKCE-A/<200>
001025      113   041515   030461         .ASCIZ /KMC11 DDCMP LINE UNIT 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  J00000                     $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
 001[illegible]  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  031610                         EM1
 001522  032614                         DH2             ; ERROR 1
 001524  033130                         DT2
 001526  031646                         EM2
 001530  032614                         DH2             ; ERROR 2
 001532  033130                         DT2
 001534  031711                         EM3
 001536  032614                         DH2             ; ERROR 3
 001540  033130                         DT2
 001542  031755                         EM4
 001544  000000                         0               ; ERROR 4
 001546  000000                         0
 001550  032017                         EM5
 001552  032614                         DH2             ; ERROR 5
 001554  033130                         DT2
 001556  032017                         EM5
 001560  032652                         DH3             ; ERPOR 6
 001562  033146                         DT3
 001564  032047                         EM6
 001566  032573                         DH1             ; ERROR 7
 001570  033116                         DT1
 001572  032066                         EM7
 001574  032573                         DH1             ; ERROR 10
 001576  033116                         DT1
 001600  032113                         EM10
 001602  032573                         DH1             ; ERROR 11
 001604  033116                         DT1
 001606  032137                         EM11
 001610  032750                         DH5             ; ERROR 12
 001612  033172                         DT5
 001614  032166                         EM12
 001616  032750                         DH5             ; ERROR 13
 001620  033172                         DT5
 001622  032137                         EM11
 001624  032710                         DH4             ; ERROR 14
 001626  033160                         DT4
```

```
    421  001630  032212                                EM13
    422  001632  000000                                0                     ; ERROR 15
    423  001634  000000                                0
    424  001636  032137                                EM11
    425  001640  032750                                DH5                   ; ERROR 16
    426  001642  033210                                DT6
    427  001644  032166                                EM12
    428  001646  032750                                DH5                   ; ERROR 17
    429  001650  033210                                DT6
    430  001652  032137                                EM11
    431  001654  033002                                DH6                   ; ERROR 20
    432  001656  033226                                DT7
    433  001660  032137                                EM11
    434  001662  033002                                DH6                   ; ERROR 21
    435  001664  033250                                DT10
    436  001666  032166                                EM12
    437  001670  033002                                DH6                   ; ERROR 22
    438  001672  033226                                DT7
    439  001674  032166                                EM12
    440  001676  033002                                DH6                   ; ERROR 23
    441  001700  033250                                DT10
    442  001702  032252                                EM14
    443  001704  000000                                0                     ; ERROR 24
    444  001706  000000                                0
    445  001710  032322                                EM15
    446  001712  032573                                DH1                   ; ERROR 25
    447  001714  033115                                DT1
    448  001716  032343                                EM16
    449  001720  032652                                DH3                   ; ERROR 16
    450  001722  033272                                DT11
    451  001724  032166                                EM12
    452  001726  032573                                DH1                   ; ERROR 27
    453  001730  033304                                DT12
    454  001732  032357                                EM17
    455  001734  000000                                0                     ; ERROR 30
    456  001736  000000                                0
    457  001740  032423                                EM20
    458  001742  032573                                DH1                   ; ERROR 31
    459  001744  033116                                DT1
    460  001746  032444                                EM21
    461  001750  033050                                DH7                   ; ERROR 32
    462  001752  000000                                0
    463  001754  032444                                EM21
    464  001756  032652                                DH3                   ; ERROR 33
    465  001760  033146                                DT3
    466  001762  032461                                EM22
    467  001764  033073                                DH10                  ; ERROR 34
    468  001766  000000                                0
    469  001770  032504                                EM23
    470  001772  032614                                DH2                   ; ERROR 35
    471  001774  033130                                DT2
    472  001776  032526                                EM24
    473  002000  000000                                0                     ; ERROR 36
    474  002002  000000                                0
    475  002004  032551                                EM25
    476  002006  000000                                0                     ; ERROR 37
```

```
002010  000000                  0
002012  032047                  EM6
002014  032614                  DH2                     ; ERROR 40
002016  033130                  DT2
002020  032017                  EM5
002022  032750                  DH5                     ; ERROR 41
002024  033172                  DT5
002026  032212                  EM13
002030  032573                  DH1                     ; ERROR 42
002032  033116                  DT1
        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 STAR; 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 UNI'
002046  000052                  .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)

```

```

                                  ;KMC11 CONTR(L 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 C4
 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 NUMBEP 06
002162  000001          KMS106: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 06
002164  000001          KMS206: .BLKW   1               ;DDCMP LINE# FOR KMC11 NUMBER 06
002166  J00001          KMS306: .BLKW   1               ;3RD STATUS WORD

002170  000001          KMCR07: .BLKW   1               ;CONTROL STATUS REGISTER FOR KMC11 NUMBER 07
002172  000001          KMS107: .BLKW   1               ;VECTOF 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               ;CONTPOL STATUS REGISTER FOR KMC11 NUMBER 10
002202  000001          KMS110: .BLKW   1               ;VECTOR FOR KMC11 NUMBER 10
002204  000001          XMS210: .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  J00001          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

```

```
   623  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  011415                  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,$LPADR          ;SET UP FOP POWER FAIL BEFORE
                                                                        ;TESTING STARTS
002522  132737  000001  001336          BITB    #1,$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 SOFTWAPE 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  001006                          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 MCDE.
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 STATJS
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
                                      ;;*ADDRESSFS 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$:      MOV     #DEVTAB,R2         ;R2 IS DEVICE TABLE PONTER
003152  012701  160010                     MOV     #160010,R1         ;START WITH ADDRESS 160010
003156  005711                    FLOAT:   TST     (R1)               ;CHECK ADDRESS IN R1
003160  111204                             MOVB    (R2),R4            ;IF NO TIMEOUT, GET NEXT ADDRESS
003162  060401                             ADD     R4,R1              ;IN R1
003164  005201                             INC     R1                 ;
003166  040401                             BIC     R4,R1              ;
003170  005703                             TST     R3                 ;ANY MORE DEVICES TO CHECK FOR?
003172  001371                             BNE     FLOAT              ;BR IF YES
003174  012737  003244  000004             MOV     #ERR,@#4           ;OK ONLY KMC'S ARE LEFT, SET UP FOR TIMEOUT
003202  005711                    FY:      TST     (R1)               ;CHECK KMC ADDRESS
003204  020137  002066                     CMP     R1,KMCSR           ;DOES IT MATCH
003210  001403                             BEQ     OK                 ;BR IF YES
003212  062701  000010                     ADD     #10,R1             ;GET NEXT KMC ADDRESS
003216  000771                             BR      FY                 ;DO IT AGAIN
003220  062700  000010            OK:      ADD     #10,R0             ;SKIP TO NEXT KMC CSR
003224  062701  000010                     ADD     #10,R1             ; GET NEXT KMC ADDRESS
003230  011037  002066                     MOV     (R0),KMCSR         ; GET NEXT KMC CSR
003234  001447                             BEQ     AUDONE             ; BRANCH IF ALL DONE.
003236  000761                             BR      FY                 ; DO IT AGAIN.
003240  122243                    NODEV:   CMPB    (R2)+,-(R3)        ;ON TIMEOUT, INC R2, DEC R3
003242  000002                             RTI                        ;$LPADR
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                             .PYTE   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$:      BIT      #SW01,$TRTSW      ;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 WI~H 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 ?OUTINE

                                          ;;*************************************************************
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                  AP¯ENV=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 INBUFFEP
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 RICHT BYTE OF TRAP
006426  006300                             ASL     R0                  ;;POSITION FOR INDEXING
006430  016000  006450                     MOV     $TRPAD(R0),R0       ;; NDEX 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                             .SAVOS  ;;CALL=SAVOS     TRAP+6(104406)  CALL TO REGISTER SAVE ROUTINE
006466  006132                             .RESOS  ;;CALL=RESOS     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=CC^VRT   TRAP+16(104416) CALL TO    .....
006506  006170                                    .CNVRT   ;;CALL=CN 'T    TRAP+17(104417) CALL TO    .......
006510  006060                                    .ADVANCE        ;,  LL=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     ,$CRLF
006664  005737  001444                    TST      LOCK
006670  001402                            BEQ      1$
0 6672  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:   RESOS                   ;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     $ERTTL          ;UPDATE ERR^R COUNT
007052  032777  000400  172160            BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
007060  001007                            BNE     1$              ;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                  ERTABO:   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$:
007344  104412                          ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
007346  121224                          121224                    ;FORT4+IBUS#11
007350  032777  000020  172516          BIT     #BIT4,@KMP04      ;IS CLOCK BIT SET?
007356  001772                          BEQ     1$                ;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
```

```
     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$:
     007536  104412                                ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
     007540  021364                                021364                     ;PORT4+IBUS* REG11
     007542  032777  000002  172224                BIT     #2,@KMP04          ;IS PGM CLOCK BIT SET?
     007550  001372                                BNE     2$                 ;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 DZKCE  /
 (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 C24503 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     CKSWRS          ;BR IF NO
    011222 132737 000001 001336         BITB    #1,$ENV         ; IS IT RUNNING UNDER APT?
    011230 001071                       BNE     CKSWRS          ; EXIT IF YES.
    J11232 022777 000007 170006         CMP     #7,@$TKB        ;WAS CTRL G TYPED? (7 BIT ASCII)
    011240 001404                       BEQ     1$              ;BR IF YES
    011242 022777 000207 167776         CMP     #207,@$TKB      ;WAS CTRL G TYPED? (8 BIT ASCII)
    011250 001061                       BNE     CKSWRS          ;BR IF NO
    011252 010246               1$:     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    ,$MSWR          ;TYPE "SWR= "
    011300 104417               CKSWR2: CNVRT                   ;TYPE OUT PRESENT CONTENTS
    011302 011452                       SOFTSW                  ;OF SOFT SWITCH REGISTER
    011304 :04401 005552        CKSWR3: TYPE    ,$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    @$TPS
011436  100375                            BPL     .-4
011440  010377  167636                    MOV     R3,@$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?
```

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011760  001044                                  BNE     7$                ;BR IF YES
011762  104401  001313                          TYPE    ,$CRLF
011766  104415                                  INPUT
011770  013003                                  MTSTN
011772  000001                                  1
011774  001000                                  1000
011776  001202                                  $TSTNM
012000     000                          .BYTE   0
012001     001                          .BYTE   1
012002  012700  013732                          MOV     #TST1,R0
012006  022710                          5$:     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$:     TST     (R0)+             ;POP R0
012056  020027  027444                          CMP     R0,#TLAST+10      ;AT END YET?
012062  001351                                  BNE     5$                ;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
```

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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
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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           BIT     #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$:    TST     (R2)+           ;POP POINTER
012770  012761  021324  000006           MOV     #02.324,6(R1)   ;PUT INSTRUCTION IN PORT6
012776  012711  001400                   MOV     #BIT9!BIT8,(R1) ;PORT4←LU 15
013002  156122  000004                   BISB    4(R1),(R2)+     ;STORE DOCMP LINE # IN TABLE
013006  012761  021344  000006           MOV     #021344,6(R1)   ;PORT6←INSTRUCTION
013014  012711  001400                   MOV     #BIT8!BIT9,(R1) ;CLOCK INSTR.
013020  156122  000004                   BISB    4(R1),(R2)+     ;STORE BM873 ADD IN TABLE
013024  005722                           TST     (R2)+           ;POP OVER STAT3
013026  005011                           CLR     (R1)            ;CLEAR ROMI
013030  005237  001472                   INC     KMNUM           ;UPDATE DEVICE COUNTER
013034  022737  000020  001472           CMP     #20,KMNUM       ;ARE MAX. NO. OF DEV FOUND?
013042  001410                           BEQ     13$             ;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     #1$,(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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013444  000000                                  PR0     ;LEVEL 0
013446  000200                                  PR4     ;LEVEL 4
013450  000240                                  PR5     ;LEVEL 5
013452  000300                                  PR6     ;LEVEL 6
013454  000340                                  PR7     ;LEVEL 7


013456  105777  165562                  INTTY:  TSTB    @$TKS                   ;WAIT FOR DONE
013462  100375                                  BPL     .-4
013464  017703  165556                          MOV     @$TKB,R3                ;PUT CHAR IN R3
013470  105777  165554                          TSTB    @$TPS                   ;WAIT UNTIL PRINTER IS READY
013474  100375                                  BPL     .-4
013476  010377  165550                          MOV     R3,@$TPB                ;ECHO CHAR
013502  042703  000240                          BIC     #BIT7!BIT5,R3           ;MASK OFF LOWER CASE
013506  000207                                  RTS     PC                      ;RETURN

013510                                  APT.SIZE:
013510  000005                                  RESET
013512  010046                                  MOV     R0,-(SP)                ;;PUSH R0 ON STACK
013514  010146                                  MOV     R1,-(SP)                ;;PUSH R1 ON STACK
013516  010246                                  MOV     R2,-(SP)                ;;PUSH R2 ON STACK
013520  010346                                  MOV     R3,-(SP)                ;;PUSH R3 ON STACK
013522  005037  013724                          CLR     VECTR                   ; CLEAR THE LOCAL VARIABLE
013526  005037  013730                          CLR     PRIRTY                  ; CLEAN UP LOCAL VARIABLE
013532  013700  001376                          MOV     $CDW1,R0                ; GET THE DEVIC¿ COUNT
013536  010037  001476                          MOV     R0,SAVNUM               ; SAVE THE NO. ϽF DEVICES
013542  012701  001346                          MOV     #$MAMS1,R1              ; GET EXTRA INFO. BITS POINTER
013546  013737  001372  013726                  MOV     $BASE,BASE              ; GET BASE CSR ADDRESS
013554  113737  001366  013724                  MOVB    $VECT1,VECTR            ; GET THE VECTOR
013562  113737  001367  013730                  MOVB    $VECT1+1,PRIRTY         ; GET THE PRIORITY
013570  013737  00)‾74  001470                  MOV     $DEVM,KMACTV            ; SAVE THE KMC'S SELECTED ACTIVE
013576  013737  0C.470  001474                  MOV     KMACTV,SAVACT           ; SAVE THE ACTIVE REGISTER
013604  012702  001402                          MOV     #$DDW0,R2               ; GET ADDRESS OF FIRST DEVICE DESCRIPTOR WORD
013610  012703  002100                          MOV     #KM.MAP,R3              ; GET POINTER TO DEVICE MAP
013614  005023                          3$:     CLR     (R3)+                   ; CLEAR DEVICE MAP
013616  022703  002300                          CMP     #KM.END,R3              ; IS WHOLE DEV.MAP CLEARED?
013622  003374                                  BGT     3$                      ; NO, THEN GO ON.
013624  012703  002100                          MOV     #KM.MAP,R3              ; RESTORE DEV.MAP POINTER.
013630  013723  013726                  1$:     MOV     BASE,(R3)+              ; LOAD CSR ADDRESS
013634  112163  000001                          MOVB    (R1)+,1(R3)             ; GET EXTRA INFO. BITS
013640  006213                                  ASR     (R3)                    ; SET IT IN RIGHT POSITION.
013642  006213                                  ASR     (R3)                    ; SET IT IN RIGHT POSITION.
013644  053713  013730                          BIS     PRIRTY,(R3)             ; GET PRIORITY IN STAT1
013650  006313                                  ASL     (R3)                    ; SET THEM IN RIGHT POSITION
013652  006313                                  ASL     (R3)                    ;  "    "    "    "    "
013654  006313                                  ASL     (R3)                    ;  "    "    "    "    "
013656  006313                                  ASL     (R3)                    ;  "    "    "    "    "
013660  053723  013724                          BIS     VECTR,(R3)+             ; GET THE VECTOR IN STAT1.
013664  012223                                  MOV     (R2)+,(R3)+             ; GET THE STAT2 FROM DDWXX
013666  005723                                  TST     (R3)+                   ; SKIP OVER STAT3
013670  005300                                  DEC     R0                      ; COUNT BY 1
013672  001407                                  BEQ     2$                      ; ALL DONE?
013674  062737  'ωω010  013726                  ADD     #10,BASE                ; INCREMENT BASE CSR ADDRE:S BY 10
013702  062737  000010  013724                  ADD     #10,VECTR               ; INCREMENT VECTOR ADDRESS B' 10
013710  000747                                  BR      1$                      ; SET THE NEXT MAP ENTRY
013712                                  2$:
```

```
013712  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
013714  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
013716  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
013720  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
013722  000207                          RTS     PC              ; RETURN
013724  000000                  VECTR:  .WORD   0
013726  000000                  BASE:   .WORD   0
013730  000000                  PRIRTY: .WORD   0



                                        ;************************** TEST 1 **************************
                                        ;*OUT CONTROL REGISTER READ/ONLY TEST
                                        ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
                                        ;*BITS ARE IN THE CORRECT STATE
                                        ;;************************************************************

                                        ;  TEST 1
                                        ;--------------

                                ;;************************************************************
013732  000004                  TST1:   SCOPE
013734  012737  000001  001202          MOV     #1,$TSTNM              ; LOAD THE NO. OF THIS TEST
013742  012737  014006  001442          MOV     #TST2,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
013750  005077  166112                  CLR     @KMCSR          ;CLEAR SEL0
013754  012702  000011                  MOV     #11,R2          ;SAVE R2 FOR TYPEOUT
013760  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013762  021224                          021004!<20*11>          ;PORT4+LINE UNIT REG 11
013764  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
013770  042704  000054                  BIC     #54,R4          ;CLEAR UNKNOWN BITS
013774  012705  000020                  MOV     #20,R5          ;PUT "EXPECTED" IN R5
014000  120504                          CMPB    R5,R4           ;IS OUT READY SET?
014002  001401                          BEQ     1$              ;BR IF YES
014004  104002                          ERROR   2               ;ERROR IN LU 11
014006                          1$:


                                        ;************************** TEST 2 **************************
                                        ;*IN CONTROL REGISTER READ/ONLY TEST
                                        ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
                                        ;*BITS ARE IN THE CORRECT STATE
                                        ;;************************************************************

                                        ;  TEST 2
                                        ;--------------

                                ;;************************************************************
014006  000004                  TST2:   SCOPE
014010  012737  000002  001202          MOV     #2,$TSTNM              ; LOAD THE NO. OF THIS TEST
014016  012737  014054  001442          MOV     #TST3,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014024  012702  000012                  MOV     #12,R2          ;SAVE R2 FOR TYPEOUT
014030  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014032  021244                          021004!<20*12>          ;PORT4+LINE UNIT REG 12
014034  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
014040  042704  000017                  BIC     #17,R4          ;CLEAR UNKNOWN BITS
014044  005005                          CLR     R5              ;PUT "EXPECTED" IN R5
```

```
014046  120504                          CMPB    R5,R4           ;ARE ALL BITS CLEARED?
014050  001401                          BEQ     1$              ;BR IF YES
014052  104002                          ERROR   2               ;ERROR IN LU 12
014054                          1$:


                                        ;************************** TEST 3 *************************
                                        ;*MODEM CONTROL REGISTER READ/ONLY TEST
                                        ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
                                        ;*BITS ARE IN THE CORRECT STATE
                                        ;:**********************************************************

                                        ;  TEST 3
                                        ;--------------
                                ;:*************************************************************
014054  000004                  TST3:   SCOPE
014056  012737  000003  001202          MOV     #3,$TSTNM               ; LOAD THE NO. OF THIS TEST
014064  012737  014126  001442          MOV     #TST4,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014072  104410                          MSTCLR                  ;MASTER CLEAR KMC11
014074  012702  000013                  MOV     #13,R2          ;SAVE R2 FOR TYPEOUT
014100  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014102  021264                          021004!<20*13>          ;PORT4+LINE UNIT REG 13
014104  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
014110  042704  000213                  BIC     #213,R4         ;CLEAR UNKNOWN BITS
014114  012705  000100                  MOV     #100,R5         ;PUT "EXPECTED" IN R5
014120  120504                          CMPB    R5,R4           ;ARE RING, DTR,  AND MODEM READY SET?
014122  001401                          BEQ     1$              ;BR IF YES
014124  104002                          ERROR   2               ;ERROR IN LU 13
014126                          1$:


                                        ;************************** TEST 4 *************************
                                        ;*MAINTENANCE REGISTER READ/ONLY TEST
                                        ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
                                        ;*BITS ARE IN THE CORRECT STATE
                                        ;:**********************************************************

                                        ;  TEST 4
                                        ;--------------
                                ;:*************************************************************
014126  000004                  TST4:   SCOPE
014130  012737  000004  001202          MOV     #4,$TSTNM               ; LOAD THE NO. OF THIS TEST
014136  012737  014220  001442          MOV     #TST5,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014144  104410                          MSTCLR                  ;MASTER CLEAR KMC11
014146  012702  000017                  MOV     #17,R2          ;SAVE R2 FOR TYPEOUT
014152  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014154  021364                          021004!<20*17>          ;PORT4+LINE UNIT REG 17
014156  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
014162  042704  000206                  BIC     #206,R4         ;CLEAR UNKNOWN BITS
014166  012705  000051                  MOV     #51,R5          ;PUT "EXPECTED" IN R5
014172  032737  020000  002050          BIT     #BIT13,STAT1    ;IS LU AN M8202 OR M8201?
014200  001404                          BEQ     .+12            ;BR IF M8201
014202  042704  000040                  BIC     #40,R4          ;MASK OFF SI BIT IF M8202
014206  042705  000040                  BIC     #BIT5,R5        ;SI BIT IS UNKNOWN ON AN M8202
```

```
014212  120504                                  CMPB    R5,R4           ;ARE SI AND ICIR SET?
014214  001401                                  BEQ     1$              ;BR IF YES
014216  104002                                  ERROR   2               ;ERROR IN LU 17
014220                                  1$:


                                        ;*************************** TEST 5 ***************************
                                        ;*LINE UNIT REGISTER WRITE/READ TEST
                                        ;*SET BITS IN LU REGISTER 12, VERIFY IT IS SET
                                        ;*CLEAR BITS IN LU REGISTER 12, VERIFY IT IS CLEAR
                                        ;:*************************************************************

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

                                ;:*******************************************************************
014220  000004                  TST5:   SCOPE
014222  012737  000005  001202          MOV     #5,$TSTNM               ; LOAD THE NO. OF THIS TEST
014230  012737  014360  001442          MOV     #TST6,NEXT              ; POINT TO THE START OF NEXT TEST.
014236  012737  014252  001444          MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
014244  104410                          MSTCLR                  ;MASTER CLEAR KMC11
014246  012702  000012                  MOV     #12,R2          ;SAVE REGISTER ADDRESS FOR TYPEOUT
014252  012761  000040  000004  1$:     MOV     #40,4(R1)       ;LOAD PORT4
014260  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014262  122112                          122112                  ;SET BITS IN LU-12
014264  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014266  021245                          021245                  ;READ LU-12
014270  012705  000040                  MOV     $40,R5          ;PUT "EXPECTED" IN R5
014274  116104  000005                  MOVB    5(R1),R4        ;PUT "FOUND" IN R4
014300  042704  000337                  BIC     #337,R4         ;CLEAR UNWANTED BITS
014304  120504                          CMPB    R5,R4           ;IS BITS SET?
014306  001401                          BEQ     2$              ;BR IF YES
014310  104003                          ERROR   3               ;ERROR, BIT 5 IS NOT SET
014312  104405                  2$:     SCOP1                   ;SCOPE SUBTEST (SW09=1)
014314  012737  014322  001444          MOV     #3$,LOCK        ;NEW SCOP1
014322  005061  000004          3$:     CLR     4(R1)           ;LOAD PORT4
014326  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014330  122112                          122112                  ;CLEAR BIT 5 IN LU-12
014332  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014334  021245                          021245                  ;READ LU-12
014336  005005                          CLR     R5              ;PUT "EXPECTED" IN R5
014340  116104  000005                  MOVB    5(R1),R4        ;PUT "FOUND" IN R4
014344  042704  000337                  BIC     #337,R4         ;CLEAR UNWANTED BITS
014350  120504                          CMPB    R5,R4           ;IS BITS CLEAR?
014352  001401                          BEQ     4$              ;BR IF YES
014354  104003                          ERROR   3               ;ERROR, BITS IS NOT CLEAR
014356  104405                  4$:     SCOP1                   ;SCOPE SUBTEST (SW09=1)


                                        ;*************************** TEST 6 ***************************
                                        ;*LINE UNIT REGISTER WRITE/READ TEST
                                        ;*SET BIT1 IN LU REGISTER 17, VERIFY IT IS SET
                                        ;*CLEAR BIT1 IN LU REGISTER 17, VERIFY IT IS CLEAR
                                        ;:*************************************************************

                                        ;  TEST 6
```

```
                                                      ;---------------
                                             ;;*****************************************************************
       014360  000004                        TST6:    SCOPE
       014362  012737  000006  001202                 MOV     #6,$TSTNM               ; LOAD THE NO. OF THIS TEST
       014370  012737  014520  001442                 MOV     #TST7,NEXT              ; POINT TO THE START OF NEXT TEST.
       014376  012737  014412  001444                 MOV     #1$,LOCK                ; ADDRESS FOR LOCK ON DATA.
                                                                              ;R1 CONTAINS BASE KMC11 ADDRESS
       014404  104410                                 MSTCLR                  ;MASTER CLEAR KMC11
       014406  012702  000017                         MOV     #17,R2          ;SAVE REGISTER ADDRESS FOR TYPEOUT
       014412  012761  000001  000004        1$:      MOV     #1,4(R1)        ;LOAD PORT4
       014420  104412                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
       014422  122117                                 122117                  ;SET BIT1 IN LU-17
       014424  104412                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
       014426  021365                                 021365                  ;READ LU-17
       014430  012705  000001                         MOV     #1,R5           ;PUT "EXPECTED" IN R5
       014434  116104  000005                         MOVB    5(R1),R4        ;PUT "FOUND" IN R4
       014440  042704  000376                         BIC     #376,R4         ;CLEAR UNWANTED BITS
       014444  120504                                 CMPB    R5,R4           ;IS BIT1 SET?
       014446  001401                                 BEQ     2$              ;BR IF YES
       014450  104003                                 ERROR   3               ;ERROR, BIT 1 IS NOT SET
       014452  104405                        2$:      SCOP1                   ;SCOPE SUBTEST (SW09=1)
       014454  012737  014462  001444                 MOV     #3$,LOCK        ;NEW SCOP1
       014462  005061  000004                3$:      CLR     4(R1)           ;LOAD PORT4
       014466  104412                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
       014470  122117                                 122117                  ;CLEAR BIT 1 IN LU-17
       014472  104412                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
       014474  021365                                 021365                  ;READ LU-17
       014476  005005                                 CLR     R5              ;PUT "EXPECTED" IN R5
       014500  116104  000005                         MOVB    5(R1),R4        ;PUT "FOUND" IN R4
       014504  042704  000376                         BIC     #376,R4         ;CLEAR UNWANTED BITS
       014510  120504                                 CMPB    R5,R4           ;IS BIT1 CLEAR?
       014512  001401                                 BEQ     4$              ;BR IF YES
       014514  104003                                 ERROR   3               ;ERROR, BIT1 IS NOT CLEAR
       014516  104405                        4$:      SCOP1                   ;SCOPE SUBTEST (SW09=1)


                                                      ;*************************** TEST 7 **************************
                                                      ;*LINE UNIT REGISTER WRITE/READ TEST
                                                      ;*FLOAT A 1 THROUGH LINE UNIT REGISTER 13
                                                      ;*FLOAT A 0 THROUGH LINE UNIT REGISTER 13
                                                      ;;***********************************************************


                                                      ;  TEST 7
                                                      ;--------------
                                             ;;*****************************************************************
       014520  000004                        TST7:    SCOPE
       014522  012737  000007  001202                 MOV     #7,$TSTNM               ; LOAD THE NO. OF THIS TEST
       014530  012737  014730  001442                 MOV     #TST10,NEXT             ; POINT TO THE START OF NEXT TEST.
       014536  012737  014556  001444                 MOV     #64$,LOCK               ; ADDRESS FOR LOCK ON DATA.
                                                                              ;R1 CONTAINS BASE KMC11 ADDRESS
       014544  104410                                 MSTCLR                  ;MASTER CLEAR KMC11
       014546  012702  000013                         MOV     #13,R2          ;SAVE REGISTER ADDRESS FOR TYPEOUT
       014552  012700  000001                         MOV     #1,R0           ;START WITH BIT 0
       014556                                64$:
       014556  010061  000004                         MOV     R0,4(R1)        ;PUT PATTERN INTO PORT4
       014562  042761  000257  000004                 BIC     #257,4(R1)      ;CLEAR UNWANTED BITS
```

```
014570  104412                              ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014572  122113                              122100!13                   ;MOV DATA TO IBUS REGISTER 13
014574  104412                              ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014576  021265                              21005!(13*20)               ;READ FROM IBUS REGISTER 13
014600  010005                              MOV     R0,R5               ;PUT EXPECTED IN R5
014602  042705  000257                      BIC     #257,R5             ;CLEAR UNWANTED BITS
014606  116104  000005                      MOVB    5(R1),R4            ;PUT "FOUND" INTO R4
014612  042704  000257                      BIC     #257,R4             ;CLEAR UNWANTED BITS
014616  120504                              CMPB    R5,R4               ;DATA CORRECT?
014620  001401                              BEQ     65$                 ;BR IF YES
014622  104003                              ERROR   3                   ;ERROR
014624  104405                      65$:    SCOP1                       ;SW09=1?
014626  000241                              CLC                         ;CLEAR CARRY
014630  106100                              ROLB    R0                  ;SHIFT BIT IN R0
014632  00135'                              BNE     64$                 ;IF R0=0 THEN DONE
014634  01273,  014650  001444              MOV     #67$,LOCK           ;NEW SCOP1
014642  012700  000001                      MOV     #1,R0               ;START WITH BIT 0
014646  005100                      69$:    COM     R0                  ;CHANGE TO FLOATING ZERO
014650                              67$:
014650  010061  000004                      MOV     R0,4(R1)            ;PUT PATTERN INTO PORT4
014654  042761  000257  000004              BIC     #257,4(R1)          ;CLEAR UNWANTED BITS
014662  104412                              ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014664  122113                              122100!13                   ;MOV DATA TO IBUS REGISTER 13
014666  104412                              ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014670  021265                              21005!(13*20)               ;READ FROM IBUS REGISTER 13
014672  010005                              MOV     R0,R5               ;PUT EXPECTED IN R5
014674  042705  000257                      BIC     #257,R5             ;CLEAR UNWANTED BITS
014700  116104  000005                      MOVB    5(R1),R4            ;PUT "FOUND" INTO R4
014704  042704  000257                      BIC     #257,R4             ;CLEAR UNWANTED BITS
014710  120504                              CMPB    R5,R4               ;DATA CORRECT?
014712  001401                              BEQ     68$                 ;BR IF YES
014714  104003                              ERROR   3                   ;ERROR
014716  104405                      68$:    SCOP1                       ;SW09=1?
014720  005100                              COM     R0                  ;CHANGE TO FLOATING 1
014722  000241                              CLC                         ;CLEAR CARRY
014724  106100                              ROLB    R0                  ;SHIFT BIT IN R0
014726  001347                              BNE     69$                 ;IF R0=0 THEN DONE


                                            ;************************** TEST 10 **************************
                                            ;*LINE UNIT REGISTER WRITE/READ TEST
                                            ;*FLOAT A 1 THROUGH LINE UNIT REGISTER 14
                                            ;*FLOAT A 0 THROUGH LINE UNIT REGISTER 14
                                            ;:************************************************************

                                            ;  TEST 10
                                            ;--------------
                                    ;;*************************************************************
014730  000004                      TST10:  SCOPE
014732  012737  000010  001202              MOV     #10,$TSTNM                  ; LOAD THE NO. OF THIS TEST
014740  012737  015104  001442              MOV     #TST11,NEXT                 ; POINT TO THE START OF NEXT TEST.
014746  012737  014766  001444              MOV     #64$,LOCK                   ; ADDRESS FOR LOCK ON DATA.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
014754  104410                              MSTCLR                      ;MASTER CLEAR KMC11
014756  012702  000014                      MOV     #14,R2              ;SAVE REGISTER ADDRESS FOR TYPEOUT
014762  012700  000001                      MOV     #1,R0               ;START WITH BIT 0
```

```
014766                                  64$:
014766  010061  000004                          MOV     R0,4(R1)        ;PUT PATTERN INTO PORT4
014772  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
014774  122114                                  122100!14               ;MOV DATA TO IBUS REGISTER 14
014776  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015000  021305                                  21005!<14*20>           ;READ FROM IBUS REGISTER 14
015002  010005                                  MOV     R0,R5           ;PUT EXPECTED IN R5
015004  116104  000005                          MOVB    5(R1),R4        ;PUT "FOUND" INTO R4
015010  120504                                  CMPB    R5,R4           ;DATA CORRECT?
015012  001401                                  BEQ     65$             ;BR IF YES
015014  104003                                  ERROR   3               ;ERROR
015016  104405                          65$:    SCOP1                   ;SW09=1?
015020  000241                                  CLC                     ;CLEAR CARRY
015022  106100                                  ROLB    R0              ;SHIFT BIT IN R0
015024  001360                                  BNE     64$             ;IF R0=0 THEN DONE
015026  012737  015042  001444                  MOV     #67$,LOCK       ;NEW SCOP1
015034  012700  000001                          MOV     #1,R0           ;START WITH BIT 0
015040  005100                          69$:    COM     R0              ;CHANGE TO FLOATING ZERO
015042                                  67$:
015042  010061  000004                          MOV     R0,4(R1)        ;PUT PATTERN INTO PORT4
015046  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015050  122114                                  122100!14               ;MOV DATA TO IBUS REGISTER 14
015052  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015054  021305                                  21005!<14*20>           ;READ FROM IBUS REGISTER 14
015056  010005                                  MOV     R0,R5           ;PUT EXPECTED IN R5
015060  116104  000005                          MOVB    5(R1),R4        ;PUT "FOUND" INTO R4
015064  120504                                  CMPB    R5,R4           ;DATA CORRECT?
015066  001401                                  BEQ     68$             ;BR IF YES
015070  104003                                  ERROR   3               ;ERROR
015072  104405                          68$:    SCOP1                   ;SW09=1?
015074  005100                                  COM     R0              ;CHANGE TO FLOATING 1
015076  000241                                  CLC                     ;CLEAR CARRY
015100  106100                                  ROLB    R0              ;SHIFT BIT IN R0
015102  001356                                  BNE     69$             ;IF R0=0 THEN DONE


                                                ;************************ TEST 11 ************************
                                                ;*SWITCH PAC TEST
                                                ;*THIS TEST READS SWITCH PAC#1
                                                ;*THIS SWITCH PAC CONTAINS THE DDCMP LINE #
                                                ;:*******************************************************

                                                ;  TEST 11
                                                ;--------------

                                        ;;******************************************************
015104  000004                          TST11:  SCOPE
015106  012737  000011  001202                  MOV     #11,$TSTNM              ; LOAD THE NO. OF THIS TEST
015114  012737  015146  001442                  MOV     #TST12,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
015122  104410                                  MSTCLR                  ;MASTER CLEAR KMC11
015124  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015126  021324                                  021324                  ;PORT4←LU15
015130  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
015134  113705  002052                          MOVB    STAT2,R5        ;PUT "EXPECTED" IN R5
015140  120504                                  CMPB    R5,R4           ;SW OK?
015142  001401                                  BEQ     1$              ;BR IF YES
```

```
015144  104031                          ERROR   31              ;ERROR, SWITCH PAC READ ERROR
015146                          1$:


                                        ;************************** TEST 12 **************************
                                        ;*SWITCH PAC TEST
                                        ;*THIS TEST READS SWITCH PAC#2
                                        ;*THIS SWITCH PAC CONTAINS THE BM873 BOOT ADD
                                        ;;************************************************************

                                        ;  TEST 12
                                        ;--------------
                                ;;**************************************************************
015146  000004                  TST12:  SCOPE
015150  012737  000012  001202          MOV     #12,$TSTNM              ; LOAD THE NO. OF THIS TEST
015156  012737  015210  001442          MOV     #TST13,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
015164  104410                          MSTCLR                  ;MASTER CLEAR KMC11
015166  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015170  021344                          021344                  ;PORT4+LU16
015172  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
015176  113705  002053                  MOVB    STAT2+1,R5      ;PUT "EXPECTED" IN R5
015202  120504                          CMPB    R5,R4           ;SW OK?
015204  001401                          BEQ     1$              ;BR IF YES
015206  104031                          ERROR   31              ;ERROR, SWITCH PAC READ ERROR
015210                          1$:


                                        ;************************** TEST 13 **************************
                                        ;*LINE UNIT CLOCK TEST
                                        ;*THIS TEST VERIFYS THAT THE LU INTERNAL CLOCK
                                        ;*(BIT 1 IN LU-17) IS WORKING
                                        ;;************************************************************

                                        ;  TEST 13
                                        ;--------------
                                ;;**************************************************************
015210  000004                  TST13:  SCOPE
015212  012737  000013  001202          MOV     #13,$TSTNM              ; LOAD THE NO. OF THIS TEST
015220  012737  015310  001442          MOV     #TST14,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
015226  104410                          MSTCLR                  ;MASTER CLEAR KMC11
015230  005037  011106                  CLR     TEMP            ;PREPARE FOR DELAY
015234                          1$:
015234  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015236  021364                          021364                  ;PORT4+LU-17
015240  032761  000002  000004          BIT     #2,4(R1)        ;IS CLOCK BIT SET?
015246  001004                          BNE     2$              ;BR IF YES
015250  005237  011106                  INC     TEMP            ;DELAY
015254  001367                          BNE     1$      ;DELAY FINISHED?
015256  104004                          ERROR   4               ;ERROR BIT IS STUCK CLEAR
015260  005037  011106          2$:     CLR     TEMP            ;PREPARE FOR DELAY
015264                          3$:
015264  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLk PC=5304
015266  021364                          021364                  ;PORT4+LU-17
015270  032761  000002  000004          BIT     #2,4(R1)        ;IS CLOCK BIT CLEAR?
```

```
015276  001404                          BEQ     4$                      ;BR IF YES
015300  005237  011106                  INC     TEMP                    ;DELAY
015304  001367                          BNE     3$                      ;BR IF DELAY NOT DONE
015306  104004                          ERROR   4                       ;ERROR BIT IS STUCK SET
015310                          4$:


                                        ;*************************** TEST 14 ***************************
                                        ;*OUT DATA SILO TEST
                                        ;*SET SOM AND LOAD OUT DATA SILO
                                        ;*VERIFY THAT OCOR SET, INDICATING THAT THE
                                        ;*CHARACTER IS AT THE BOTTOM OF THE OUT SILO
                                        ;;*************************************************************

                                        ;  TEST 14
                                        ;--------------
                                ;;*********************************************************************
015310  000004                  TST14:  SCOPE
015312  012737  000014  001202          MOV     #14,$TSTNM                      ; LOAD THE NO. OF THIS TEST
015320  012737  015410  001442          MOV     #TST15,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
015326  104410                          MSTCLR                  ;MASTER CLEAR KMC11
015330  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
015334  012761  000001  000004          MOV     #1,4(R1)        ;LOAD PORT4 WITH BIT0
015342  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015344  122111                          122111                  ;SET SOM
015346  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015350  122110                          122110                  ;LOAD OUT DATA SILO
015352  104414  000002                  TIMER,  2               ;WAIT FOR OCOR
015356  012702  000017                  MOV     #17,R2          ;SAVE ADDRESS FOR TYPEOUT
015362  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015364  021364                          021364                  ;PORT4←LU 17
015366  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
015372  042704  000357                  BIC     #357,R4         ;CLEAR UNWANTED BITS
015376  012705  000020                  MOV     #20,R5          ;PUT "EXPECTED" IN R5
015402  120504                          CMPB    R5,R4           ;IS OCOR SET?
015404  001401                          BEQ     1$              ;BR IF YES
015406  104005                          ERROR   5
015410                          1$:


                                        ;*************************** TEST 15 ***************************
                                        ;*DOCMP TEST OF RTS AND OUT ACTIVE
                                        ;*SET SOM AND LOAD OUT DATA SILO
                                        ;*SINGLE STEP 2 DATA CLOCKS, VERIFY
                                        ;*THAT RTS AND ACTIVE ARE SET
                                        ;;*************************************************************

                                        ;  TEST 15
                                        ;--------------
                                ;;*********************************************************************
015410  000004                  TST15:  SCOPE
015412  012737  000015  001202          MOV     #15,$TSTNM                      ; LOAD THE NO. OF THIS TEST
015420  012737  015546  001442          MOV     #TST16,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
015426  104410                          MSTCLR                  ;MASTER CLEAR KMC11
```

```
015430  012711  004000                    MOV     #BIT11,(R1)      ;SET LINE UNIT LOOP
015434  012761  000001  000004            MOV     #1,4(R1)         ;LOAD PORT4 WITH BIT0
015442  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015444  122111                            122111                   ;SET SOM
015446  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015450  122110                            122110                   ;LOAD OUT DATA SILO
015452  004737  030006                    JSR     PC,OCOR          ;WAIT FOR OCOR
015456  104413  000002                    DATACLK,        2        ;CLOCK DATA FOUR TIMES
015462  012702  000011                    MOV     #11,R2           ;SAVE ADDRESS FOR TYPEOUT
015466  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015470  021224                            021224                   ;PORT4+LU 11
015472  016104  000004                    MOV     4(R1),R4         ;PUT "FOUND" IN R4
015476  042704  000257                    BIC     #257,R4          ;CLEAR UNWANTED BITS
015502  012705  000120                    MOV     #120,R5          ;PUT "EXPECTED" IN R5
015506  120504                            CMPB    R5,R4            ;IS ACTIVE SET?
015510  001401                            BEQ     1$               ;BR IF YES
015512  104005                            ERROR   5
015514                            1$:
015514  012702  000013                    MOV     #13,R2           ;SAVE ADDRESS FOR TYPEOUT
015520  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015522  021264                            021264                   ;PORT4+LU 13
015524  016104  000004                    MOV     4(R1),R4         ;PUT EXPECTED IN R4
015530  042704  000337                    BIC     #337,R4          ;CLEAR UNWANTED BITS
015534  012705  000040                    MOV     #BIT5,R5         ;PUT "EXPECTED" IN R5, RTS SHOULD BE SET
015540  120504                            CMPB    R5,R4            ;IS RTS OK?
015542  001401                            BEQ     2$               ;BR IF YES
015544  104005                            ERROR   5                ;RTS ERROR
015546                            2$:



                                          ;************************** TEST 16 **************************
                                          ;*TEST OF OUT CLEAR
                                          ;*SET SOM AND LOAD OUT DATA SILO
                                          ;*SINGLE STEP DATA CLOCK, SET OUT CLEAR
                                          ;*VERIFY THAT OCOR,RTS, AND ACTIVE ARE CLEARED
                                          ;:***********************************************************

                                          ;  TEST 16
                                          ;--------------
                                  ;;**************************************************************
015546  000004                    TST16:  SCOPE
015550  012737  000016  001202            MOV     #16,$TSTNM               ; LOAD THE NO. OF THIS TEST
015556  012737  015744  001442            MOV     #TST17,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                   ;R1 CONTAINS BASE KMC11 ADDRESS
015564  104410                            MSTCLR                   ;MASTER CLEAR KMC11
015566  012711  004000                    MOV     #BIT11,(R1)      ;SET LINE UNIT LOOP
015572  012761  000001  000004            MOV     #1,4(R1)         ;LOAD PORT4 WITH BIT0
015600  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015602  122111                            122111                   ;SET SOM
015604  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015606  122110                            122110                   ;LOAD OUT DATA SILO
015610  004737  030006                    JSR     PC,OCOR          ;WAIT FOR OCOR
015614  104413  000002                    DATACLK,        2        ;CLOCK DATA FOUR TIMES
015620  012761  000200  000004            MOV     #BIT7,4(R1)      ;SET BIT7 IN PORT4
015626  104412                            ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015630  122111                            122111                   ;SET OUT CLEAR
```

```
015632  104413  000001                 DATACLK,      1         ;GIVE A TICK TO CLEAR RTS
015636  012702  000017                 MOV     #17,R2          ;SAVE ADDRESS FOR TYPEOUT
015642  104412                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015644  021364                         021364                  ;PORT4+LU 17
015646  016104  000004                 MOV     4(R1),R4        ;PUT "FOUND" IN R4
015652  042704  000357                 BIC     #357,R4         ;CLEAR UNWANTED BITS
015656  005005                         CLR     R5              ;PUT "EXPECTED" IN R5
015560  120504                         CMPB    R5,R4           ;IS OCOR CLEARED?
015662  001401                         BEQ     1$              ;BR IF YES
015664  104005                         ERROR   5
015666                         1$:
015666  012702  000013                 MOV     #13,R2          ;SAVE ADDRESS FOR TYPEOUT
015672  104412                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015674  021264                         021264                  ;PORT4+LU 13
015676  016104  000004                 MOV     4(R1),R4        ;PUT EXPECTED IN R4
015702  042704  000337                 BIC     #337,R4         ;CLEAR UNWANTED BITS
015706  005005                         CLR     R5              ;PUT "EXPECTED" IN R5, RTS SHOULD BE CLEARED
015710  120504                         CMPB    R5,R4           ;IS RTS OK?
015712  001401                         BEQ     2$              ;BR IF YES
015714  104005                         ERROR   5               ;RTS ERROR
015716                         2$:
015716  012702  000011                 MOV     #11,R2          ;SAVE ADDRESS FOR TYPEOUT
015722  104412                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
015724  021224                         021224                  ;PORT4+LU11
015726  016104  000004                 MOV     4(R1),R4        ;PUT "FOUND" IN R4
015732  012705  000020                 MOV     #BIT4,R5        ;ONLY OUT READY SHOULD BE SET
015736  120504                         CMPB    R5,R4           ;IS ACTIVE CLEAR?
015740  001401                         BEQ     3$              ;BR IF YES
015742  104005                         ERROR   5               ;ERROR ACTIVE NOT CLEARED
015744                         3$:


                                       ;*************************** TEST 17 **************************
                                       ;*DDCMP TRANSMITTER TEST
                                       ;*SINGLE CLOCK THE CHARACTER 0
                                       ;*VERIFY EACH BIT POSITION AS IT
                                       ;*PASSES THE BIT WINDOW (SI BIT)
                                       ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
                                       ;;*************************************************************

                                       ;  TEST 17
                                       ;--------------
                               ;;*************************************************************
015744  000004                 TST17:  SCOPE
015746  012737  000017  001202         MOV     #17,$TSTNM              ; LOAD THE NO. OF THIS TEST
015754  012737  016126  001442         MOV     #TST20,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                               ;R1 CONTAINS BASE KMC11 ADDRESS
015762  104410                         MSTCLR                  ;MASTER CLEAR KMC11
015764  012711  004000                 MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
015770  004737  030140                 JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
015774  012761  000001  000004         MOV     #1,4(R1)        ;SET BIT0 IN PORT4
016002  104412                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016004  122111                         122111                  ;SET SOM!
016006  012705  000000                 MOV     #0,R5   ;LOAD CHARACTER IN R5 FOR TYPEOUT
016012  004737  030140                 JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
016016  010561  000004                 MOV     R5,4(R1)        ;LOAD PORT4 WITH CHARACTER
```

```
016022  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016024  122110                          122110                          ;LOAD OUT DATA
016026  004737  030006                  JSR     PC,OCOR                 ;WAIT FOR OCOR TO SET
016032  005003                          CLR     R3                      ;CLEAR BIT COUNTER
016034  010502                          MOV     R5,R2                   ;LOAD CHARACTER IN R2
016036  104413  000002                  DATACLK,        2               ;2 TICKS TO SET UP TRANSMITTER
016042  104413  000001          1$:     DATACLK,        1               ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
016046  106002                          RORB    R2                      ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
016050  103005                          BCC     2$                      ;BR IF CARRY CLEAR
016052  004737  027754                  JSR     PC,GETSI                ;GET THE WINDOW
016056  103406                          BCS     3$                      ;BR IF BIT IS A MARK
016060  104006                          ERROR   6                       ;ERROR BIT WAS A SPACE
016062  000404                          BR      3$                      ;CONTINE WITH TEST
016064  004737  027754          2$:     JSR     PC,GETSI                ;GET THE WINDOW
016070  103001                          BCC     3$                      ;BR IF BIT IS A SPACE
016072  104006                          ERROR   6                       ;ERROR BIT WAS A MARK
016074                          3$:
016074  005203                          INC     R3                      ;NEXT BIT
016076  022703  000010                  CMP     #10,R3                  ;DONE YET?
016102  001357                          BNE     1$                      ;BR IF NO
016104  104413  000014                  DATACLK,        14              ;CLOCK TRANSMITTER 14 MORE TICKS
016110  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016112  021264                          021264                          ;PORT4+LU-13
016114  032761  000040  000004          BIT     #BIT5,4(R1)             ;RTS SHOULD BE CLEAR NOW
016122  001401                          BEQ     4$                      ;BR IF YES
016124  104034                          ERROR   34                      ;ERROR, RTS NOT CLEAR
016126                          4$:


                                        ;*************************** TEST 20 ******************************
                                        ;*DDCMP TRANSMITTER TEST
                                        ;*SINGLE CLOCK THE CHARACTER 125
                                        ;*VERIFY EACH BIT POSITION AS IT
                                        ;*PASSES THE BIT WINDOW (SI BIT)
                                        ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
                                        ;;*****************************************************************

                                        ;  TEST 20
                                        ;--------------
                                ;;*****************************************************************
016126  000004                  TST20:  SCOPE
016130  012737  000020  001202          MOV     #20,$TSTNM                      ; LOAD THE NO. OF THIS TEST
016136  012737  016310  001442          MOV     #TST21,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
016144  104410                          MSTCLR                          ;MASTER CLEAR KMC11
016146  012711  004000                  MOV     #BIT11,(R1)             ;SET LINE UNIT LOOP
016152  004737  030140                  JSR     PC,OUTRDY               ;WAIT FOR OUT-READY
016156  012761  000001  000004          MOV     #1,4(R1)                ;SET BIT0 IN PORT4
016164  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016166  122111                          122111                          ;SET SOM!
016170  012705  000125                  MOV     #125,R5 ;LOAD CHARACTER IN R5 FOR TYPEOUT
016174  004737  030140                  JSR     PC,OUTRDY               ;WAIT FOR OUT-READY
016200  010561  000004                  MOV     R5,4(R1)                ;LOAD PORT4 WITH CHARACTER
016204  104412                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016206  122110                          122110                          ;LOAD OUT DATA
016210  004737  030006                  JSR     PC,OCOR                 ;WAIT FOR OCOR TO SET
```

```
016214  005003                          CLR     R3                  ;CLEAR BIT COUNTER
016216  010502                          MOV     R5,R2               ;LOAD CHARACTER IN R2
016220  104413  000002                  DATACLK,        2           ;2 TICKS TO SET UP TRANSMITTER
016224  104413  000001          1$:     DATACLK,        1           ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
016230  106002                          RORB    R2                  ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
016232  103005                          BCC     2$                  ;BR IF CARRY CLEAR
016234  004737  027754                  JSR     PC,GETSI            ;GET THE WINDOW
016240  103406                          BCS     3$                  ;BR IF BIT IS A MARK
016242  104006                          ERROR   6                   ;ERROR BIT WAS A SPACE
016244  000404                          BR      3$                  ;CONTINE WITH TEST
016246  004737  027754          2$:     JSR     PC,GETSI            ;GET THE WINDOW
016252  103001                          BCC     3$                  ;BR IF BIT IS A SPACE
016254  104006                          ERROR   6                   ;ERROR BIT WAS A MARK
016256                          3$:
016256  005203                          INC     R3                  ;NEXT BIT
016260  022703  000010                  CMP     #10,R3              ;DONE YET?
016264  001357                          BNE     1$                  ;BR IF NO
016266  104413  000014                  DATACLK,        14          ;CLOCK TRANSMITTER 14 MORE TICKS
016272  104412                          ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016274  021264                          021264                      ;PORT4+LU-13
C16276  032761  000040  000004          BIT     #BIT5,4(R1)         ;RTS SHOULD BE CLEAR NOW
016304  001401                          BEQ     4$                  ;BR IF YES
016306  104034                          ERROR   34                  ;ERROR, RTS NOT CLEAR
016310                          4$:


                                        ;*************************** TEST 21 *************************
                                        ;*DDCMP TRANSMITTER TEST
                                        ;*SINGLE CLOCK THE CHARACTER 252
                                        ;*VERIFY EACH BIT POSITION AS IT
                                        ;*PASSES THE BIT WINDOW (SI BIT)
                                        ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
                                        ;;*************************************************************

                                        ;  TEST 21
                                        ;--------------
                                ;;*************************************************************
016310  000004                  TST21:  SCOPE
016312  012737  000021  001202          MOV     #21,$TSTNM                ; LOAD THE NO. OF THIS TEST
016320  012737  016472  001442          MOV     #TST22,NEXT               ; POINT TO THE START OF NEXT TEST.
                                                                    ;R1 CONTAINS BASE KMC11 ADDRESS
016326  104410                          MSTCLR                      ;MASTER CLEAR KMC11
016330  012711  004000                  MOV     #BIT11,(R1)         ;SET LINE UNIT LOOP
016334  004737  030140                  JSR     PC,OUTRDY           ;WAIT FOR OUT-READY
016340  012761  000001  000004          MOV     #1,4(R1)            ;SET BIT0 IN PORT4
016346  104412                          ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016350  122111                          122111                      ;SET SOM!
016352  012705  000252                  MOV     #252,R5 ;LOAD CHARACTER IN R5 FOR TYPEOUT
016356  004737  030140                  JSR     PC,OUTRDY           ;WAIT FOR OUT-READY
016362  010561  000004                  MOV     R5,4(R1)            ;LOAD PORT4 WITH CHARACTER
016366  104412                          ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016370  122110                          122110                      ;LOAD OUT DATA
016372  004737  030006                  JSR     PC,OCOR             ;WAIT FOR OCOR TO SET
016376  005003                          CLR     R3                  ;CLEAR BIT COUNTER
016400  010502                          MOV     R5,R2               ;LOAD CHARACTER IN R2
016402  104413  000002                  DATACLK,        2           ;2 TICKS TO SET UP TRANSMITTER
```

```
016406  104413  000001            1$:     DATACLK,        1           ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
016412  106002                            RORB    R2                  ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
016414  103005                            BCC     2$                  ;BR IF CARRY CLEAR
016416  004737  027754                    JSR     PC,GETSI            ;GET THE WINDOW
016422  103406                            BCS     3$                  ;BR IF BIT IS A MARK
016424  104006                            ERROR   6                   ;ERROR BIT WAS A SPACE
016426  000404                            BR      3$                  ;CONTINE WITH TEST
016430  004737  027754            2$:     JSR     PC,GETSI            ;GET THE WINDOW
016434  103001                            BCC     3$                  ;BR IF BIT IS A SPACE
016436  104006                            ERROR   6                   ;ERROR BIT WAS A MARK
016440                            3$:
016440  005203                            INC     R3                  ;NEXT BIT
016442  022703  000010                    CMP     #10,R3              ;DONE YET?
016446  001357                            BNE     1$                  ;BR IF NO
016450  104413  000014                    DATACLK,        14          ;CLOCK TRANSMITTER 14 MORE TICKS
016454  104412                            ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016456  021264                            021264                      ;PORT4+LU-13
016460  032761  000040  000004            BIT     #BIT5,4(R1)         ;RTS SHOULD BE CLEAR NOW
016466  001401                            BEQ     4$                  ;BR IF YES
016470  104034                            ERROR   34                  ;ERROR, RTS NOT CLEAR
016472                            4$:


                                          ;*************************** TEST 22 ***************************
                                          ;*DDCMP TRANSMITTER TEST
                                          ;*SINGLE CLOCK THE CHARACTER 377
                                          ;*VERIFY EACH BIT POSITION AS IT
                                          ;*PASSES THE BIT WINDOW (SI BIT)
                                          ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
                                          ;;*************************************************************

                                          ;  TEST 22
                                          ;--------------

                                  ;;*************************************************************
016472  000004                    TST22:  SCOPE
016474  012737  000022  001202            MOV     #22,$TSTNM                  ; LOAD THE NO. OF THIS TEST
016502  012737  016654  001442            MOV     #TST23,NEXT                 ; POINT TO THE START OF NEXT TEST.
                                                                      ;R1 CONTAINS BASE KMC11 ADDRESS
016510  104410                            MSTCLR                      ;MASTER CLEAR KMC11
016512  012711  004000                    MOV     #BIT11,(R1)         ;SET LINE UNIT LOOP
016516  004737  030140                    JSR     PC,OUTRDY           ;WAIT FOR OUT-READY
016522  012761  000001  000004            MOV     #1,4(R1)            ;SET BIT0 IN PORT4
016530  104412                            ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016532  122111                            122111                      ;SET SOM!
016534  012705  000377                    MOV     #377,R5 ;LOAD CHARACTER IN R5 FOR TYPEOUT
016540  004737  030140                    JSR     PC,OUTRDY           ;WAIT FOR OUT-READY
016544  010561  000004                    MOV     R5,4(R1)            ;LOAD PORT4 WITH CHARACTER
016550  104412                            ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016552  122110                            122110                      ;LOAD OUT DATA
016554  004737  030006                    JSR     PC,OCOR             ;WAIT FOR OCOR TO SET
016560  005003                            CLR     R3                  ;CLEAR BIT COUNTER
016562  010502                            MOV     R5,R2               ;LOAD CHARACTER IN R2
016564  104413  000002                    DATACLK,        2           ;2 TICKS TO SET UP TRANSMITTER
016570  104413  000001            1$:     DATACLK,        1           ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
016574  106002                            RORB    R2                  ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
016576  103005                            BCC     2$                  ;BR IF CARRY CLEAR
```

```
016600  004737  027754                  JSR     PC,GETSI        ;GET THE WINDOW
016604  103406                          BCS     3$              ;BR IF BIT IS A MARK
016606  104006                          ERROR   6               ;ERROR BIT WAS A SPACE
016610  000404                          BR      3$              ;CONTINE WITH TEST
016612  004737  027754          2$:     JSR     PC,GETSI        ;GET THE WINDOW
016616  103001                          BCC     3$              ;BR IF BIT IS A SPACE
016620  104006                          ERROR   6               ;ERROR BIT WAS A MARK
016622                          3$:
016622  005203                          INC     R3              ;NEXT BIT
016624  022703  000010                  CMP     #10,R3          ;DONE YET?
016630  001357                          BNE     1$              ;BR IF NO
016632  104413  000014                  DATACLK,        14      ;CLOCK TRANSMITTER 14 MORE TICKS
016636  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016640  021264                          021264                  ;PORT4+LU-13
016642  032761  000040  000004          BIT     #BIT5,4(R1)     ;RTS SHOULD BE CLEAR NOW
016650  001401                          BEQ     4$              ;BR IF YES
016652  104034                          ERROR   34              ;ERROR, RTS NOT CLEAR
016654                          4$:


                                        ;*************************** TEST 23 ***************************
                                        ;*DDCMP TRANSMITTER TEST
                                        ;*SINGLE CLOCK A BINARY COUNT PATTERN
                                        ;*VERIFY EACH BIT POSITION AS IT
                                        ;*PASSES THE BIT WINDOW (SI BIT)
                                        ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
                                        ;*AND R5 CONTAINS THE CHARACTER THAT FAILED
                                        ;;**************************************************************

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

                                ;;************************************************************
016654  000004                  TST23:  SCOPE
016656  012737  000023  001202          MOV     #23,$TSTNM              ; LOAD THE NO. OF THIS TEST
016664  012737  017062  001442          MOV     #TST24,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
016672  104410                          MSTCLR                  ;MASTER CLEAR KMC11
016674  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
016700  005003                          CLR     R3              ;R3 CONTAINS BIT COUNT
016702  005004                          CLR     R4              ;R4 CONTAINS CHAR TO BE LOADED IN SILO
016704  005005                          CLR     R5              ;R5 CONTAINS CHARACTER CURRENTLY BEING SHIFTED OUT
016706  004737  030140                  JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
016712  012761  000001  000004          MOV     #1,4(R1)        ;SET BIT0 IN PORT4
016720  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016722  122111                          122111                  ;SET SOM!
016724  004737  030140                  JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
016730  010461  000004                  MOV     R4,4(R1)        ;LOAD PORT4 WITH CHARACTER
016734  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016736  122110                          122110                  ;LOAD OUT DATA
016740  005204                          INC     R4              ;INCREMENT TO NEXT CHARACTER
016742  004737  030140                  JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
016746  010461  000004                  MOV     R4,4(R1)        ;LOAD PORT4 WITH CHARACTER
016752  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016754  122110                          122110                  ;LOAD OUT DATA
016756  004737  030006                  JSR     PC,OCOR         ;WAIT FOR OCOR TO SET
016762  104413  000002                  DATACLK,        2       ;2 TICKS TO SET UP TRANSMITTER
```

```
016766  005003                          4$:     CLR     R3                      ;CLEAR BIT COUNTER
016770  010502                                  MOV     R5,R2                   ;LOAD CHARACTER IN R2
016772  104413  000001                  1$:     DATACLK,        1               ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
016776  106002                                  RORB    R2                      ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
017000  103005                                  BCC     2$                      ;BR IF CARRY CLEAR
017002  004737  027754                          JSR     PC,GETSI                ;GET THE WINDOW
017006  103406                                  BCS     3$                      ;BR IF BIT IS A MARK
017010  104006                                  ERROR   6                       ;ERROR BIT WAS A SPACE
017012  000404                                  BR      3$                      ;CONTINE WITH TEST
017014  004737  027754                  2$:     JSR     PC,GETSI                ;GET THE WINDOW
017020  103001                                  BCC     3$                      ;BR IF BIT IS A SPACE
017022  104006                                  ERROR   6                       ;ERROR BIT WAS A MARK
017024                                  3$:
017024  005203                                  INC     R3                      ;NEXT BIT
017026  022703  000010                          CMP     #10,R3                  ;DONE YET?
017032  001357                                  BNE     1$                      ;BR IF NO
017034  005204                                  INC     R4                      ;NEXT CHARACTER
017036  004737  030140                          JSR     PC,OUTRDY               ;WAIT FOR OUT-READY
017042  010461  000004                          MOV     R4,4(R1)                ;LOAD PORT4 WITH CHARACTER
017046  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017050  122110                                  122110                          ;LOAD OUT DATA
017052  005205                                  INC     R5                      ;NEXT CHARACTER
017054  022705  000400                          CMP     #400,R5                 ;DONE YET?
017060  001342                                  BNE     4$                      ;BR IF NO
017062                                  5$:



                                                ;*************************** TEST 24 ***************************
                                                ;*DDCMP STRIP SYNC TEST
                                                ;*SET LU LOOP, SINGLE STEP 5 SYNCS
                                                ;*VERIFY THAT IN ACTIVE DOES NOT SET
                                                ;;*************************************************************

                                                ;  TEST 24
                                                ;---------------
                                        ;;*************************************************************
017062  000004                          TST24:  SCOPE
017064  012737  000024  001202                  MOV     #24,$TSTNM                      ; LOAD THE NO. OF THIS TEST
017072  012737  017150  001442                  MOV     #TST25,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
017100  104410                                  MSTCLR                  ;MASTER CLEAR KMC11
017102  012711  004000                          MOV     #BIT11,(R1)     ;SET LU LOOP
017106  012702  000012                          MOV     #12,R2          ;SAVE LU REG FOR TYPEOUT
017112  004737  030024                          JSR     PC,SYNC         ;SINGLE CLOCK 5 SYNC CHARACTERS
017116  000005                                  5
017120  104413  000054                          DATACLK,        54
017124  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017126  021244                                  021244                  ;PORT4+LU12
017130  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
017134  042704  000277                          BIC     #277,R4         ;CLEAR UNWANTED BITS
017140  005005                                  CLR     R5              ;PUT "EXPECTED" IN R5
017142  120504                                  CMPB    R5,R4           ;IS ACTIVE CLEAR?
017144  001401                                  BEQ     1$              ;BR IF YES
017146  104040                                  ERROR   40              ;ERROR ACTIVE IS NOT CLEAR
017150                                  1$:
```

```

                                                 ;************************** TEST 25 **************************
                                                 ;*DDCMP IN ACTIVE TEST
                                                 ;*SET LU LOOP, SINGLE STEP 5 SYNCS AND A NON-SYNC (301)
                                                 ;*VERIFY THAT IN ACTIVE IS SET
                                                 ;;***********************************************************

                                                 ;  TEST 25
                                                 ;--------------
                                         ;;*************************************************************
017150  000004                           TST25:  SCOPE
017152  012737  000025  001202                   MOV     #25,$TSTNM               ; LOAD THE NO. OF THIS TEST
017160  012737  017240  001442                   MOV     #TST26,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
017166  104410                                   MSTCLR                   ;MASTER CLEAR KMC11
017170  012711  004000                           MOV     #BIT11,(R1)      ;SET LU LOOP
017174  012702  000012                           MOV     #12,R2           ;SAVE LU REG FOR TYPEOUT
017200  004737  030024                           JSR     PC,SYNC          ;SINGLE CLOCK 5 SYNC CHARACTERS
017204  000005                                   5
017206  104413  000064                           DATACLK,        64
017212  104412                                   ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017214  021244                                   021244                   ;PORT4+LU12
017216  016104  000004                           MOV     4(R1),R4         ;PUT "FOUND" IN R4
017222  042704  000277                           BIC     #277,R4          ;CLEAR UNWANTED BITS
017226  012705  000100                           MOV     #BIT6,R5            ;PUT "EXPECTED" IN R5
017232  120504                                   CMPB    R5,R4            ;IS ACTIVE SET?
017234  001401                                   BEQ     1$               ;BR IF YES
017236  104040                                   ERROR   40               ;ERROR ACTIVE IS NOT SET
017240                                   1$:


                                                 ;************************** TEST 26 **************************
                                                 ;*DDCMP IN ACTIVE TEST
                                                 ;*SET LU LOOP, SINGLE STEP 1 SYNC AND A NON-SYNC (301)
                                                 ;*VERIFY THAT IN ACTIVE DOES NOT SET
                                                 ;;***********************************************************

                                                 ;  TEST 26
                                                 ;--------------
                                         ;;*************************************************************
017240  000004                           TST26:  SCOPE
017242  012737  000026  001202                   MOV     #26,$TSTNM               ; LOAD THE NO. OF THIS TEST
017250  012737  017326  001442                   MOV     #TST27,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
017256  104410                                   MSTCLR                   ;MASTER CLEAR KMC11
017260  012711  004000                           MOV     #BIT11,(R1)      ;SET LU LOOP
017264  012702  000012                           MOV     #12,R2           ;SAVE LU REG FOR TYPEOUT
017270  004737  030024                           JSR     PC,SYNC          ;SINGLE CLOCK 1 SYNC CHARACTERS
017274  000001                                   1
017276  104413  000024                           DATACLK,        24
017302  104412                                   ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017304  021244                                   021244                   ;PORT4+LU12
017306  016104  000004                           MOV     4(R1),R4         ;PUT "FOUND" IN R4
017312  042704  000277                           BIC     #277,R4          ;CLEAR UNWANTED BITS
017316  005005                                   CLR     R5               ;PUT "EXPECTED" IN R5
017320  120504                                   CMPB    R5,R4            ;IS ACTIVE CLEAR?
```

```
017322  001401                                  BEQ     1$                      ;BR IF YES
017324  104040                                  ERROR   40                      ;ERROR ACTIVE IS NOT CLEAR
017326                                  1$:


                                                ;************************** TEST 27 **************************
                                                ;*DDCMP IN ACTIVE TEST
                                                ;*SET LU LOOP, SINGLE STEP 2 SYNCS AND A NON-SYNC (301)
                                                ;*VERIFY THAT IN ACTIVE IS SET
                                                ;:***********************************************************

                                                ;  TEST 27
                                                ;--------------

                                        ;;**************************************************************
017326  000004                          TST27:  SCOPE
017330  012737  000027  001202                  MOV     #27,$TSTNM                      ; LOAD THE NO. OF THIS TEST
017336  012737  017416  001442                  MOV     #TST30,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
017344  104410                                  MSTCLR                  ;MASTER CLEAR KMC11
017346  012711  004000                          MOV     #BIT11,(R1)     ;SET LU LOOP
017352  012702  000012                          MOV     #12,R2          ;SAVE LU REG FOR TYPEOUT
017356  004737  030024                          JSR     PC,SYNC         ;SINGLE CLOCK 2 SYNC CHARACTERS
017362  000002                                  2
017364  104413  000034                          DATACLK,        34
017370  104412                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017372  021244                                  021244                  ;PORT4+LU12
017374  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
017400  042704  000277                          BIC     #277,R4         ;CLEAR UNWANTED BITS
017404  012705  000100                          MOV     #BIT6,R5                ;PUT "EXPECTED" IN R5
017410  120504                                  CMPB    R5,R4           ;IS ACTIVE SET?
017412  001401                                  BEQ     1$              ;BR IF YES
017414  104040                                  ERROR   40              ;ERROR ACTIVE IS NOT SET
017416                                  1$:


                                                ;************************** TEST 30 **************************
                                                ;*IN CLEAR TEST
                                                ;*SYNC UP RECEIVER AND TRANSMIT A CHARACTER
                                                ;*WAIT FOR IN RDY, THEN SET IN CLEAR
                                                ;*VERIFY THAT IN ACTIVE AND IN RDY ARE CLEARED
                                                ;:***********************************************************

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

                                        ;;**************************************************************
017416  000004                          TST30:  SCOPE
017420  012737  000030  001202                  MOV     #30,$TSTNM                      ; LOAD THE NO. OF THIS TEST
017426  012737  017570  001442                  MOV     #TST31,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
017434  104410                                  MSTCLR                  ;MASTER CLEAR KMC11
017436  012702  000012                          MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
017442  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
017446  004737  030172                          JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
017452  000301                                  301                     ;AND A NON-SYNC  (301)
017454  104413  000053                          DATACLK,        53      ;SINGLE CLOCK THE DATA
017460  104414  000002                          TIMER,  2               ;WAIT FOR INRDY
```

```
017464  104412                                ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017466  021244                                021244                          ;PORT4+LU 12
017470  016104  000004                        MOV     4(R1),R4                ;PUT "FOUND" IN R4
017474  042704  000357                        BIC     #357,R4                 ;CLEAR UNWANTED BITS
017500  012705  000020                        MOV     #BIT4,R5                        ;PUT "EXPECTED" IN R5
017504  120504                                CMPB    R5,R4                   ;IS INRDY SET?
017506  001401                                BEQ     1$
017510  104040                                ERROR   40                      ;ERROR, INRDY IS NOT SET
017512                                1$:
017512  012761  000200  000004                MOV     #BIT7,4(R1)             ;LOAD PORT4
017520  104412                                ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017522  122112                                122112                          ;SET IN CLEAR
017524  104412                                ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017526  021244                                021244                          ;PORT4+LU 12
017530  016104  000004                        MOV     4(R1),R4                ;PUT "FOUND" IN R4
017534  042704  000277                        BIC     #277,R4                 ;CLEAR UNWANTED BITS
017540  005005                                CLR     R5                      ;PUT "EXPECTED" IN R5
017542  120504                                CMPB    R5,R4                   ;IS IN ACTIVE CLEAR?
017544  001401                                BEQ     2$
017546  104040                                ERROR   40                      ;ERROR, IN ACTIVE IS NOT CLEAR
017550                                2$:
017550  016104  000004                        MOV     4(R1),R4                ;PUT "FOUND" IN R4
017554  042704  000357                        BIC     #357,R4                 ;CLEAR UNWANTED BITS
017560  005005                                CLR     R5                      ;PUT "EXPECTED" IN R5
017562  120504                                CMPB    R5,R4                   ;IS INRDY CLEARED?
017564  001401                                BEQ     3$
017566  104040                                ERROR   40                      ;ERROR, INRDY IS NOT CLEARED
017570                                3$:


                                              ;*************************** TEST 31 **************************
                                              ;*DDCMP BASIC RECEICER TEST
                                              ;*SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 0
                                              ;*VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED
                                              ;;**********************************************************

                                              ;  TEST 31
                                              ;--------------

                                      ;;*************************************************************
017570  000004                        TST31:  SCOPE
017572  012737  000031  001202                MOV     #31,$TSTNM                      ; LOAD THE NO. OF THIS TEST
017600  012737  017704  001442                MOV     #TST32,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                              ;R1 CONTAINS BASE KMC11 ADDRESS
017606  104410                                MSTCLR                          ;MASTER CLEAR KMC11
017610  012702  000012                        MOV     #12,R2                  ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
017614  012711  004000                        MOV     #BIT11,(R1)             ;SET LINE UNIT LOOP
017620  004737  030172                        JSR     PC,CHAR                 ;LOAD SILO WITH 3 SYNCS
017624  000000                                0                               ;AND THE CHARACTER 0
017626  104413  000053                        DATACLK,        53              ;SINGLE CLOCK THE DATA
017632  104414  000002                        TIMER,  2                       ;WAIT FOR INRDY
017636  104412                                ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017640  021244                                021244                          ;PORT4+LU 12
017642  016104  000004                        MOV     4(R1),R4                ;PUT "FOUND" IN R4
017646  042704  000357                        BIC     #357,R4                 ;CLEAR UNWANTED BITS
017652  012705  000020                        MOV     #BIT4,R5                        ;PUT "EXPECTED" IN R5
017656  120504                                CMPB    R5,R4                   ;IS INRDY SET?
```

```
017660  001401                                  BEQ     1$
017662  104040                                  ERROR   40                      ;ERROR, INRDY IS NOT SET
017664                                  1$:
017664  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017666  021204                                  021204                          ;PORT4←IN DATA
017670  016104  000004                          MOV     4(R1),R4                ;PUT "FOUND" IN R4
017674  005005                                  CLR     R5                      ;PUT "EXPECTED" IN R5
017676  120504                                  CMPB    R5,R4                   ;WAS A 0 RECEIVED?
017700  001401                                  BEQ     2$
017702  104010                                  ERROR   10                      ;ERROR, RECEIVED DATA IS WRONG
017704                                  2$:


                                                ;*************************** TEST 32 ***************************
                                                ;*DDCMP BASIC RECEICER TEST
                                                ;*SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 125
                                                ;*VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED
                                                ;;**************************************************************

                                                ;  TEST 32
                                                ;--------------

                                        ;;**************************************************************
017704  000004                          TST32:  SCOPE
017706  012737  000032  001202                  MOV     #32,$TSTNM                      ; LOAD THE NO. OF THIS TEST
017714  012737  020022  001442                  MOV     #TST33,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
017722  104410                                  MSTCLR                          ;MASTER CLEAR KMC11
017724  012702  000012                          MOV     #12,R2                  ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
017730  012711  004000                          MOV     #BIT11,(R1)             ;SET LINE UNIT LOOP
017734  004737  030172                          JSR     PC,CHAR                 ;LOAD SILO WITH 3 SYNCS
017740  000125                                  125                             ;AND THE CHARACTER 125
017742  104413  000053                          DATACLK,        53              ;SINGLE CLOCK THE DATA
017746  104414  000002                          TIMER,  2                       ;WAIT FOR INRDY
017752  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
017754  021244                                  021244                          ;PORT4←LU 12
017756  016104  000004                          MOV     4(R1),R4                ;PUT "FOUND" IN R4
017762  042704  000357                          BIC     #357,R4                 ;CLEAR UNWANTED BITS
017766  012705  000020                          MOV     #BIT4,R5                        ;PUT "EXPECTED" IN R5
017772  120504                                  CMPB    R5,R4                   ;IS INRDY SET?
017774  001401                                  BEQ     1$
017776  104040                                  ERROR   40                      ;ERROR, INRDY IS NOT SET
020000                                  1$:
020000  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020002  021204                                  021204                          ;PORT4←IN DATA
020004  016104  000004                          MOV     4(R1),R4                ;PUT "FOUND" IN R4
020010  012705  000125                          MOV     #125,R5                 ;PUT "EXPECTED" IN R5
020014  120504                                  CMPB    R5,R4                   ;WAS A 125 RECEIVED?
020016  001401                                  BEQ     2$
020020  104010                                  ERROR   10                      ;ERROR, RECEIVED DATA IS WRONG
020022                                  2$:


                                                ;*************************** TEST 33 ***************************
                                                ;*DDCMP BASIC RECEICER TEST
                                                ;*SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 252
                                                ;*VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED
```

```
                                                  ;;************************************************************

                                                  ;  TEST 33
                                                  ;--------------
                                          ;;************************************************************
020022  000004                            TST33:  SCOPE
020024  012737  000033  001202                    MOV     #33,$TSTNM              ; LOAD THE NO. OF THIS TEST
020032  012737  020140  001442                    MOV     #TST34,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
020040  104410                                    MSTCLR                  ;MASTER CLEAR KMC11
020042  012702  000012                            MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
020046  012711  004000                            MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
020052  004737  030172                            JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
020056  000252                                    252                     ;AND THE CHARACTER 252
020060  104413  000053                            DATACLK,        53      ;SINGLE CLOCK THE DATA
020064  104414  000002                            TIMER,  2               ;WAIT FOR INRDY
020070  104412                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020072  021244                                    021244                  ;PORT4+LU 12
020074  016104  000004                            MOV     4(R1),R4        ;PUT "FOUND" IN R4
020100  042704  000357                            BIC     #357,R4         ;CLEAR UNWANTED BITS
020104  012705  000020                            MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
020110  120504                                    CMPB    R5,R4           ;IS INRDY SET?
020112  001401                                    BEQ     1$
020114  104040                                    ERROR   40              ;ERROR, INRDY IS NOT SET
020116                                    1$:
020116  104412                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020120  021204                                    021204                  ;PORT4+IN DATA
020122  016104  000004                            MOV     4(R1),R4        ;PUT "FOUND" IN R4
020126  012705  000252                            MOV     #252,R5         ;PUT "EXPECTED" IN R5
020132  120504                                    CMPB    R5,R4           ;WAS A 252 RECEIVED?
020134  001401                                    BEQ     2$
020136  104010                                    ERROR   10              ;ERROR, RECEIVED DATA IS WRONG
020140                                    2$:


                                                  ;************************** TEST 34 **************************
                                                  ;*DDCMP BASIC RECEICER TEST
                                                  ;*SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 377
                                                  ;*VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED
                                                  ;;************************************************************

                                                  ;  TEST 34
                                                  ;--------------
                                          ;;************************************************************
020140  000004                            TST34:  SCOPE
020142  012737  000034  001202                    MOV     #34,$TSTNM              ; LOAD THE NO. OF THIS TEST
020150  012737  020256  001442                    MOV     #TST35,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
020156  104410                                    MSTCLR                  ;MASTER CLEAR KMC11
020160  012702  000012                            MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
020164  012711  004000                            MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
020170  004737  030172                            JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
020174  000377                                    377                     ;AND THE CHARACTER 377
020176  104413  000053                            DATACLK,        53      ;SINGLE CLOCK THE DATA
020202  104414  000002                            TIMER,  2               ;WAIT FOR INRDY
020206  104412                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
020210  021244                              021244                  ;PORT4+LU 12
020212  016104  000004                      MOV     4(R1),R4        ;PUT "FOUND" IN R4
020216  042704  000357                      BIC     #357,R4         ;CLEAR UNWANTED BITS
020222  012705  000020                      MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
020226  120504                              CMPB    R5,R4           ;IS INRDY SET?
020230  001401                              BEQ     1$
020232  104040                              ERROR   40              ;ERROR, INRDY IS NOT SET
020234                              1$:
020234  104412                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020236  021204                              021204                  ;PORT4+IN DATA
020240  016104  000004                      MOV     4(R1),R4        ;PUT "FOUND" IN R4
020244  012705  000377                      MOV     #377,R5         ;PUT "EXPECTED" IN R5
020250  120504                              CMPB    R5,R4           ;WAS A 377 RECEIVED?
020252  001401                              BEQ     2$
020254  104010                              ERROR   10              ;ERROR, RECEIVED DATA IS WRONG
020256                              2$:


                                            ;************************** TEST 35 ***************************
                                            ;*DDCMP DATA TEST
                                            ;*THIS TEST SINGLE STEPS A BINARY COUNT PATTERN
                                            ;*CHECKING EACH CHARACTER AS IT IS RECEIVED
                                            ;;*************************************************************

                                            ;  TEST 35
                                            ;--------------

                                    ;;*****************************************************************
020256  000004                      TST35:  SCOPE
020260  012737  000035  001202              MOV     #35,$TSTNM              ; LOAD THE NO. OF THIS TEST
020266  012737  020406  001442              MOV     #TST36,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                    ;R1 CONTAINS BASE KMC11 ADDRESS
020274  104410                              MSTCLR                  ;MASTEP CLEAR KMC11
020276  005037  030610                      CLR     SCHAR           ;START BINARY COUNT AT ZERO
020302  005037  030612                      CLR     STUFLG          ;CLEAR BITSTUFF FLAG
020306  005002                              CLR     R2              ;R2 IS "EXPECTED" DATA
020310  012703  000073                      MOV     #73,R3          ;R3 IS CHARACTER COUNT
020314  012711  004000                      MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
020320  004737  030350                      JSR     PC,SILOLD       ;LOAD SILO WITH COUNT PATTERN
020324  104413  000043                      DATACLK,        43      ;SYNC RECEIVER AND GET IT ACTIVE
020330  104413  000730              1$:     DATACLK,       730      ;CLOCK IN 73 CHARACTERS
020334  004737  030614              4$:     JSR     PC,INRDY        ;WAIT FOR INRDY
020340  104412                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020342  021204                              021204                  ;PORT4+IN DATA
020344  016104  000004                      MOV     4(R1),R4        ;PUT "FOUND" IN R4
020350  010205                              MOV     R2,R5           ;PUT "EXPECTED" IN R5
020352  120504                              CMPB    R5,R4           ;IS DATA CORRECT?
020354  001401                              BEQ     2$              ;BR IF YES
020356  104010                              ERROR   10              ;DATA ERROR
020360  005202                      2$:     INC     R2              ;NEXT CHARACTER
020362  022702  000400                      CMP     #400,R2         ;ALL DONE?
020366  001407                              BEQ     3$              ;BR IF YES
020370  005303                              DEC     R3              ;DECREMENT CHARACTER COUNT
020372  001360                              BNE     4$              ;BR IF SILO NOT EMPTY
020374  004737  030350                      JSR     PC,SILOLD       ;LOAD SILO WITH MORE OF COUNT PATTERN
020400  012703  000073                      MOV     #73,R3          ;RELOAD CHARACTER COUNT
020404  000751                              BR      1$              ;CONTINUE
```

```
020406                                  3$:



                                                ;************************** TEST 36 ***************************
                                                ;*DDCMP DATA TEST
                                                ;*THIS TEST SINGLE STEPS A BINARY COUNT PATTERN
                                                ;*CHECKING EACH CHARACTER AS IT IS RECEIVED
                                                ;*THIS TEST IS EXACTLY THE SAME AS THE LAST TEST,
                                                ;*EXCEPT LINE UNIT LOOP IS SET IN LU REGISTER 12
                                                ;;**************************************************************

                                                ;  TEST 36
                                                ;--------------
                                        ;;********************************************** ;*******************
020406  000004                          TST36:  SCOPE
020410  012737  000036  001202                  MOV     #36,$TSTNM              ; LOAD THE NO. OF THIS TEST
020416  012737  020546  001442                  MOV     #TST37,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
020424  104410                                  MSTCLR                          ;MASTER CLEAR KMC11
020426  005037  030610                          CLR     SCHAR                   ;START BINARY COUNT AT ZERO
020432  005037  030612                          CLR     STUFLG                  ;CLEAR BITSTUFF FLAG
020436  005002                                  CLR     R2                      ;R2 IS "EXPECTED" DATA
020440  012703  000073                          MOV     #73,R3                  ;R3 IS CHARACTER COUNT
020444  005011                                  CLR     (R1)                    ;CLEAR LU LOOP IN MAINT REG
020446  012761  000040  000004                  MOV     #BITS,4(R1)             ;LOAD PORT4
020454  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020456  122112                                  122112                          ;SET LU LOOP IN LU REG 12
020460  004737  030350                          JSR     PC,SILOLD               ;LOAD SILO WITH COUNT PATTERN
020464  104413  000043                          DATACLK,        43              ;SYNC RECEIVER AND GET IT ACTIVE
020470  104413  000730                  1$:     DATACLK,        730             ;CLOCK IN 73 CHARACTERS
020474  004737  030614                  4$:     JSR     PC,INRDY                ;WAIT FOR INRDY
020500  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020502  021204                                  021204                          ;PORT4+IN DATA
020504  016104  000004                          MOV     4(R1),R4                ;PUT "FOUND" IN R4
020510  010205                                  MOV     R2,R5                   ;PUT "EXPECTED" IN R5
020512  120504                                  CMPB    R5,R4                   ;IS DATA CORRECT?
020514  001401                                  BEQ     2$                      ;BR IF YES
020516  104010                                  ERROR   10                      ;DATA ERROR
020520  005202                          2$:     INC     R2                      ;NEXT CHARACTER
020522  022702  000400                          CMP     #400,R2                 ;ALL DONE?
020526  001407                                  BEQ     3$                      ;BR IF YES
020530  005303                                  DEC     R3                      ;DECREMENT CHARACTER COUNT
020532  001360                                  BNE     4$                      ;BR IF SILO NOT EMPTY
020534  004737  030350                          JSR     PC,SILOLD               ;LOAD SILO WITH MORE OF COUNT PATTERN
020540  012703  000073                          MOV     #73,R3                  ;RELOAD CHARACTER COUNT
020544  000751                                  BR      1$                      ;CONTINUE
020546                                  3$:


                                                ;************************** TEST 37 ***************************
                                                ;*TRANSMITTER MARK TEST
                                                ;*SINGLE CLOCK 3 SYNCS AND A 301 AND 20 EXTRA
                                                ;*CLOCK TICKS, VERIFY THAT A 301, A 377 AND A 377
                                                ;*WERE RECEIVED INDICATING THAT THE TRANSMITTER WENT
                                                ;*TO A MARK STATE FOR 16 BITS WHEN OUT SILO WAS EMPTY
                                                ;;**************************************************************
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                                               ;  TEST 37
                                               ;--------------
                                      ;;*****************************************************************
      020546  000004                  TST37:   SCOPE
      020550  012737  000037  001202           MOV     #37,$TSTNM              ; LOAD THE NO. OF THIS TEST
      020556  012737  020706  001442           MOV     #TST40,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                       ;R1 CONTAINS BASE KMC11 ADDRESS
      020564  104410                           MSTCLR                  ;MASTER CLEAR KMC11
      020566  012711  004000                   MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
      020572  004737  030172                   JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
      020576  000301                           301                     ;AND A 301
      020600  104413  000073                   DATACLK,        73      ;CLOCK THE 301 IN AND 20 EXTRA TICKS
      020604  004737  030614                   JSR     PC,INRDY        ;WAIT FOR INRDY
      020610  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
      020612  021204                           021204                  ;PORT4+IN DATA
      020614  016104  000004                   MOV     4(R1),R4        ;PUT "FOUND" IN R4
      020620  012705  000301                   MOV     #301,R5         ;PUT "EXPECTED" IN R5
      020624  120504                           CMPB    R5,R4           ;WAS A 301 RECEIVED?
      020626  001401                           BEQ     1$
      020630  104010                           ERROR   10              ;ERROR FIRST CHARACTER INCORRECT
      020632  004737  030614          1$:      JSR     PC,INRDY        ;WAIT FOR INRDY
      020636  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
      020640  021204                           021204                  ;PORT4+IN DATA
      020642  016104  000004                   MOV     4(R1),R4        ;PUT "FOUND" IN R4
      020646  012705  000377                   MOV     #377,R5         ;PUT "EXPECTED" IN R5
      020652  120504                           CMPB    R5,R4           ;WAS A 377 RECEIVED?
      020654  001401                           BEQ     2$
      020656  104010                           ERROR   10              ;ERROR, 377 WAS NOT RECEIVED
      020660  004737  030614          2$:      JSR     PC,INRDY        ;WAIT FOR INRDY
      020664  104412                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
      020666  021204                           021204                  ;PORT4+IN DATA
      020670  016104  000004                   MOV     4(R1),R4        ;PUT "FOUND" IN R4
      020674  012705  000377                   MOV     #377,R5         ;PUT "EXPECTED" IN R5
      020700  120504                           CMPB    R5,R4           ;WAS A 377 RECEIVED?
      020702  001401                           BEQ     3$
      020704  104010                           ERROR   10              ;ERROR, 177 WAS NOT RECEIVED
      020706                          3$:



                                               ;**************************** TEST 40 **************************
                                               ;*CABLE TURNAROUND TEST
                                               ;*CLEAR LINE UNIT LOOP, SET DTR
                                               ;*VERIFY THAT RING AND MODEM READY ARE SET
                                               ;*CLEAR DTR, VERIFY THAT RING AND MRDY ARE CLEARED
                                               ;;*************************************************************


                                               ;  TEST 40
                                               ;--------------
                                      ;;*****************************************************************
      020706  000004                  TST40:   SCOPE
      020710  012737  000040  001202           MOV     #40,$TSTNM              ; LOAD THE NO. OF THIS TEST
      020716  012737  021104  001442           MOV     #TST41,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                       ;R1 CONTAINS BASE KMC11 ADDRESS
      020724  104410                           MSTCLR                  ;MASTER CLEAR KMC11
      020726  032737  020000  002050           BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
```

```
020734  001004                            BNE     .+12            ;BR IF YES (DO TEST EVEN IF NO LOOP-BACK CONN)
020736  032737  040000  002050            BIT     #BIT14,STAT1    ;IS TURNAROUND CONNECTOR ON?
020744  001457                            BEQ     2$              ;SKIP TEST IF NO
020746  005011                            CLR     (R1)            ;CLEAR LINE UNIT LOOP
020750  012761  000100  000004            MOV     #100,4(R1)      ;LOAD PORT4
020756  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020760  122113                            122113                  ;SET DTR
020762  104414  000002                    TIMER,  2               ;WAIT
020766  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020770  021264                            021264                  ;PORT4+LU13
020772  016104  000004                    MOV     4(R1),R4        ;PUT "FOUND" IN R4
020776  042704  000023                    BIC     #23,R4          ;CLEAR UNWANTED BITS
021002  012705  000310                    MOV     #310,R5         ;PUT "EXPECTED" IN R5
021006  032737  020000  002050            BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
021014  001402                            BEQ     .+6             ;BR IF NO
021016  042705  000200                    BIC     #BIT7,R5        ;NO RING ON M8202
021022  120504                            CMPB    R5,R4           ;ARE RING AND MRDY SET?
021024  001401                            BEQ     1$
021026  104011                            ERROR   11              ;ERROR, RING OR MRDY NOT SET
021030  005061  000004            1$:     CLR     4(R1)           ;CLEAR PORT4
021034  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021036  122113                            122113                  ;CLEAR DTR
021040  104414  000002                    TIMER,  2
021044  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021046  021264                            021264                  ;PORT4+LU13
021050  016104  000004                    MOV     4(R1),R4        ;PUT "FOUND" IN R4
021054  042704  000023                    BIC     #23,R4          ;CLEAR UNWANTED BITS
021060  005005                            CLR     R5              ;PUT "EXPECTED" IN R5
021062  032737  020000  002050            BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
021070  001402                            BEQ     .+6             ;BR IF NO
021072  052705  000010                    BIS     #BIT3,R5        ;MRDY SET ON M8202
021076  120504                            CMPB    R5,R4           ;ARE RING AND MRDY CLEAR?
021100  001401                            BEQ     2$
021102  104011                            ERROR   11              ;ERROR, RING OR MRDY NOT CLEAR
021104                            2$:


                                          ;************************** TEST 41 **************************
                                          ;*CABLE TURNAROUND TEST
                                          ;*CLEAR LINE UNIT LOOP, LOAD OUT DATA SILO
                                          ;*VERIFY THAT ALL MODEM SIGNALS ARE SET
                                          ;;*************************************************************

                                          ;  TEST 41
                                          ;--------------

                                  ;;************************************************************************
021104  000004                    TST41:  SCOPE
021106  012737  000041  001202            MOV     #41,$TSTNM              ; LOAD THE NO. OF THIS TEST
021114  012737  021264  001442            MOV     #TST42,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                  ;R1 CONTAINS BASE KMC11 ADDRESS
021122  104410                            MSTCLR                  ;MASTER CLEAR KMC11
021124  032737  020000  002050            BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
021132  001004                            BNE     .+12            ;BR IF YES (DO TEST EVEN IF NO LOOP-BACK CONN)
021134  032737  040000  002050            BIT     #BIT14,STAT1    ;IS TURNAROUND CONNECTOR ON?
021142  001450                            BEQ     1$              ;SKIP TEST IF NO
021144  012711  004000                    MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
```

```
021150  012761  000100  000004              MOV     #100,   4(R1)           ;LOAD PORT4
021156  104412                              ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021160  122113                              122113                          ;CLEAR ALL MODEM SIGNALS,EXCEPT DTR
021162  104414  000002                      TIMER,  2                       ;WAIT
021166  012761  000001  000004              MOV     #1,4(R1)                ;LOAD PORT4
021174  104412                              ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021176  122111                              122111                          ;SET SOM
021200  004537  031256                      JSR     R5,MESLD                ;FILL OUT DATA SILO
021204  031540                              MESDAT                          ;WITH 64 CHARACTERS
021206  000100                              64.
021210  012700  000050                      MOV     #50,R0                  ;PREPARE FOR DELAY
021214  005011                              CLR     (R1)                    ;CLEAR LINE UNIT LOOP
021216                              2$:
021216  104412                              ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021220  021264                              021264                          ;PORT4+LU13
021222  016104  000004                      MOV     4(R1),R4                ;PUT "FOUND" IN R4
021226  042704  000023                      BIC     #23,R4                  ;CLEAR UNWANTED BITS
021232  012705  000354                      MOV     #354,R5                 ;PUT "EXPECTED" IN R5
021236  032737  020000  002050              BIT     #BIT13,STAT1            ;IS LINE UNIT M8202?
021244  001402                              BEQ     .+6                     ;BR IF NO
021246  042705  000200                      BIC     #BIT7,R5                ;NO RING ON M8202
021252  120504                              CMPB    R5,R4                   ;COMPARE EXPECTED AND FOUND
021254  001403                              BEQ     1$                      ;BR IF OK
021256  005300                              DEC     R0                      ;DEC DELAY COUNT
021260  001356                              BNE     2$                      ;BR IF NOT ZERO
021262  104011                              ERROR   11                      ;ERROR, ALL SIGNALS ARE NOT SET
021264                              1$:



                                            ;************************** TEST 42 **************************
                                            ;*TEST OF CRC OPERATION
                                            ;*USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
                                            ;*0, VERIFY THE LSB OF THE BCC ON EACH SHIFT
                                            ;*TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
                                            ;:************************************************************


                                            ;  TEST 42
                                            ;--------------

                                    ;;************************************************************
021264  000004                      TST42:  SCOPE
021266  012737  000042  001202              MOV     #42,$TSTNM                      ; LOAD THE NO. OF THIS TEST
021274  012737  021600  001442              MOV     #TST43,NEXT                     ; POINT TO THE START OF NEXT TEST.
021302  012737  021316  001444              MOV     #64$,LOCK                       ; ADDRESS FOR LOCK ON DATA.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
021310  104410                              MSTCLR                          ;MASTER CLEAR KMC11
021312  012711  004000                      MOV     #BIT11,(R1)             ;SET LU LOOP
021316  004737  031320              64$:    JSR     PC,CLRIO                ;CLEAR BCC REGISTERS
021322  005000                              CLR     R0                      ;START SHIFT COUNTER AT ZERO
021324  012737  120001  030754              MOV     #CRC16,XPOLY            ;LOAD POLYNOMIAL FOR SOFTWARE BCC
021332  012737  000000  021372              MOV     #0,66$                  ;LOAD CHAR FOR SOFTWARE BCC
021340  005037  021374                      CLR     67$                     ;CLEAR OLD SOFTWARE BCC
021344  004737  030760                      JSR     PC,BCCLD                ;LOAD OUT SILO WITH 2 SYNCS
021350  000000                              0                               ;AND THE CHARACTER 0
021352  104413  000021                      DATACLK,        21              ;GET TRANSMITTER ACTIVE
021356  104413  000001              65$:    DATACLK,        1               ;SHIFT BCC ONCE
021362  005200                              INC     R0                      ;BUMP SHIFT COUNT
```

```
021364  004537  030650                   JSR     R5,SIMBCC         ;CALCULATE SOFTWARE BCC LSB
021370  000001                           1                         ;ONE SHIFT
021372  000000                   66$:    0                         ;DATA CHARACTER
021374  000000                   67$:    0                         ;OLD BCC
021376  103405                           BCS     68$               ;BR IF SOFT BCC LSB IS SET
021400  004737  031072                   JSR     PC,GETQ0          ;GET HARDWARE TRANSMITTER BCC LSB
021404  103006                           BCC     69$               ;BR IF HARD BCC LSB IS CLEAR
021406  104012                           ERROR   12                ;ERROR, BCC LSB IS SET
021410  000404                           BR      69$               ;CONTINLE
021412  004737  031072           68$:    JSR     PC,GETQ0          ;GET HARDWARE TRANSMITTER BCC LSB
021416  103401                           BCS     69$               ;BR IF HARD BCC LSB IS SET
021420  104016                           ERROR   16                ;ERROR, HARD BCC LSB IS CLEAR
021422                           69$:
021422  006037  021372                   ROR     66$               ;SHIFT SOFT DATA
021426  013737  030756  021374           MOV     CALBCC,67$        ;LOAD OLD SOFT BCC
021434  022700  000010                   CMP     #10,R0            ;DONE YET?
021440  001346                           BNE     65$               ;BR IF NOT DONE
021442  104405                           SCOP1                     ;SCOPE SUBTEST (SW09=1)
021444  012737  021452  001444           MOV     #71$,LOCK         ;NEW SCOPE1
021452  004737  031320           71$:    JSR     PC,CLRIO          ;CLEAR BCC REGISTERS
021456  005000                           CLR     R0                ;START SHIFT COUNTER AT ZERO
021460  012737  120001  030754           MOV     #CRC16,XPOLY      ;LOAD POLYNOMIAL FOR SOFTWARE BCC
021466  012737  000000  021526           MOV     #0,73$            ;LOAD CHAR FOR SOFTWARE BCC
021474  005037  021530                   CLR     74$               ;CLEAR OLD SOFTWARE BCC
021500  004737  030760                   JSR     PC,BCCLD          ;LOAD OUT SILO WITH 2 SYNCS
021504  000000                           0                         ;AND THE CHARACTER 0
021506  104413  000032                   DATACLK,        32        ;GET RECEIVER ACTIVE
021512  104413  000001           72$:    DATACLK,        1         ;SHIFT BCC ONCE
021516  005200                           INC     R0                ;BUMP SHIFT COUNT
021520  004537  030650                   JSR     R5,SIMBCC         ;CALCULATE SOFTWARE BCC LSB
021524  000001                           1                         ;ONE SHIFT
021526  000000                   73$:    0                         ;DATA CHARACTER
021530  000000                   74$:    0                         ;OLD BCC
021532  103405                           BCS     75$               ;BR IF SOFT BCC LSB IS SET
021534  004737  031104                   JSP     PC,GETQI          ;GET HARDWARE RECEIVER BCC LSB
021540  103006                           BCC     76$               ;BR IF HARD BCC LSB IS CLEAR
021542  104013                           ERROR   13                ;ERROR, BCC LSB IS SET
021544  000404                           BR      76$               ;CONTINUE
021546  004737  031104           75$:    JSR     PC,GETQI          ;GET HARDWARE RECEIVER BCC LSB
021552  103401                           BCS     76$               ;BR IF HARD BCC LSB IS SET
021554  104017                           ERROR   17                ;ERROR, BCC LSB IS CLEAR
021556                           76$:
021556  006037  021526                   ROR     73$               ;SHIFT SOFT DATA
021562  013737  030756  021530           MOV     CAL3CC,74$        ;LOAD OLD SOFT BCC
021570  022700  000010                   CMP     #10,R0            ;DONE YET?
021574  001346                           BNE     72$               ;BR IF NOT DONE
021576  104405                           SCOP1                     ;SCOPE SUBTEST (SW09=1)
021600                           77$:



                                         ;**************************** TEST 43 ****************************
                                         ;*TEST OF CRC OPERATION
                                         ;*USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
                                         ;*377, VERIFY THE LSB OF THE BCC ON EACH SHIFT
                                         ;*TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
                                         ;;*****************************************************************
```

```

                                          ;  TEST 43
                                          ;---------------
                                   ;;********************************************************
021600  000004                     TST43:  SCOPE
021602  012737  000043  001202             MOV     #43,$TSTNM            ; LOAD THE NO. OF THIS TEST
021610  012737  022114  001442             MOV     #TST44,NEXT           ; POINT TO THE START OF NEXT TEST.
021616  012737  021632  001444             MOV     #64$,LOCK             ; ADDRESS FOR LOCK ON DATA.
                                                                  ;R1 CONTAINS BASE KMC11 ADDRESS
021624  104410                             MSTCLR                 ;MASTER CLEAR KMC11
021626  012711  004000                     MOV     #BIT11,(R1)    ;SET LU LOOP
021632  004737  031320             64$:    JSR     PC,CLRIO       ;CLEAR BCC REGISTERS
021636  005000                             CLR     R0             ;START SHIFT COUNTER AT ZERO
021640  012737  120001  030754             MOV     #CRC16,XPOLY   ;LOAD POLYNOMIAL FOR SOFTWARE BCC
021646  012737  000377  021706             MOV     #377,66$;      ;LOAD CHAR FOR SOFTWARE BCC
021654  005037  021710                     CLR     67$            ;CLEAR OLD SOFTWARE BCC
021660  004737  030760                     JSR     PC,BCCLD       ;LOAD OUT SILO WITH 2 SYNCS
021664  000377                             377                    ;AND THE CHARACTER 377
021666  104413  000021                     DATACLK,        21     ;GET TRANSMITTER ACTIVE
021672  104413  000001             65$:    DATACLK,        1      ;SHIFT BCC ONCE
021676  005200                             INC     R0             ;BUMP SHIFT COUNT
021700  004537  030650                     JSR     R5,SIMBCC      ;CALCULATE SOFTWARE BCC LSB
021704  000001                             1                      ;ONE SHIFT
021706  000000                     66$:    0                      ;DATA CHARACTER
021710  000000                     67$:    0                      ;OLD BCC
021712  103405                             BCS     68$            ;BR IF SOFT BCC LSB IS SET
021714  004737  031072                     JSR     PC,GETQO       ;GET HARDWARE TRANSMITTER BCC LSB
021720  103006                             BCC     69$            ;BR IF HARD BCC LSB IS CLEAR
021722  104012                             ERROR   12             ;ERROR, BCC LSB IS SET
021724  000404                             BR      69$            ;CONTINUE
021726  004737  031072             68$:    JSR     PC,GETQO       ;GET HARDWARE TRANSMITTER BCC LSB
021732  103401                             BCS     69$            ;BR IF HARD BCC LSB IS SET
021734  104016                             ERROR   16             ;ERROR, HARD BCC LSB IS CLEAR
021736                             69$:
021736  006037  021706                     ROR     66$            ;SHIFT SOFT DATA
021742  013737  030756  021710             MOV     CALBCC,67$     ;LOAD OLD SOFT BCC
021750  022700  000010                     CMP     #10,R0         ;DONE YET?
021754  001346                             BNE     65$            ;BR IF NOT DONE
021756  104405                             SCOP1                  ;SCOPE SUBTEST (SW09=1)
021760  012737  021766  001444             MOV     #71$,LOCK      ;NEW SCOPE1
021766  004737  031320             71$:    JSR     PC,CLRIO       ;CLEAR BCC REGISTERS
021772  005000                             CLR     R0             ;START SHIFT COUNTER AT ZERO
021774  012737  120001  030754             MOV     #CRC16,XPOLY   ;LOAD POLYNOMIAL FOR SOFTWARE BCC
022002  012737  000377  022042             MOV     #377,73$;      ;LOAD CHAR FOR SOFTWARE BCC
022010  005037  022044                     CLR     74$            ;CLEAR OLD SOFTWARE BCC
022014  004737  030760                     JSR     PC,BCCLD       ;LOAD OUT SILO WITH 2 SYNCS
022020  000377                             377                    ;AND THE CHARACTER 377
022022  104413  000032                     DATACLK,         32    ;GET RECEIVER ACTIVE
022026  104413  000001             72$:    DATACLK,         1     ;SHIFT BCC ONCE
022032  005200                             INC     R0             ;BUMP SHIFT COUNT
022034  004537  030650                     JSR     R5,SIMBCC      ;CALCULATE SOFTWARE BCC LSB
022040  000001                             1                      ;ONE SHIFT
022042  000000                     73$:    0                      ;DATA CHARACTER
022044  000000                     74$:    0                      ;OLD BCC
022046  103405                             BCS     75$            ;BR IF SOFT BCC LSB IS SET
022050  004737  031104                     JSR     PC,GETQI       ;GET HARDWARE RECEIVER BCC LSB
```

```
022054  103006                          BCC     76$             ;BR IF HARD BCC LSB IS CLEAR
022056  104013                          ERROR   13              ;ERROR, BCC LSB IS SET
022060  000404                          BR      76$             ;CONTINUE
022062  004737  031104          75$:    JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
022066  103401                          BCS     76$             ;BR IF HARD BCC LSB IS SET
022070  104017                          ERROR   17              ;ERROR, BCC LSB IS CLEAR
022072                          76$:
022072  006037  022042                  ROR     73$             ;SHIFT SOFT DATA
022076  013737  030756  022044          MOV     CALBCC,74$      ;LOAD OLD SOFT BCC
022104  022700  000010                  CMP     #10,R0          ;DONE YET?
022110  001346                          BNE     72$             ;BR IF NOT DONE
022112  104405                          SCOP1                   ;SCOPE SUBTEST (SW09=1)
022114                          77$:


                                        ;************************** TEST 44 **************************
                                        ;*TEST OF CRC OPERATION
                                        ;*USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
                                        ;*125, VERIFY THE LSB OF THE BCC ON EACH SHIFT
                                        ;*TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
                                        ;;*************************************************************

                                        ;  TEST 44
                                        ;--------------
                                ;;***********************************************************
022114  000004                  TST44:  SCOPE
022116  012737  000044  001202          MOV     #44,$TSTNM              ; LOAD THE NO. OF THIS TEST
022124  012737  022430  001442          MOV     #TST45,NEXT             ; POINT TO THE START OF NEXT TEST.
022132  012737  022146  001444          MOV     #64$,LOCK               ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
022140  104410                          MSTCLR                  ;MASTER CLEAR KMC11
022142  012711  004000                  MOV     #BIT11,(R1)     ;SET LU LOOP
022146  004737  031320          64$:    JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
022152  005000                          CLR     R0              ;START SHIFT COUNTER AT ZERO
022154  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
022162  012737  000125  022222          MOV     #125,66$;       ;LOAD CHAR FOR SOFTWARE BCC
022170  005037  022224                  CLR     67$             ;CLEAR OLD SOFTWARE BCC
022174  004737  030760                  JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
022200  000125                          125                     ;AND THE CHARACTER 125
022202  104413  000021                  DATACLK,        21      ;GET TRANSMITTER ACTIVE
022206  104413  000001          65$:    DATACLK,        1       ;SHIFT BCC ONCE
022212  005200                          INC     R0              ;BUMP SHIFT COUNT
022214  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
022220  000001                          1                       ;ONE SHIFT
022222  000000                  66$:    0                       ;DATA CHARACTER
022224  000000                  67$:    0                       ;OLD BCC
022226  103405                          BCS     68$             ;BR IF SOFT BCC LSB IS SET
022230  004737  031072                  JSR     PC,GETQO        ;GET HARDWARE TRANSMITTER BCC LSB
022234  103006                          BCC     69$             ;BR IF HARD BCC LSB IS CLEAR
022236  104012                          ERROR   12              ;ERROR, BCC LSB IS SET
022240  000404                          BR      69$             ;CONTINUE
022242  004737  031072          68$:    JSR     PC,GETQO        ;GET HARDWARE TRANSMITTER BCC LSB
022246  103401                          BCS     69$             ;BR IF HARD BCC LSB IS SET
022250  104016                          ERROR   16              ;ERROR, HARD BCC LSB IS CLEAR
022252                          69$:
022252  006037  022222                  ROR     66$             ;SHIFT SOFT DATA
```

```
022256  013737  030756  022224          MOV     CALBCC,67$      ;LOAD OLD SOFT BCC
022264  022700  000010                  CMP     #10,R0          ;DONE YET?
022270  001346                          BNE     65$             ;BR IF NOT DONE
022272  104405                          SCOP1                   ;SCOPE SUBTEST (SW09=1)
022274  012737  022302  001444          MOV     #71$,LOCK       ;NEW SCOPE1
022302  004737  031320          71$:    JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
022306  005000                          CLR     R0              ;START SHIFT COUNTER AT ZERO
022310  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
022316  012737  000125  022356          MOV     #125,73$;       ;LOAD CHAR FOR SOFTWARE BCC
022324  005037  022360                  CLR     74$             ;CLEAR OLD SOFTWARE BCC
022330  004737  030760                  JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
022334  000125                          125                     ;AND THE CHARACTER 125
022336  104413  000032                  DATACLK,        32      ;GET RECEIVER ACTIVE
022342  104413  000001          72$:    DATACLK,        1       ;SHIFT BCC ONCE
022346  005200                          INC     R0              ;BUMP SHIFT COUNT
022350  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
022354  000001                          1                       ;ONE SHIFT
022356  000000                  73$:    0                       ;DATA CHARACTER
022360  000000                  74$:    0                       ;OLD BCC
022362  103405                          BCS     75$             ;BR IF SOFT BCC LSB IS SET
022364  004737  031104                  JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
022370  103006                          BCC     76$             ;BR IF HARD BCC LSB IS CLEAR
022372  104013                          ERROR   13              ;ERROR, BCC LSB IS SET
022374  000404                          BR      76$             ;CONTINUE
022376  004737  031104          75$:    JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
022402  103401                          BCS     76$             ;BR IF HARD BCC LSB IS SET
022404  104017                          ERROR   17              ;ERROR, BCC LSB IS CLEAR
022406                          76$:
022406  006037  022356                  ROR     73$             ;SHIFT SOFT DATA
022412  013737  030756  022360          MOV     CALBCC,74$      ;LOAD OLD SOFT BCC
022420  022700  000010                  CMP     #10,R0          ;DONE YET?
022424  001346                          BNE     72$             ;BR IF NOT DONE
022426  104405                          SCOP1                   ;SCOPE SUBTEST (SW09=1)
022430                          77$:



                                        ;*************************** TEST 45 ***************************
                                        ;*TEST OF CRC OPERATION
                                        ;*USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
                                        ;*252, VERIFY THE LSB OF THE BCC ON EACH SHIFT
                                        ;*TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
                                        ;;*************************************************************

                                        ;  TEST 45
                                        ;--------------
                                ;;***********************************************************************
022430  000004                  TST45:  SCOPE
022432  012737  000045  001202          MOV     #45,$TSTNM              ; LOAD THE NO. OF THIS TEST
022440  012737  022744  001442          MOV     #TST46,NEXT             ; POINT TO THE START OF NEXT TEST.
022446  012737  022462  001444          MOV     #64$,LOCK               ; ADDRESS FOR LOCK ON DATA.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
022454  104410                          MSTCLR                  ;MASTER CLEAR KMC11
022456  012711  004000                  MOV     #BIT11,(R1)     ;SET LU LOOP
022462  004737  031320          64$:    JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
022466  005000                          CLR     R0              ;START SHIFT COUNTER AT ZERO
022470  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
```

```
022476  012737  000252  022536          MOV     #252,66$;           ;LOAD CHAR FOR SOFTWARE BCC
022504  005037  022540                  CLR     67$                 ;CLEAR OLD SOFTWARE BCC
022510  004737  030760                  JSR     PC,BCCLD            ;LOAD OUT SILO WITH 2 SYNCS
022514  000252                          252                         ;AND THE CHARACTER 252
022516  104413  000021                  DATACLK,         21         ;GET TRANSMITTER ACTIVE
022522  104413  000001          65$:    DATACLK,         1          ;SHIFT BCC ONCE
022526  005200                          INC     R0                  ;BUMP SHIFT COUNT
022530  004537  030650                  JSR     R5,SIMBCC           ;CALCULATE SOFTWARE BCC LSB
022534  000001                          1                           ;ONE SHIFT
022536  000000                  66$:    0                           ;DATA CHARACTER
022540  000000                  67$:    0                           ;OLD BCC
022542  103405                          BCS     68$                 ;BR IF SOFT BCC LSB IS SET
022544  004737  031072                  JSR     PC,GETQ0            ;GET HARDWARE TRANSMITTER BCC LSB
022550  103006                          BCC     69$                 ;BR IF HARD BCC LSB IS CLEAR
022552  104012                          ERROR   12                  ;ERROR, BCC LSB IS SET
022554  000404                          BR      69$                 ;CONTINUE
022556  004737  031072          68$:    JSR     PC,GETQ0            ;GET HARDWARE TRANSMITTER BCC LSB
022562  103401                          BCS     69$                 ;BR IF HARD BCC LSB IS SET
022564  104016                          ERROR   16                  ;ERROR, HARD BCC LSB IS CLEAR
022566                          69$:
022566  006037  022536                  ROR     66$                 ;SHIFT SOFT DATA
022572  013737  030756  022540          MOV     CALBCC,67$          ;LOAD OLD SOFT BCC
022600  022700  000010                  CMP     #10,R0              ;DONE YET?
022604  001346                          BNE     65$                 ;BR IF NOT DONE
022606  104405                          SCOP1                       ;SCOPE SUBTEST (SW09=1)
022610  012737  022616  001444          MOV     #71$,LOCK           ;NEW SCOPE1
022616  004737  031320          71$:    JSR     PC,CLRIO            ;CLEAR BCC REGISTERS
022622  005000                          CLR     R0                  ;START SHIFT COUNTER AT ZERO
022624  012737  120001  030754          MOV     #CRC16,XPOLY        ;LOAD POLYNOMIAL FOR SOFTWARE BCC
022632  012737  000252  022672          MOV     #252,73$;           ;LOAD CHAR FOR SOFTWARE BCC
022640  005037  022674                  CLR     74$                 ;CLEAR OLD SOFTWARE BCC
022644  004737  030760                  JSR     PC,BCCLD            ;LOAD OUT SILO WITH 2 SYNCS
022650  000252                          252                         ;AND THE CHARACTER 252
022652  104413  000032                  DATACLK,         32         ;GET RECEIVER ACTIVE
022656  104413  000001          72$:    DATACLK,         1          ;SHIFT BCC ONCE
022662  005200                          INC     R0                  ;BUMP SHIFT COUNT
022664  004537  030650                  JSR     R5,SIMBCC           ;CALCULATE SOFTWARE BCC LSB
022670  000001                          1                           ;ONE SHIFT
022672  000000                  73$:    0                           ;DATA CHARACTER
022674  000000                  74$:    0                           ;OLD BCC
022676  103405                          BCS     75$                 ;BR IF SOFT BCC LSB IS SET
022700  004737  031104                  JSR     PC,GETQ1            ;GET HARDWARE RECEIVER BCC LSB
022704  103006                          BCC     76$                 ;BR IF HARD BCC LSB IS CLEAR
022706  104013                          ERROR   13                  ;ERROR, BCC LSB IS SET
022710  000404                          BR      76$                 ;CONTINUE
022712  004737  031104          75$:    JSR     PC,GETQ1            ;GET HARDWARE RECEIVER BCC LSB
022716  103401                          BCS     76$                 ;BR IF HARD BCC LSB IS SET
022720  104017                          ERROR   17                  ;ERROR, BCC LSB IS CLEAR
022722                          76$:
022722  006037  022672                  ROR     73$                 ;SHIFT SOFT DATA
022726  013737  030756  022674          MOV     CALBCC,74$          ;LOAD OLD SOFT BCC
022734  022700  000010                  CMP     #10,R0              ;DONE YET?
022740  001346                          BNE     72$                 ;BR IF NOT DONE
022742  104405                          SCOP1                       ;SCOPE SUBTEST (SW09=1)
022744                          77$:
```

```

                                        ;************************** TEST 46 ***************************
                                        ;*TRANSMITTER CRC TEST
                                        ;*USING THE CRC16 POLYNOMINAL, SINGLE CLOCK A BINARY
                                        ;*COUNT PATTERN, VERIFY THE LSB OF THE TRANSMITTER BCC ON EACH SHIFT
                                        ;:*************************************************************

                                        ;  TEST 46
                                        ;---------------
                                ;;***********************************************************
022744  000004                  TST46:  SCOPE
022746  012737  000046  001202          MOV     #46,$TSTNM                  ; LOAD THE NO. OF THIS TEST
022754  012737  023202  001442          MOV     #TST47,NEXT                 ; POINT TO THE START OF NEXT TEST.
                                                                  ;R1 CONTAINS BASE KMC11 ADDRESS
022762  104410                          MSTCLR                    ;MASTER CLEAR KMC11
022764  012711  004000                  MOV     #BIT11,(R1)       ;SET LINE UNIT LOOP
022770  005003                          CLR     R3                ;ZERO BIT COUNT
022772  005004                          CLR     R4                ;R4 CONTAINS CHAR TO BE LOADED IN SILO
022774  005005                          CLR     R5                ;R5 CONTAINS CHAR CURRENTLY BEING SHIFTED OUT
022776  005037  023100                  CLR     4$                ;CLEAR SOFT BCC
023002  012737  120001  030754          MOV     #CRC16,XPOLY      ;LOAD POLYNOMINAL
023010  004737  031122                  JSR     PC,SYNLD          ;LOAD SILO WITH 2 SYNCS, SOM SET
023014  010461  000004                  MOV     R4,4(R1)          ;PORT4+CHAR
023020  104412                          ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023022  122110                          122110                    ;LOAD OUT DATA
023024  005204                          INC     R4                ;INCREMENT TO NEXT CHARACTER
023026  010461  000004                  MOV     R4,4(R1)          ;PORT4+CHAR
023032  104412                          ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023034  122110                          122110                    ;LOAD OUT DATA
023036  005204                          INC     R4                ;INCREMENT TO NEXT CHARACTER
023040  010461  000004                  MOV     R4,4(R1)          ;PORT4+CHAR
023044  104412                          ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023046  122110                          122110                    ;LOAD OUT DATA
023050  004737  030006                  JSR     PC,OCOR           ;WAIT FOR OCOR
023054  104413  000021                  DATACLK,21                ;CLOCK DATA
023060  010537  023076          1$:     MOV     R5,3$             ;LOAD CHAR FOR SOFT CRC
023064  104413  000001          2$:     DATACLK,1                 ;SHIFT BCC ONCE
023070  004537  030650                  JSR     R5,SIMBCC         ;CALCULATE SOFT BCC
023074  000001                          1                         ;SOFT SHIFT COUNT
023076  000000                  3$:     0                         ;SOFT CHARACTER
023100  000000                  4$:     0                         ;OLD SOFT BCC
023102  103405                          BCS     5$                ;BR IF SOFT BCC LSB IS SET
023104  004737  031072                  JSR     PC,GETQO                  ;GET HARDWARE TRANSMITTER BCC LSB
023110  103006                          BCC     6$                ;BR IF OK (CLEARED)
023112  104020                          ERROR   20                ;ERROR, BCC LSB WAS SET
023114  000404                          BR      6$                ;CONTINUE WITH TEST
023116  004737  031072          5$:     JSR     PC,GETQO                  ;GET HARDWARE TRANSMITTER BCC LSB
023122  103401                          BCS     6$                ;BR IF OK (SET)
023124  104021                          ERROR   21                ;ERROR, BCC LSB WAS CLEAR

023126                          6$:
023126  006037  023076                  ROR     3$                ;SHIFT SOFT DATA
023132  013737  030756  023100          MOV     CALBCC,4$         ;LOAD OLD SOFT BCC
023140  005203                          INC     R3                ;INCREMENT BIT COUNTER
023142  022703  000010                  CMP     #10,R3            ;DONE A FULL CHARACTER YET?
023146  001346                          BNE     2$                ;BR IF NO
```

```
023150  005003                          CLR     R3              ;RESTART BIT COUNTER
023152  005204                          INC     R4              ;INCREMENT DATA FOR SILO
023154  022704  000400                  CMP     #400,R4         ;DONE BINARY COUNT YET?
023160  003404                          BLE     9$              ;BR IF YES
023162  010461  000004                  MOV     R4,4(R1)        ;PORT4←DATA
023166  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023170  122110                          122110                  ;LOAD OUT DATA
023172  005205                  9$:     INC     R5              ;INCREMENT DATA
023174  022705  000400                  CMP     #400,R5         ;DONE BINARY PATTERN YET?
023200  001327                          BNE     1$              ;BR IF NO
023202                          7$:


                                        ;************************** TEST 47 **************************
                                        ;*RECEIVER CRC TEST
                                        ;*USING THE CRC16 POLYNOMINAL, SINGLE CLOCK A BINARY
                                        ;*COUNT PATTERN, VERIFY THE LSB OF THE RECEIVER BCC ON EACH SHIFT
                                        ;;************************************************************

                                        ;  TEST 47
                                        ;--------------
                                ;;*************************************************************
023202  000004                  TST47:  SCOPE
023204  012737  000047  001202          MOV     #47,$TSTNM                      ; LOAD THE NO. OF THIS TEST
023212  012737  023440  001442          MOV     #TST50,NEXT                     ; POINT TO THE START OF NEXT TEST.
                                                                ;R1 CONTAINS BASE KMC11 ADDRESS
023220  104410                          MSTCLR                  ;MASTER CLEAR KMC11
023222  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
023226  005003                          CLR     R3              ;ZERO BIT COUNT
023230  005004                          CLR     R4              ;R4 CONTAINS CHAR TO BE LOADED IN SILO
023232  005005                          CLR     R5              ;R5 CONTAINS CHAR CURRENTLY BEING SHIFTED OUT
023234  005037  023336                  CLR     4$              ;CLEAR SOFT BCC
023240  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMINAL
023246  004737  031122                  JSR     PC,SYNLD        ;LOAD SILO WITH 2 SYNCS, SOM SET
023252  010461  000004                  MOV     R4,4(R1)        ;PORT4←CHAR
023256  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023260  122110                          122110                  ;LOAD OUT DATA
023262  005204                          INC     R4              ;INCREMENT TO NEXT CHARACTER
023264  010461  000004                  MOV     R4,4(R1)        ;PORT4←CHAR
023270  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023272  122110                          122110                  ;LOAD OUT DATA
023274  005204                          INC     R4              ;INCREMENT TO NEXT CHARACTER
023276  010461  000004                  MOV     R4,4(R1)        ;PORT4←CHAR
023302  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023304  122110                          122110                  ;LOAD OUT DATA
023306  004737  030006                  JSR     PC,OCOR         ;WAIT FOR OCOR
023312  104413  000032                  DATACLK,32              ;CLOCK DATA
023316  010537  023334          1$:     MOV     R5,3$           ;LOAD CHAR FOR SOFT CRC
023322  104413  000001          2$:     DATACLK,1               ;SHIFT BCC ONCE
023326  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
023332  000001                          1                       ;SOFT SHIFT COUNT
023334  000000                  3$:     0                       ;SOFT CHARACTER
023336  000000                  4$:     0                       ;OLD SOFT BCC
023340  103405                          BCS     5$              ;BR IF SOFT BCC LSB IS SET
023342  004737  031104                  JSR     PC,GETQI                ;GET HARDWARE RECEIVER BCC LSB
023346  103006                          BCC     6$              ;BR IF OK (CLEARED)
```

```
023350  104022                                  ERROR   22                      ;ERROR, BCC LSB WAS SET
023352  000404                                  BR      6$                      ;CONTINUE WITH TEST
023354  004737  031104                  5$:     JSR     PC,GETQI                        ;GET HARCWARE RECEIVER BCC LSB
023360  103401                                  BCS     6$                      ;BR IF OK (SET)
023362  104023                                  ERROR   23                      ;ERROR, BCC LSB WAS CLEAR

023364                                  6$:
023364  006037  023334                          ROR     3$                      ;SHIFT SOFT DATA
023370  013737  030756  023336                  MOV     CALBCC,4$               ;LOAD OLD SOFT BCC
023376  005203                                  INC     R3                      ;INCREMENT BIT COUNTER
023400  022703  000010                          CMP     #10,R3                  ;DONE A FULL CHARACTER YET?
023404  001346                                  BNE     2$                      ;BR IF NO
023406  005003                                  CLR     R3                      ;RESTART BIT COUNTER
023410  005204                                  INC     R4                      ;INCREMENT DATA FOR SILO
023412  022704  000400                          CMP     #400,R4                 ;DONE BINARY COUNT YET?
023416  003404                                  BLE     9$                      ;BR IF YES
023420  010461  000004                          MOV     R4,4(R1)                ;PORT4+DATA
023424  104412                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023426  122110                                  122110                          ;LOAD OUT DATA
023430  005205                          9$:     INC     R5                      ;INCREMENT DATA
023432  022705  000400                          CMP     #400,R5                 ;DONE BINARY PATTERN YET?
023436  001327                                  BNE     1$                      ;BR IF NO
023440                                  7$:



                                                ;:**************************** TEST 50 ****************************
                                                ;:*TRANSMITTER DOCMP CRC TEST
                                                ;:*THIS TEST TRANSMITS A FOUR CHARACTER MESSAGE WITH CRC
                                                ;:*BOTH DATA AND THE BCC ARE VERIFIED IN THE BIT
                                                ;:*WINDOW. THE FOUR CHARACTERS ARE 0,125,252,377
                                                ;:*THE TRANSMITTER IS CHECKED FOR GOING TO A MARK STATE AFTER THE BCC
                                                ;:****************************************************************

                                                ;  TEST 50
                                                ;--------------
                                        ;:****************************************************************
023440  000004                          TST50:  SCOPE
023442  012737  000050  001202                  MOV     #50,$TSTNM              ; LOAD THE NO. OF THIS TEST
023450  012737  023772  001442                  MOV     #TST51,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                        ;R1 CONTAINS BASE KMC11 ADDRESS
023456  104410                                  MSTCLR                  ;MASTER CLEAR KMC11

                                                ;LOAD OUT DATA SILO

023460  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
023464  012704  031540                          MOV     #MESDAT,R4      ;LOAD POINTER TO DATA
023470  005037  023564                          CLR     10$             ;CLEAR SOFT BCC
023474  012700  000004                          MOV     #4,R0           ;LOAD CHARACTER COUNT
023500  004737  031122                          JSR     PC,SYNLD        ;LOAD 2 SYNCS IN OUT SILO
023504  004737  030140                          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
023510  004537  031256                          JSR     R5,MESLD        ;LOAD SILO WITH 4 CHAR MESS
023514  031540                                  MESDAT                  ;ADDRESS OF MESSAGE
023516  000004                                  4                       ;NUMBER OF CHARACTERS
023520  004737  031232                          JSR     PC,EOM          ;LOAD GARBAGE CHARACTER, WITH EOM SET
023524  004737  030006                          JSR     PC,OCOR         ;WAIT FOR OCOR
023530  005003                                  CLR     R3              ;CLEAR BIT COUNTER
```

```
023532  104413  000022                  DATACLK,22              ;CLOCK DATA
023536  112405                  12$:    MOVB    (R4)+,R5        ;LOAD R5 WITH CHAR
023540  010502                          MOV     R5,R2           ;LOAD R2 WITH CHAR

                                        ;CHECK FIRST FOUR CHARACTER MESSAGE
                                        ;IN THE BIT WINDOW (0,125,252,377)

023542  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
023550  010537  023562                  MOV     R5,67$          ;LOAD SOFT CHAR FOR BCC
023554  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
023560  000010                          10                      ;SHIFT COUNT
023562  000000                  67$:    0                       ;CHARACTER
023564  000000                  10$:    0                       ;OLD BCC
023566  013737  030756  023564          MOV     CALBCC,10$      ;LOAD SOFT BCC FOR NEXT SHIFT
023574  104413  000001          64$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
023600  106002                          RORB    R2              ;SHIFT SOFT DATA
023602  103005                          BCC     65$             ;BR IF A SPACE
023604  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
023610  103406                          BCS     66$             ;BR IF OK (MARK)
023612  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A SPACE
023614  000404                          BR      66$             ;CONTINUE
023616  004737  027754          65$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
023622  103001                          BCC     66$             ;BR IF OK (SPACE)
023624  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A MARK
023626                          66$:
023626  005203                          INC     R3              ;BUMP BIT COUNTER
023630  022703  000010                  CMP     #10,R3          ;DONE FULL 8 BITS YET
023634  001357                          BNE     64$             ;BR IF N)
023636  005003                          CLR     R3              ;CLEAR B'T COUNTER
023640  005300                          DEC     R0              ;DEC CHARACTER COUNT
023642  001335                          BNE     12$             ;BR IF NOT DONE YET

                                        ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW

023644  013700  030756                  MOV     CALBCC,R0       ;PUT BCC IN R0
023650  104413  000001          68$:    DATACLK,1               ;SHIFT HARDWARE BCC
023654  006000                          ROR     R0              ;SHIFT SOFT BCC
023656  103005                          BCC     69$             ;BR IF CARRY CLEAR
023660  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
023664  103406                          BCS     70$             ;BR IF OK (MARK)
023666  104014                          ERROR   14              ;ERROR, CRC WRONG (SPACE)
023670  000404                          BR      70$             ;CONTINUE
023672  004737  027754          69$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
023676  103001                          BCC     70$             ;BR IF OK (SPACE)
023700  104014                          ERROR   14              ;ERROR, CRC WRONG (MARK)
023702                          70$:
023702  005203                          INC     R3              ;BUMP BIT COUNTER
023704  022703  000020                  CMP     #20,R3          ;FINISHED BCC YET?
023710  001357                          BNE     68$             ;BR IF NO
023712  005003                          CLR     R3              ;CLEAR BIT COUNTER

                                        ;CHECK TO SEE IF TRANSMITTER IS MARKING

023714  104413  000001          2$:     DATACLK,        1       ;CLOCK TRANSMITTER
023720  004737  027754                  JSR     PC,GETSI        ;LOOK AT WINDOW
023724  103401                          BCS     3$              ;IT SHOULD BE MARKING
```

```
023726  104024                           ERROR   24                  ;ERROR, BIT HAS A SPACE
023730  005203                  3$:      INC     R3                  ;BUMP BIT COUNTER
023732  022703  000007                   CMP     #7,R3               ;DONE YET
023736  001366                           BNE     2$                  ;BR IF NO
023740  104413  000010                   DATACLK,         10         ;GIVE ENOUGH TICKS TO CLEAR OUT ACTIVE
023744  005003                           CLR     R3                  ;CLEAR BIT COUNTER
023746  104413  000001          4$:      DATACLK,          1         ;SHIFT OUT NEXT BIT
023752  004737  027754                   JSR     PC,GETSI            ;LOOK AT BIT WINDOW
023756  103401                           BCS     .+4                 ;BR IF IT IS A MARK
023760  104024                           ERROR   24                  ;ERROR, TRANSMITTER IS NOT MARKING
023762  005203                           INC     R3                  ;INC BIT COUNT
023764  022703  000020                   CMP     #20,R3              ;DONE YET?
023770  001366                           BNE     4$                  ;BR IF NO
023772                          5$:


                                         ;*************************** TEST 51 ****************************
                                         ;*RECEIVER DDCMP CRC TEST
                                         ;*THIS TEST CLOCKS A FOUR CHARACTER MESSAGE WITH BCC
                                         ;*AND VERIFYS CORRECT DATA RECEPTION AND BCC MATCH
                                         ;*THE FOUR CHARACTER MESSAGE IS 0,125,252,377
                                         ;;*************************************************************

                                         ;  TEST 51
                                         ;--------------

                                ;;*************************************************************
023772  000004                  TST51:   SCOPE
023774  012737  000051  001202           MOV     #51,$TSTNM                   ; LOAD THE NO. OF THIS TEST
024002  012737  024174  001442           MOV     #TST52,NEXT                  ; POINT TO THE START OF NEXT TEST.
                                                                     ;R1 CONTAINS BASE KMC11 ADDRESS
024010  104410                           MSTCLR                      ;MASTER CLEAR KMC11
024012  012711  004000                   MOV     #BIT11,(R1)         ;SET LINE UNIT LOOP
024016  012702  031540                   MOV     #MESDAT,R2          ;LOAD POINTER TO DATA
024022  012700  000004                   MOV     #4,R0               ;LOAD CHARACTER COUNT
024026  004737  031122                   JSR     PC,SYNLD            ;LOAD 2 SYNCS IN OUT SILO
024032  004737  030140                   JSR     PC,OUTRDY           ;WAIT FOR OUTRDY
024036  004537  031256                   JSR     R5,MESLD            ;LOAD SILO WITH 4 CHAR MESS
024042  031540                           MESDAT                      ;ADDRESS OF MESSAGE
024044  000004                           4                           ;NUMBER OF CHARACTERS
024046  004737  031232                   JSR     PC,EOM              ;LOAD GARBAGE CHARACTER, WITH EOM SET
024052  004737  030006                   JSR     PC,OCOR             ;WAIT FOR OCOR
024056  104413  000114                   DATACLK,114                 ;CLOCK DATA
024062  004737  030614          3$:      JSR     PC,INRDY            ;WAIT FOR INRDY
024066  104412                           ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024070  021204                           021204                      ;GET IN DATA
024072  016104  000004                   MOV     4(R1),R4            ;PUT "FOUND" IN R4
024076  112205                           MOVB    (R2)+,R5            ;PUT "EXPECTED" IN R5
024100  120504                           CMPB    R5,R4               ;COMPARE RECEIVED DATA
024102  001401                           BEQ     1$                  ;BR IF OK
024104  104010                           ERROR   10                  ;DATA ERROR
024106  005300                  1$:      DEC     R0                  ;DEC CHARACTER COUNT
024110  001364                           BNE     3$                  ;BR IF NOT DONE YET

                                         ;CHECK TO SEE THAT IN BCC MATCH IS SET

024112  004737  030614                   JSR     PC,INRDY            ;WAIT FOR INRDY
```

```
024116  104412                            ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024120  021204                            021204                          ;GET FIRST HALF OF CRC
024122  116137  000004  001302            MOVB    4(R1),$TMP2             ;PUT IN $TMP2
024130  042737  177400  001302            BIC     #177400,$TMP2           ;CLEAR HI BYTE
024136  004737  030614                    JSR     PC,INRDY                ;WAIT FOR INRDY
024142  104412                            ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024144  021244                            021244
024146  016104  000004                    MOV     4(R1),R4                ;PUT "FOUND" IN R4
024152  042704  000376                    BIC     #376,R4                 ;CLEAR UNWANTED BITS
024156  012705  000001                    MOV     #1,R5                   ;PUT "EXPECTED" IN R5
024162  120504                            CMPB    R5,R4                   ;IS IN BCC MATCH SET?
024164  001401                            BEQ     25$
024166  104015                            ERROR   15                      ;IN BCC MATCH ERROR
024170                            25$:
024170  104412                            ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024172  021204                            021204                          ;GET LAST HALF
024174                            2$:


                                          ;*************************** TEST 52 ***************************
                                          ;*DDCMP EOM FUNCTION TEST
                                          ;*THIS TEST LOADS OUT SILO WITH: 2 SYNCS,4 CHAR MESSAGE,EOM
                                          ;*4 CHARACTER MESS,EOM. THE DATA STREAM IS CHECKED TO BE
                                          ;*4 CHAR,BCC,4 CHAR,BCC,MARKS. THIS TEST VERIFYS THAT
                                          ;*THE CHARCTERS LOADED WITH EOM SET ARE LOST
                                          ;*ALL DATA AND BCC'S ARE CHECKED IN THE BIT WINDOW
                                          ;*THE FOUR CHARACTER MESSAGE IS 0,125,252,377
                                          ;*RECEIVED DATA IS VERIFIED, AND IN BCC MATCH IS CHECKED
                                          ;:**************************************************************

                                          ;  TEST 52
                                          ;--------------
                                ;;*************************************************************
024174  000004                  TST52:    SCOPE
024176  012737  000052  001202            MOV     #52,$TSTNM                     ; LOAD THE NO. OF THIS TEST
024204  012737  025274  001442            MOV     #TST53,NEXT                    ; POINT TO THE START OF NEXT TEST.
                                                                          ;R1 CONTAINS BASE KMC11 ADDRESS
024212  104410                            MSTCLR                          ;MASTER CLEAR KMC11

                                          ;LOAD OUT DATA SILO

024214  012711  004000                    MOV     #BIT11,(R1)             ;SET LINE UNIT LOOP
024220  012704  031540                    MOV     #MESDAT,R4              ;LOAD POINTER TO DATA
024224  005037  024334                    CLR     10$                     ;CLEAR SOFT BCC
024230  012700  000004                    MOV     #4,R0                   ;LOAD CHARACTER COUNT
024234  004737  031122                    JSR     PC,SYNLD                ;LOAD 2 SYNCS IN OU  SILO
024240  004737  030140                    JSR     PC,OUTRDY               ;WAIT FOR OUTRDY
024244  004537  031256                    JSR     R5,MESLD                ;LOAD SILO WITH 4 CHAR MESS
024250  031540                            MESDAT                          ;ADDRESS OF MESSAGE
024252  000004                            4                               ;NUMBER OF CHARACTERS
024254  004737  031232                    JSR     PC,EOM                  ;LOAD GARBAGE CHARACTER, WITH EOM SET
024260  004537  031256                    JSR     R5,MESLD                ;LOAD FOUR MORE CHARACTERS
024264  031540                            MESDAT                          ;ADDRESS OF MESSAGE
024266  000004                            4                               ;NUMBER OF CHACTERS
024270  004737  031232                    JSR     PC,EOM                  ;SET EOM
024274  004737  030006                    JSR     PC,OCOR                 ;WAIT FOR OCOR
```

```
024300  005003                          CLR     R3              ;CLEAR BIT COUNTER
024302  104413  000022                  DATACLK,22              ;CLOCK DATA
024306  112405                  12$:    MOVB    (R4)+,R5        ;LOAD R5 WITH CHAR
024310  010502                          MOV     R5,R2           ;LOAD R2 WITH CHAR

                                        ;CHECK FIRST FOUR CHARACTER MESSAGE
                                        ;IN THE BIT WINDOW (0,125,252,377)

024312  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
024320  010537  024332                  MOV     R5,67$          ;LOAD SOFT CHAR FOR BCC
024324  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
024330  000010                          10                      ;SHIFT COUNT
024332  000000                  67$:    0                       ;CHARACTER
024334  000000                  10$:    0                       ;OLD BCC
024336  013737  030756  024334          MOV     CALBCC,10$      ;LOAD SOFT BCC FOR NEXT SHIFT
024344  104413  000001          64$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
024350  106002                          RORB    R2              ;SHIFT SOFT DATA
024352  103005                          BCC     65$             ;BR IF A SPACE
024354  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024360  103406                          BCS     66$             ;BR IF OK (MARK)
024362  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A SPACE
024364  000404                          BR      66$             ;CONTINUE
024366  004737  027754          65$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024372  103001                          BCC     66$             ;BR IF OK (SPACE)
024374  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A MARK
024376                          66$:
024376  005203                          INC     R3              ;BUMP BIT COUNTER
024400  022703  000010                  CMP     #10,R3          ;DONE FULL 8 BITS YET
024404  001357                          BNE     64$             ;BR IF NO
024406  005003                          CLR     R3              ;CLEAR BIT COUNTER
024410  005300                          DEC     R0              ;DEC CHARACTER COUNT
024412  001335                          BNE     12$             ;BR IF NOT DONE YET

                                        ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW

024414  013700  030756                  MOV     CALBCC,R0       ;PUT BCC IN R0
024420  104413  000001          68$:    DATACLK,1               ;SHIFT HARDWARE BCC
024424  006000                          ROR     R0              ;SHIFT SOFT BCC
024426  103005                          BCC     69$             ;BR IF CARRY CLEAR
024430  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024434  103406                          BCS     70$             ;BR IF OK (MARK)
024436  104014                          ERROR   14              ;ERROR, CRC WRONG (SPACE)
024440  000404                          BR      70$             ;CONTINUE
024442  004737  027754          69$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024446  103001                          BCC     70$             ;BR IF OK (SPACE)
024450  104014                          ERROR   14              ;ERROR, CRC WRONG (MARK)
024452                          70$:
024452  005203                          INC     R3              ;BUMP BIT COUNTER
024454  022703  000020                  CMP     #20,R3          ;FINISHED BCC YET?
024460  001357                          BNE     68$             ;BR IF NO
024462  005003                          CLR     R3              ;CLEAR BIT COUNTER
024464  012700  000004                  MOV     #4,R0           ;RESET CHARACTER COUNTER
024470  012704  031540                  MOV     #MESDAT,R4      ;LOAD MESSAGE POINTER
024474  005037  024526                  CLR     11$             ;CLR SOFT BCC
024500  112405                  13$:    MOVB    (R4)+,R5        ;LOAD CHAR IN R5
024502  010502                          MOV     R5,R2           ;LOAD CHAR IN R2
```

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                                                ;CHECK SECOND MESSAGE IN THE BIT WINDOW (0,125,252,377)

024504  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
024512  010537  024524                  MOV     R5,76$          ;LOAD SOFT CHAR FOR BCC
024516  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
024522  000010                          10                      ;SHIFT COUNT
024524  000000                  76$:    0                       ;CHARACTER
024526  000000                  11$:    0                       ;OLD BCC
024530  013737  030756  024526          MOV     CALBCC,11$      ;LOAD SOFT BCC FOR NEXT SHIFT
024536  104413  000001          73$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
024542  106002                          RORB    R2              ;SHIFT SOFT DATA
024544  103005                          BCC     74$             ;BR IF A SPACE
024546  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024552  103406                          BCS     75$             ;BR IF OK (MARK)
024554  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A SPACE
024556  000404                          BR      75$             ;CONTINUE
024560  004737  027754          74$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024564  103001                          BCC     75$             ;BR IF OK (SPACE)
024566  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A MARK
024570                          75$:
024570  005203                          INC     R3              ;BUMP BIT COUNTER
024572  022703  000010                  CMP     #10,R3          ;DONE FULL 8 BITS YET
024576  001357                          BNE     73$             ;BR IF NO
024600  005003                          CLR     R3              ;CLEAR BIT COUNTER
024602  005300                          DEC     R0              ;DEC CHARACTER COUNT
024604  001335                          BNE     13$             ;BR IF NOT DONE YET

                                        ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW

024606  013700  030756                  MOV     CALBCC,R0       ;PUT BCC IN R0
024612  104413  000001          77$:    DATACLK,1               ;SHIFT HARDWARE BCC
024616  006000                          ROR     R0              ;SHIFT SOFT BCC
024620  103005                          BCC     78$             ;BR IF CARRY CLEAR
024622  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024626  103406                          BCS     79$             ;BR IF OK (MARK)
024630  104014                          ERROR   14              ;ERROR, CRC WRONG (SPACE)
024632  000404                          BR      79$             ;CONTINUE
024634  004737  027754          78$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
024640  103001                          BCC     79$             ;BR IF OK (SPACE)
024642  104014                          ERROR   14              ;ERROR, CRC WRONG (MARK)
024644                          79$:
024644  005203                          INC     R3              ;BUMP BIT COUNTER
024646  022703  000020                  CMP     #20,R3          ;FINISHED BCC YET?
024652  001357                          BNE     77$             ;BR IF NO
024654  005003                          CLR     R3              ;CLEAR BIT COUNTER

                                        ;CHECK TO SEE IF TRANSMITTER IS MARKING

024656  104413  000001          2$:     DATACLK,        1       ;CLOCK TRANSMITTER
024662  004737  027754                  JSR     PC,GETSI        ;LOOK AT WINDOW
024666  103401                          BCS     3$              ;IT SHOULD BE MARKING
024670  104024                          ERROR   24              ;ERROR, BIT WAS A SPACE
024672  005203                  3$:     INC     R3              ;BUMP BIT COUNTER
024674  022703  000007                  CMP     #7,R3           ;DONE YET
024700  001366                          BNE     2$              ;BR IF NO
```

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4382 024702  104413  000010                 DATACLK,        10       ;GIVE ENOUGH TICKS TO CLEAR OUT ACTIVE
4383 024706  005003                         CLR     R3               ;CLEAR BIT COUNTER
4384 024710  104413  000001         4$:     DATACLK,        1        ;SHIFT OUT NEXT BIT
4385 024714  004737  027754                 JSR     PC,GETSI         ;LOOK AT BIT WINDOW
4386 024720  103401                         BCS     .+4              ;BR IF IT IS A MARK
4387 024722  104024                         ERROR   24               ;ERROR, TRANSMITTER IS NOT MARKING
4388 024724  005203                         INC     R3               ;INC BIT COUNT
4389 024726  022703  000020                 CMP     #20,R3           ;DONE YET?
4390 024732  001366                         BNE     4$               ;BR IF NO
4391
4392                                        ;CHECK TO SEE THAT FIRST FOUR CHARACTER MESSAGE
4393                                        ;WAS RECEIVED CORRECTLY (0,125,252,377)
4394
4395 024734  104413  000001                 DATACLK,        1        ;GET LAST BIT IN RECEIVER
4396 024740  012703  000004                 MOV     #4,R3            ;R3=CHARACTER COUNT
4397 024744  012702  031540                 MOV     #MESDAT,R2       ;LOAD MESSAGE POINTER IN R2
4398 024750  004737  030614         40$:    JSR     PC,INRDY         ;WAIT FOR INRDY
4399 024754  104412                         ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4400 024756  021204                         021204
4401 024760  016104  000004                 MOV     4(R1),R4         ;PUT "FOUND" IN R4
4402 024764  112205                         MOVB    (R2)+,R5         ;PUT "EXPECTED" IN R5
4403 024766  120504                         CMPB    R5,R4            ;IS RECEIVED DATA CORRECT?
4404 024770  001401                         BEQ     41$              ;BR IF YES
4405 024772  104010                         ERROR   10               ;RECEIVE DATA ERROR
4406 024774  005303                41$:     DEC     R3               ;DEC CHARACTER COUNT
4407 024776  001364                         BNE     40$              ;BR IF NOT DONE YET
4408
4409                                        ;CHECK TO SEE THAT IN BCC MATCH IS SET
4410                                        ;AND THAT THE BCC WAS RECEIVED CORRECTLY
4411
4412 025000  004737  030614                 JSR     PC,INRDY         ;WAIT FOR INRDY
4413 025004  104412                         ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4414 025006  021204                         021204                   ;GET FIRST HALF OF CRC
4415 025010  116137  000004  001302         MOVB    4(R1),$TMP2      ;PUT IN $TMP2
4416 025016  042737  177400  001302         BIC     #177400,$TMP2    ;CLEAR HI BYTE
4417 025024  004737  030614                 JSR     PC,INRDY         ;WAIT FOR INRDY
4418 025030  104412                         ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4419 025032  021244                         021244
4420 025034  016104  000004                 MOV     4(R1),R4         ;PUT "FOUND" IN R4
4421 025040  042704  000376                 BIC     #376,R4          ;CLEAR UNWANTED BITS
4422 025044  012705  000001                 MOV     #1,R5            ;PUT "EXPECTED" IN R5
4423 025050  120504                         CMPB    R5,R4            ;IS IN BCC MATCH SET?
4424 025052  001401                         BEQ     50$
4425 025054  104015                         ERROR   15               ;IN BCC MATCH ERROR
4426 025056                         50$:
4427 025056  104412                         ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4428 025060  021204                         021204                   ;GET LAST HALF
4429 025062  116137  000004  001301         MOVB    4(R1),$TMP1+1    ;PUT IN $TMP1
4430 025070  042737  000377  001300         BIC     #377,$TMP1       ;CLEAR LO BYTE
4431 025076  053737  001300  001302         BIS     $TMP1,$TMP2      ;16 BIT BCC NOW IN $TMP2
4432 025104  023737  030756  001302         CMP     CALBCC,$TMP2     ;IS IT CORRECT?
4433 025112  001401                         BEQ     42$              ;BR IF OK
4434 025114  104027                         ERROR   27
4435
4436                                        ;CHECK TO SEE THAT SECOND FOUR CHARACTER MESSAGE
4437                                        ;WAS RECEIVED CORRECTLY (0,125,252,377)
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025116  012703  000004          42$:    MOV     #4,R3           ;R3=CHARACTER COUNT
025122  012702  031540                  MOV     #MESDAT,R2      ;LOAD MESSAGE POINTER IN R2
025126  004737  030614          43$:    JSR     PC,INRDY        ;WAIT FOR INRDY
025132  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025134  021204                          021204
025136  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
025142  112205                          MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
025144  120504                          CMPB    R5,R4           ;IS RECEIVED DATA CORRECT?
025146  001401                          BEQ     44$             ;BR IF YES
025150  104010                          ERROR   10              ;RECEIVE DATA ERROR
025152  005303                  44$:    DEC     R3              ;DEC CHARACTER COUNT
025154  001364                          BNE     43$             ;BR IF NOT DONE YET

                                        ;CHECK TO SEE THAT IN BCC MATCH IS SET
                                        ;AND THAT THE BCC WAS RECEIVED CORRECTLY

025156  004737  030614                  JSR     PC,INRDY        ;WAIT FOR INRDY
025162  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025164  021204                          021204                  ;GET FIRST HALF OF CRC
025166  116137  000004  001302          MOVB    4(R1),$TMP2     ;PUT IN $TMP2
025174  042737  177400  001302          BIC     #177400,$TMP2   ;CLEAR HI BYTE
025202  004737  030614                  JSR     PC,INRDY        ;WAIT FOR INRDY
025206  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025210  021244                          021244
025212  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
025216  042704  000376                  BIC     #376,R4         ;CLEAR UNWANTED BITS
025222  012705  000001                  MOV     #1,R5           ;PUT "EXPECTED" IN R5
025226  120504                          CMPB    R5,R4           ;IS IN BCC MATCH SET?
025230  001401                          BEQ     51$
025232  104015                          ERROR   15              ;IN BCC MATCH ERROR
025234                          51$:
025234  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025236  021204                          021204                  ;GET LAST HALF
025240  116137  000004  001301          MOVB    4(R1),$TMP1+1   ;PUT IN $TMP1
025246  042737  000377  001300          BIC     #377,$TMP1      ;CLEAR LO BYTE
025254  053737  001300  001302          BIS     $TMP1,$TMP2     ;16 BIT BCC NOW IN $TMP2
025262  023737  030756  001302          CMP     CALBCC,$TMP2    ;IS IT CORRECT?
025270  001401                          BEQ     5$              ;BR IF OK
025272  104027                          ERROR   27
025274                          5$:


                                        ;**************************** TEST 53 ****************************
                                        ;*DDCMP EOM FUNCTION TEST
                                        ;*THIS TEST LOADS OUT SILO WITH: 2 SYNCS,4 CHAR MESSAGE,EOM
                                        ;*SOM,4 CHAR MESS,EOM. THE DATA STREAM IS CHECKED TO BE
                                        ;*4 CHAR,BCC,4 CHAR,BCC,MARKS. THIS TEST VERIFYS THAT
                                        ;*THE CHARCTERS LOADED WITH EOM SET ARE LOST
                                        ;*ALSO THAT THE CHAR LOADED WITH SOM IS NOT IN THE BCC
                                        ;*ALL DATA AND BCC'S ARE CHECKED IN THE BIT WINDOW
                                        ;*THE FOUR CHARACTER MESSAGE IS 0,125,252,377
                                        ;*RECEIVED DATA IS VERIFIED, AND IN BCC MATCH IS CHECKED
                                        ;;***************************************************************


                                        ;  TEST 53
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                                               ;---------------
                                       ;;*******************************************************************
025274  000004                         TST53:  SCOPE
025276  012737  000053  001202                 MOV     #53,$TSTNM              ; LOAD THE NO. OF THIS TEST
025304  012737  026474  001442                 MOV     #TST54,NEXT             ; POINT TO THE START OF NEXT TEST.
                                                                               ;R1 CONTAINS BASE KMC11 ADDRESS
025312  104410                                 MSTCLR                          ;MASTER CLEAR KMC11

                                               ;LOAD OUT DATA SILO

025314  012711  004000                         MOV     #BIT11,(R1)             ;SET LINE UNIT LOOP
025320  012704  031540                         MOV     #MESDAT,R4              ;LOAD POINTER TO DATA
025324  005037  025440                         CLR     10$                     ;CLEAR SOFT BCC
025330  012700  000004                         MOV     #4,R0                   ;LOAD CHARACTER COUNT
025334  004737  031122                         JSR     PC,SYNLD                ;LOAD 2 SYNCS IN OUT SILO
025340  004737  030140                         JSR     PC,OUTRDY               ;WAIT FOR OUTRDY
025344  004537  031256                         JSR     R5,MESLD                ;LOAD SILO WITH 4 CHAR MESS
025350  031540                                 MESDAT                          ;ADDRESS OF MESSAGE
025352  000004                                 4                               ;NUMBER OF CHARACTERS
025354  004737  031232                         JSR     PC,EOM                  ;LOAD GARBAGE CHARACTER, WITH EOM SET
025360  004737  031202                         JSR     PC,SOM                  ;LOAD GARBAGE CHAR WITH SOM SET
025364  004537  031256                         JSR     R5,MESLD                ;LOAD FOUR MORE CHARACTERS
025370  031540                                 MESDAT                          ;ADDRESS OF MESSAGE
025372  000004                                 4                               ;NUMBER OF CHACTERS
025374  004737  031232                         JSR     PC,EOM                  ;SET EOM
025400  004737  030006                         JSR     PC,OCOR                 ;WAIT FOR OCOR
025404  005003                                 CLR     R3                      ;CLEAR BIT COUNTER
025406  104413  000022                         DATACLK,22                      ;CLOCK DATA
025412  112405                         12$:    MOVB    (R4)+,R5                ;LOAD R5 WITH CHAR
025414  010502                                 MOV     R5,R2                   ;LOAD R2 WITH CHAR

                                               ;CHECK FIRST FOUR CHARACTER MESSAGE
                                               ;IN THE BIT WINDOW (0,125,252,377)

025416  012737  120001  030754                 MOV     #CRC16,XPOLY            ;LOAD POLYNOMIAL
025424  010537  025436                         MOV     R5,67$                  ;LOAD SOFT CHAR FOR BCC
025430  004537  030650                         JSR     R5,SIMBCC               ;CALCULATE SOFT BCC
025434  000010                                 10                              ;SHIFT COUNT
025436  000000                         67$:    0                               ;CHARACTER
025440  000000                         10$:    0                               ;OLD BCC
025442  013737  030756  025440                 MOV     CALBCC,10$              ;LOAD SOFT BCC FOR NEXT SHIFT
025450  104413  000001                 64$:    DATACLK,        1               ;SHIFT DATA IN TO BIT WINDOW
025454  106002                                 RORB    R2                      ;SHIFT SOFT DATA
025456  103005                                 BCC     65$                     ;BR IF A SPACE
025460  004737  027754                         JSR     PC,GETSI                ;LOOK AT BIT WINDOW
025464  103406                                 BCS     66$                     ;BR IF OK (MARK)
025466  104006                                 ERROR   6                       ;ERROR, BIT WINDOW WAS A SPACE
025470  000404                                 BR      66$                     ;CONTINUE
025472  004737  027754                 65$:    JSR     PC,GETSI                ;LOOK AT BIT WINDOW
025476  103001                                 BCC     66$                     ;BR IF OK (SPACE)
025500  104006                                 ERROR   6                       ;ERROR, BIT WINDOW WAS A MARK
025502                                 66$:
025502  005203                                 INC     R3                      ;BUMP BIT COUNTER
025504  022703  000010                         CMP     #10,R3                  ;DONE FULL 8 BITS YET
025510  001357                                 BNE     64$                     ;BR IF NO
025512  005003                                 CLR     R3                      ;CLEAR BIT COUNTER
```

```
025514  005300                          DEC     R0              ;DEC CHARACTER COUNT
025516  001335                          BNE     12$             ;BR IF NOT DONE YET

                                        ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW

025520  013700  030756                  MOV     CALBCC,R0       ;PUT BCC IN R0
025524  104413  000001          68$:    DATACLK,1               ;SHIFT HARDWARE BCC
025530  006000                          ROR     R0              ;SHIFT SOFT BCC
025532  103005                          BCC     69$             ;BR IF CARRY CLEAR
025534  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
025540  103406                          BCS     70$             ;BR IF OK (MARK)
025542  104014                          ERROR   14              ;ERROR, CRC WRONG (SPACE)
025544  000404                          BR      70$             ;CONTINUE
025546  004737  027754          69$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
025552  103001                          BCC     70$             ;BR IF OK (SPACE)
025554  104014                          ERROR   14              ;ERROR, CRC WRONG (MARK)
025556                          70$:
025556  005203                          INC     R3              ;BUMP BIT COUNTER
025560  022703  000020                  CMP     #20,R3          ;FINISHED BCC YET?
025564  001357                          BNE     68$             ;BR IF NO
025566  005003                          CLR     R3              ;CLEAR BIT COUNTER

                                        ;CHECK CHARACTER LOADED WITH SOM (000), IN THE BIT WINDOW

025570  005005                          CLR     R5              ;CHARACTER LOADED WITH SOM
025572  010502                          MOV     R5,R2           ;LOAD R2 WITH CHAR
025574  104413  000001          32$:    DATACLK,        1       ;CLOCK TRANSMITTER
025600  106002                          RORB    R2              ;SHIFT SOFT DATA
025602  103005                          BCC     30$             ;BR IF SPACE
025604  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
025610  103406                          BCS     31$             ;BR IF OK (MARK)
025612  104006                          ERROR   6               ;ERROR,BIT WINDOW WAS A SPACE
025614  000404                          BR      31$             ;CONTINUE
025616  004737  027754          30$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
025622  103001                          BCC     31$             ;BR IF OK (SPACE)
025624  104006                          ERROR   6               ;ERROR,BIT WINDOW WAS A MARK
025626  005203                  31$:    INC     R3              ;BUMP BIT COUNTER
025630  022703  000010                  CMP     #10,R3          ;DONE CHARACTER YET?
025634  001357                          BNE     32$             ;BR IF NO
025636  005003                          CLR     R3              ;RESET BIT COUNTER
025640  012700  000004                  MOV     #4,R0           ;RESET CHARACTER COUNTER
025644  012704  031540                  MOV     #MESDAT,R4      ;LOAD MESSAGE POINTER
025650  005037  025702                  CLR     11$             ;CLR SOFT BCC
025654  112405                  13$:    MOVB    (R4)+,R5        ;LOAD CHAR IN R5
025656  010502                          MOV     R5,R2           ;LOAD CHAR IN R2

                                        ;CHECK SECOND MESSAGE IN THE BIT WINDOW (0,125,252,377)

025660  012737  120001  030754          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
025666  010537  025700                  MOV     R5,76$          ;LOAD SOFT CHAR FOR BCC
025672  004537  030650                  JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
025676  000010                          10                      ;SHIFT COUNT
025700  000000                  76$:    0                       ;CHARACTER
025702  000000                  11$:    0                       ;OLD BCC
025704  013737  030756  025702          MOV     CALBCC,11$      ;LOAD SOFT BCC FOR NEXT SHIFT
025712  104413  000001          73$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
```

```
025716  106002                          RORB    R2              ;SHIFT SOFT DATA
025720  103005                          BCC     74$             ;BR IF A SPACE
025722  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
025726  103406                          BCS     75$             ;BR IF OK (MARK)
025730  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A SPACE
025732  000404                          BR      75$             ;CONTINUE
025734  004737  027754          74$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
025740  103001                          BCC     75$             ;BR IF OK (SPACE)
025742  104006                          ERROR   6               ;ERROR, BIT WINDOW WAS A MARK
025744                          75$:
025744  005203                          INC     R3              ;BUMP BIT COUNTER
025746  022703  000010                  CMP     #10,P3          ;DONE FULL 8 BITS YET
025752  001357                          BNE     73$             ;BR IF NO
025754  005003                          CLR     R3              ;CLEAR BIT COUNTER
025756  005300                          DEC     R0              ;DEC CHARACTER COUNT
025760  001335                          BNE     13$             ;BR IF NOT DONE YET

                                        ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW

025762  013700  030756                  MOV     CALBCC,R0       ;PUT BCC IN R0
025766  104413  000001          77$:    DATACLK,1               ;SHIFT HARDWARE BCC
025772  006000                          ROR     R0              ;SHIFT SOFT BCC
025774  103005                          BCC     78$             ;BR IF CARRY CLEAR
025776  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
026002  103406                          BCS     79$             ;BR IF OK (MARK)
026004  104014                          ERROR   14              ;ERROR, CRC WRONG (SPACE)
026006  000404                          BR      79$             ;CONTINUE
026010  004737  027754          78$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
026014  103001                          BCC     79$             ;BR IF OK (SPACE)
026016  104014                          ERROR   14              ;ERROR, CRC WRONG (MARK)
026020                          79$:
026020  005203                          INC     R3              ;BUMP BIT COUNTER
026022  022703  000020                  CMP     #20,P3          ;FINISHED BCC YET?
026026  001357                          BNE     77$             ;BR IF NO
026030  005003                          CLR     R3              ;CLEAR BIT COUNTER

                                        ;CHECK TO SEE IF TRANSMITTER IS MARKING

026032  104413  000001          2$:     DATACLK,        1       ;CLOCK TRANSMITTER
026036  004737  027754                  JSR     PC,GETSI        ;LOOK AT WINDOW
026042  103401                          BCS     3$              ;IT SHOULD BE MARKING
026044  104024                          ERROR   24              ;ERROR, BIT WAS A SPACE
026046  005203                  3$:     INC     R3              ;BUMP BIT COUNTER
026050  022703  000007                  CMP     #7,R3           ;DONE YET
026054  001366                          BNE     2$              ;BR IF NO
026056  104413  000010                  DATACLK,        10      ;GIVE ENOUGH TICKS TO CLEAR OUT ACTIVE
026062  005003                          CLR     R3              ;CLEAR BIT COUNTER
026064  104413  000001          4$:     DATACLK,        1       ;SHIFT OUT NEXT BIT
026070  004737  027754                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
026074  103401                          BCS     .+4             ;BR IF IT IS A MARK
026076  104024                          ERROR   24              ;ERROR, TRANSMITTER IS NOT MARKING
026100  005203                          INC     R3              ;INC BIT COUNT
026102  022703  000020                  CMP     #20,R3          ;DONE YET?
026106  001366                          BNE     4$              ;BR IF NO

                                        ;CHECK TO SEE THAT FIRST FOUR CHARACTER MESSAGE
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                                                 ;WAS RECEIVED CORRECTLY (0,125,252,377)

026110  104413  000001                           DATACLK,        1          ;GET LAST BIT IN RECEIVER
026114  012703  000004                           MOV     #4,R3              ;R3=CHARACTER COUNT
026120  012702  031540                           MOV     #MESDAT,R2         ;LOAD MESSAGE POINTER IN R2
026124  004737  030614                  40$:     JSR     PC,INRDY           ;WAIT FOR INRDY
026130  104412                                   ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026132  021204                                   021204
026134  016104  000004                           MOV     4(R1),R4           ;PUT "FOUND" IN R4
026140  112205                                   MOVB    (R2)+,R5           ;PUT "EXPECTED" IN R5
026142  120504                                   CMPB    R5,R4              ;IS RECEIVED DATA CORRECT?
026144  001401                                   BEQ     41$                ;BR IF YES
026146  104010                                   ERROR   10                 ;RECEIVE DATA ERROR
026150  005303                          41$:     DEC     R3                 ;DEC CHARACTER COUNT
026152  001364                                   BNE     40$                ;BR IF NOT DONE YET

                                                 ;CHECK TO SEE THAT IN BCC MATCH IS SET
                                                 ;AND THAT THE BCC WAS RECEIVED CORRECTLY

026154  004737  030614                           JSR     PC,INRDY           ;WAIT FOR INRDY
026160  104412                                   ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026162  021204                                   021204                     ;GET FIRST HALF OF CRC
026164  116137  000004  00.302                   MOVB    4(R1),$TMP2        ;PUT IN $TMP2
026172  042737  177400  001302                   BIC     #177400,$TMP2      ;CLEAR HI BYTE
026200  004737  030614                           JSR     PC,INRDY           ;WAIT FOR INRDY
026204  104412                                   ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026206  021244                                   021244
026210  016104  000004                           MOV     4(R1),R4           ;PUT "FOUND" IN R4
026214  042704  000376                           BIC     #376,R4            ;CLEAR UNWANTED BITS
026220  012705  000001                           MOV     #1,R5              ;PUT "EXPECTED" IN R5
026224  120504                                   CMPB    R5,R4              ;IS IN BCC MATCH SET?
026226  001401                                   BEQ     50$
026230  104015                                   ERROR   15                 ;IN BCC MATCH ERROR
026232                                  50$:
026232  104412                                   ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026234  021204                                   021204                     ;GET LAST HALF
026236  116137  000004  00:301                   MOVB    4(R1),$TMP1+1      ;PUT IN $TMP1
026244  042737  000377  001300                   BIC     #377,$TMP1         ;CLEAR LO BYTE
026252  053737  001300  001302                   BIS     $TMP1,$TMP2        ;16 BIT BCC NOW IN $TMP2
026260  023737  030756  001302                   CMP     CALBCC,$TMP2       ;IS IT CORRECT?
026266  001401                                   BEQ     45$                ;BR IF OK
026270  104027                                   ERROR   27

                                                 ;CHECK THAT CHARACTER LOADED WITH SOM WAS RECEIVED (000)

026272  004737  030614                  45$:     JSR     PC,INRDY           ;WAIT FOR INRDY
026276  104412                                   ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026300  021204                                   021204                     ;GET RECEIVE DATA
026302  016104  000004                           MOV     4(R1),R4           ;PUT "FOUND" IN R4
026306  005005                                   CLR     R5                 ;PUT "EXPECTED" IN R5
026310  120504                                   CMPB    R5,R4              ;IS RECEVIED DATA CORRECT?
026312  001401                                   BEQ     42$                ;BR IF YES
026314  104010                                   ERROR   10                 ;RECEIVE DATA ERROR

                                                 ;CHECK TO SEE THAT SECOND FOUR CHARACTER MESSAGE
                                                 ;WAS RECEIVED CORRECTLY (0,125,252,377)
```

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026316  012703  000004           42$:    MOV     #4,R3            ;R3=CHARACTER COUNT
026322  012702  031540                   MOV     #MESDAT,R2       ;LOAD MESSAGE POINTER IN R2
026326  004737  030614           43$:    JSR     PC,INRDY         ;WAIT FOR INRDY
026332  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026334  021204                           021204
026336  016104  000004                   MOV     4(R1),R4         ;PUT "FOUND" IN R4
026342  112205                           MOVB    (R2)+,R5         ;PUT "EXPECTED" IN R5
026344  120504                           CMPB    R5,R4            ;IS RECEIVED DATA CORRECT?
026346  001401                           BEQ     44$              ;BR IF YES
026350  104010                           ERROR   10               ;RECEIVE DATA ERROR
026352  005303                   44$:    DEC     R3               ;DEC CHARACTER COUNT
026354  001364                           BNE     43$              ;BR IF NOT DONE YET

                                         ;CHECK TO SEE THAT IN BCC MATCH IS SET
                                         ;AND THAT THE BCC WAS RECEIVED CORRECTLY

026356  004737  030614                   JSR     PC,INRDY         ;WAIT FOR INRDY
026362  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026364  021204                           021204                   ;GET FIRST HALF OF CRC
026366  116137  000004  001302           MOVB    4(R1),$TMP2      ;PUT IN $TMP2
026374  042737  177400  001302           BIC     #177400,$TMP2    ;CLEAR HI BYTE
026402  004737  030614                   JSR     PC,INRDY         ;WAIT FOR INRDY
026406  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026410  021244                           021244
026412  016104  000004                   MOV     4(R1),R4         ;PUT "FOUND" IN R4
026416  042704  000376                   BIC     #376,R4          ;CLEAR UNWANTED BITS
026422  012705  000001                   MOV     #1,R5            ;PUT "EXPECTED" IN R5
026426  120504                           CMPB    R5,R4            ;IS IN BCC MATCH SET?
026430  001401                           BEQ     51$
026432  104015                           ERROR   15               ;IN BCC MATCH ERROR
026434                           51$:
026434  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026436  021204                           021204                   ;GET LAST HALF
026440  116137  000004  001301           MOVB    4(R1),$TMP1+1    ;PUT IN $TMP1
026446  042737  000377  001300           BIC     #377,$TMP1       ;CLEAR LO BYTE
026454  053737  001300  001302           BIS     $TMP1,$TMP2      ;16 BIT BCC NOW IN $TMP2
026462  023737  030756  001302           CMP     CALBCC,$TMP2     ;IS IT CORRECT?
026470  001401                           BEQ     5$               ;BR IF OK
026472  104027                           ERROR   27
026474                           5$:


                                         ;*************************** TEST 54 ****************************
                                         ;*EMPTY SILO TEST
                                         ;*LOAD SILO WITH 2 SYNCS, 4 CHAR MESSAGE, SINGLE CLOCK
                                         ;*UNTIL THE SILO IS EMPTY, LOAD 4 MORE CHARACTERS IN THE
                                         ;*SILO. GIVE MORE TICKS, AND VERIFY THAT ONLY THE FIRST
                                         ;*4 CHARACTER MESSAGE WAS RECEIVED AND THAT RTS IS CLEAR
                                         ;****************************************************************

                                         ;  TEST 54
                                         ;--------------

                                 ;;**************************************************************
026474  000004                   TST54:  SCOPE
026476  012737  000054  001202           MOV     #54,$TSTNM               ; LOAD THE NO. OF THIS TEST
```

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026504  012737  026726  001442           MOV     #TST55,NEXT          ; POINT TO THE START OF NEXT TEST.
                                                                     ;R1 CONTAINS BASE KMC11 ADDRESS
026512  104410                           MSTCLR                       ;MASTER CLEAR KMC11
026514  012711  004000                   MOV     #BIT11,(R1)          ;SET LINE UNIT LOOP
026520  012702  031540                   MOV     #MESDAT,R2           ;R2 POINTS TO MESSAGE
026524  012700  000004                   MOV     #4,R0                ;R0 = CHAR COUNT
026530  004737  031122                   JSR     PC,SYNLD             ;LOAD SILO WITH TWO SYNCS
026534  004737  030140                   JSR     PC,OUTRDY            ;WAIT FOR OUTRDY
026540  004537  031256                   JSR     RS,MESLD             ;LOAD MESSAGE IN SILO
026544  031540                           MESDAT                       ;START OF MESSAGE
026546  000004                           4                            ;CHARACTER COUNT
026550  004737  030006                   JSR     PC,OCOR              ;WAIT FOR OCOR
026554  104413  000065                   DATACLK,        65           ;CLOCK DATA (EMPTY SILO)
026560  004537  031256                   JSR     RS,MESLD             ;PUT MORE CHARACTERS IN SILO
026564  031540                           MESDAT
026566  000004                           4
026570  004737  030006                   JSR     PC,OCOR
026574  104413  000005                   DATACLK,         5           ;CLOCK UNTIL RTS IS CLEARED
026600  104412                           ROMCLK                       ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026602  021264                           021264                       ;GET RTS
026604  032761  000040  000004           BIT     #BIT5,4(R1)          ;IS IT CLEAR?
026612  001401                           BEQ     5$                   ;BR IF YES
026614  104034                           ERROR   34                   ;ERROR, RTS NOT CLEAR
026616  104413  000041           5$:     DATACLK,        41           ;CLOCK XMITTER SOME MORE
026622  004737  030614           1$:     JSR     PC,INRDY             ;OK LETS CHECK WHAT WAS RECEIVED
026626  104412                           ROMCLK                       ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026630  021204                           021204                       ;GET RECEIVE DATA
026632  016104  000004                   MOV     4(R1),R4             ;PUT IT IN R4
026636  112205                           MOVB    (R2)+,RS             ;RS = "EXPECTED"
026640  120504                           CMPB    RS,R4                ;IS DATA CORRECT?
026642  001401                           BEQ     2$                   ;BR IF OK
026644  104010                           ERROR   10                   ;DATA ERROR
026646  005300                   2$:     DEC     R0                   ;DEC CHAR COUNT
026650  001364                           BNE     1$                   ;BR IF NOT DONE YET
026652  004737  030614           3$:     JSR     PC,INRDY             ;WAIT FOR INRDY
026656  104412                           ROMCLK                       ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026660  021204                           021204                       ;GET RECEIVE DATA
026662  016104  000004                   MOV     4(R1),R4             ;PUT IT IN "FOUND"
026666  012705  000377                   MOV     #377,RS              ;RS = "EXPECTED"
026672  120504                           CMPB    RS,R4                ;SHOULD SEE 377
026674  001401                           BEQ     4$                   ;BR IF OK
026676  104010                           ERROR   10                   ;ERROR, TRANSMITTER DID NOT ABORT
026700  004737  030614           4$:     JSR     PC,INRDY             ;WAIT FOR INRDY
026704  104412                           ROMCLK                       ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026706  021204                           021204                       ;GET RECEIVE DATA
026710  016104  000004                   MOV     4(R1),R4             ;PUT IT IN "FOUND"
026714  012705  000377                   MOV     #377,RS              ;RS = "EXPECTED"
026720  120504                           CMPB    RS,R4                ;SHOULD SEE 377
026722  001401                           BEQ     10$                  ;BR IF OK
026724  104010                           ERROR   10                   ;ERROR, TRANSMITTER DID NOT ABORT
026726                           10$:



                                         ;*************************** TEST 55 **************************
                                         ;*HALF DUPLEX TEST
                                         ;*SET LINE UNIT LOOP AND HALF DUPLEX, SEND SYNCS AND A
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                                                         ;*MESSAGE, VERIFY THAT IN-ACTIVE AND IN-READY ARE CLEAR
                                                         ;;*******************************************************************

                                                         ;  TEST 55
                                                         ;-------------

                                               ;;*******************************************************************
026726  000004                                 TST55:    SCOPE
026730  012737  000055  001202                           MOV      #55,$TSTNM               ; LOAD THE NO. OF THIS TEST
026736  012737  027044  001442                           MOV      #TST56,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                                    ;R1 CONTAINS BASE KMC11 ADDRESS
026744  104410                                           MSTCLR                     ;MASTER CLEAR KMC11
026746  012702  000012                                   MOV      #12,R2            ;SAVE R2 FOR TYPEOUT
026752  012711  004000                                   MOV      #BIT11,(R1)       ;SET LINE UNIT LOOP
026756  012761  000020  000004                           MOV      #BIT4,4(R1)       ;LOAD PORT4
026764  104412                                           ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
026766  122113                                           122113                     ;SET H/D BIT
026770  004737  031122                                   JSR      PC,SYNLD          ;LOAD 2 SYNCS
026774  004737  030140                                   JSR      PC,OUTRDY         ;WAIT FOR OUTRDY
027000  004537  031256                                   JSR      R5,MESLD          ;LOAD 4 CHAR MESSAGE
027004  031540                                           MESDAT                     ;ADDRESS OF MESSAGE
027006  000004                                           4                          ;CHARACTER COUNT
027010  004737  030006                                   JSR      PC,OCOR           ;WAIT FOR OCOR
027014  104413  000073                                   DATACLK,          73       ;SEND MESSAGE
027020  104412                                           ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027022  021244                                           021244                     ;READ LU-12
027024  016104  000004                                   MOV      4(R1),R4          ;PUT "FOUND" IN R4
027030  042704  000257                                   BIC      #257,R4           ;CLEAR UNWANTED BITS
027034  005005                                           CLR      R5                ;R5 = "EXPECTED"
027036  120504                                           CMPB     R5,R4             ;IN-ACTIVE AND IN-RDY SHOULD BE CLEAR
027040  001401                                           BEQ      1$                ;BR IF OK
027042  104035                                           ERROR    35                ;ERROR BOTH ARE NOT CLEAR
027044                                         1$:



                                                         ;*************************** TEST 56 *************************
                                                         ;*DDCMP CABLE DATA TEST
                                                         ;*THIS TEST LOADS OUT SILO WITH THE FOLLOWING:
                                                         ;*4 SYNCS,16 CHAR,EOM,16 CHAR,EOM,16 CHAR,EOM
                                                         ;*THE 16 CHARACTERS INCLUDE A FLOATING ONE AND ZERO
                                                         ;*THE DATA IS TRANSMITTED OVER THE CABLE USING THE INTERNAL CLOCK
                                                         ;*RECEIVED DATA IS VERIFIED AS IS IN BCC MATCH
                                                         ;*LOOP-BACK CONNECTOR MUST BE ON TO RUN THIS TEST
                                                         ;;*******************************************************************

                                                         ;  TEST 56
                                                         ;-------------

                                               ;;*******************************************************************
027044  000004                                 TST56:    SCOPE
027046  012737  000056  001202                           MOV      #56,$TSTNM               ; LOAD THE NO. OF THIS TEST
027054  012737  027434  001442                           MOV      #TST57,NEXT              ; POINT TO THE START OF NEXT TEST.
                                                                                    ;R1 CONTAINS BASE KMC11 ADDRESS
027062  104410                                           MSTCLR                     ;MASTER CLEAR KMC11
027064  032737  040000  002050                           BIT      #BIT14,STAT1      ;SKIP TEST IF NO
027072  001557                                           BEQ      3$                ;LOOPBACK CONNECTOR ON
027074  012711  004000                                   MOV      #BIT11,(R1)       ;SET LINE UNIT LOOP
027100  004737  031122                                   JSR      PC,SYNLD          ;LOAD 2 SYNCS
```

```
027104  004737  031122                   JSR     PC,SYNLD         ;LOAD 2 MORE SYNCS
027110  012737  120001  030754           MOV     #CRC16,XPOLY     ;LOAD POLYNOMIAL FOR SOFT CRC CALC
027116  005037  027146                   CLR     6$               ;CLEAR OLD BCC
027122  012703  000020                   MOV     #16.,R3          ;CHARACTER COUNT
027126  012702  031544                   MOV     #FLTDAT,R2       ;R2= POINTER
027132  112237  027144          7$:      MOVB    (R2)+,5$         ;LOAD CHAR FOR SOFT BCC CALC.
027136  004537  030650                   JSR     R5,SIMBCC        ;CALC SOFT BCC
027142  000010                           10                       ;SHIFT COUNT
027144  000000                  5$:      0                        ;CHARACTER
027146  000000                  6$:      0                        ;OLD BCC
027150  013737  030756  027146           MOV     CALBCC,6$        ;LOAD OLD BCC
027156  005303                           DEC     R3               ;DEC COUNT
027160  001364                           BNE     7$               ;BR IF NOT DONE YET
027162  004537  031256                   JSR     R5,MESLD         ;LOAD SILO
027166  031544                           FLTDAT                   ;MESSAGE ADDRESS
027170  000020                           16.                      ;CHARACTER COUNT
027172  004737  031232                   JSR     PC,EOM           ;LOAD AN EOM
027176  004537  031256                   JSR     R5,MESLD         ;LOAD SILO
027202  031544                           FLTDAT                   ;MESSAGE ADDRESS
027204  000020                           16.                      ;CHARACTER COUNT
027206  004737  031232                   JSR     PC,EOM           ;LOAD AN EOM
027212  004537  031256                   JSR     R5,MESLD         ;LOAD SILO
027216  031544                           FLTDAT                   ;MESSAGE ADDRESS
027220  000020                           16.                      ;CHARACTER COUNT
027222  004737  031232                   JSR     PC,EOM           ;LOAD AN EOM
027226  004737  030006                   JSR     PC,OCOR          ;WAIT FOR OCOR
027232  005011                           CLR     (R1)             ;CLEAR LINE UNIT LOOP
027234  012700  000003                   MOV     #3,R0            ;R0 = MESSAGE COUNT
027240  012703  000020                   MOV     #16.,R3          ;R3= CHARACTER COUNT
027244  012702  031544                   MOV     #FLTDAT,R2       ;LOAD MESSAGE POINTER IN R2
027250  004737  030614          1$:      JSR     PC,INRDY         ;WAIT FOR INRDY
027254  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027256  021204                           021204                   ;GET DATA FROM IN SILO
027260  016104  000004                   MOV     4(R1),R4         ;PUT CHARACTER IN "FOUND"
027264  112205                           MOVB    (R2)+,R5         ;PUT "EXPECTED" IN R5
027266  120504                           CMPB    R5,R4            ;IS RECEIVED DATA CORRECT
027270  001401                           BEQ     2$               ;BR IF OK
027272  104025                           ERROR   25               ;DATA ERROR
027274                          2$:
027274  005303                           DEC     R3               ;DEC CHARACTER COUNT
027276  001364                           BNE     1$               ;BR IF NOT DONE THIS MESSAGE
027300  012703  000020                   MOV     #16.,R3          ;RESET CHARACTER COUNT

                                         ;CHECK TO SEE THAT IN BCC MATCH IS SET
                                         ;AND THAT THE BCC WAS RECEIVED CORRECTLY

027304  004737  030614                   JSR     PC,INRDY         ;WAIT FOR INRDY
027310  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027312  021204                           021204                   ;GET FIRST HALF OF CRC
027314  116137  000004  001302           MOVB    4(R1),$TMP2      ;PUT IN $TMP2
027322  042737  177400  001302           BIC     #177400,$TMP2    ;CLEAR HI BYTE
027330  004737  030614                   JSR     PC,INRDY         ;WAIT FOR INRDY
027334  104412                           ROMCLK                   ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027336  021244                           021244
027340  016104  000004                   MOV     4(R1),R4         ;PUT "FOUND" IN R4
027344  042704  000376                   BIC     #376,R4          ;CLEAR UNWANTED BITS
```

```
027350  012705  000001                  MOV     #1,R5             ;PUT "EXPECTED" IN R5
027354  120504                          CMPB    R5,R4             ;IS IN BCC MATCH SET?
027356  001401                          BEQ     25$
027360  104015                          ERROR   15                ;IN BCC MATCH ERROR
027362                          25$:
027362  104412                          ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027364  021204                          021204                    ;GET LAST HALF
027366  116137  000004  001301          MOVB    4(R1),$TMP1+1     ;PUT IN $TMP1
027374  042737  000377  001300          BIC     #377,$TMP1        ;CLEAR LO BYTE
027402  053737  001300  001302          BIS     $TMP1,$TMP2       ;16 BIT BCC NOW IN $TMP2
027410  023737  030756  001302          CMP     CALBCC,$TMP2      ;I> IT CORRECT?
027416  001401                          BEQ     4$                ;BR IF OK
027420  104027                          ERROR   27
027422  012702  031544          4$:     MOV     #FLTDAT,R2        ;RESET MESSAGE POINTER
027426  005300                          DEC     R0                ;DECREMENT COUNTER
027430  001307                          BNE     1$                ;BR IF NOT DONE
027432  104420                  3$:     ADVANCE         ; ADVANCE TO NEXT TEST


                                        ;*************************** TEST 57 ***************************
                                        ;*DDCMP CABLE DATA TEST
                                        ;*THIS TEST LOADS OUT SILO WITH THE FOLLOWING:
                                        ;*4 SYNCS,59 DATA CHARACTERS,EOM WITH GARBAGE CHARACTER
                                        ;*THE DATA IS TRANSMITTED OVER THE CABLE USING THE INTERNAL CLOCK
                                        ;*RECEIVED DATA IS VERIFIED AS IS IN BCC MATCH
                                        ;*LOOP-BACK CONNECTOR MUST BE ON TO RUN THIS TEST
                                        ;;**************************************************************

                                        ;  TEST 57
                                        ;--------------
                                ;;*****************************************************************
027434  000004                  TST57:  SCOPE
027436  012737  000057  001202          MOV     #57,$TSTNM                  ; LOAD THE NO. OF THIS TEST
027444  012737  003662  001442          MOV     #$EOP,NEXT                  ; POINT TO THE END OF PASS HANDLER.
                                                                  ;R1 CONTAINS BASE KMC11 ADDRESS
027452  104410                          MSTCLR                    ;MASTER CLEAR KMC11
027454  032737  040000  002050          BIT     #BIT14,STAT1      ;SKIP TEST IF NO
027462  001533                          BEQ     3$                ;LOOPBACK CONNECTOR ON
027464  012711  004000                  MOV     #BIT11,(R1)       ;SET LINE UNIT LOOP
027470  004737  031122                  JSR     PC,SYNLD          ;LOAD 2 SYNCS
027474  004737  031122                  JSR     PC,SYNLD          ;LOAD 2 MORE SYNCS
027500  012737  120001  030754          MOV     #CRC16,XPOLY      ;LOAD POLYNOMIAL FOR SOFT CRC CALC
027506  005037  027536                  CLR     6$                ;CLEAR OLD BCC
027512  012703  000073                  MOV     #59.,R3           ;CHARACTER COUNT
027516  012702  031540                  MOV     #MESDAT,R2        ;R2= POINTER
027522  112237  027534          7$:     MOVB    (R2)+,5$          ;LOAD CHAR FOR SOFT BCC CALC.
027526  004537  030650                  JSR     R5,SIMBCC         ;CALC SOFT BCC
027532  000010                          10                        ;SHIFT COUNT
027534  000000                  5$:     0                         ;CHARACTER
027536  000000                  6$:     0                         ;OLD BCC
027540  013737  030756  027536          MOV     CALBCC,6$         ;LOAD OLD BCC
027546  005303                          DEC     R3                ;DEC COUNT
027550  001364                          BNE     7$                ;BR IF NOT DONE YET
027552  004537  031256                  JSR     R5,MESLD          ;LOAD SILO
027556  031540                          MESDAT                    ;MESSAGE ADDRESS
027560  000073                          59.                       ;CHARACTER COUNT
```

```
027562  004737  031232                    JSR     PC,EOM          ;LOAD AN EOM
027566  004737  030006                    JSR     PC,OCOR         ;WAIT FOR OCOR
027572  005011                            CLR     (R1)            ;CLEAR LINE UNIT LOOP
027574  012700  000073                    MOV     #59.,R0         ;R0= CHARACTER COUNT
027600  012702  031540                    MOV     #MESDAT,R2      ;LOAD MESSAGE POINTER IN R2
027604  004737  030614          1$:       JSR     PC,INRDY        ;WAIT FOR INRDY
027610  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027612  021204                            021204                  ;GET DATA FROM IN SILO
027614  016104  000004                    MOV     4(R1),R4        ;PUT CHARACTER IN "FOUND"
027620  112205                            MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
027622  120504                            CMPB    R5,R4           ;IS RECEIVED DATA CORRECT
027624  001401                            BEQ     2$              ;BR IF OK
027626  104025                            ERROR   25              ;DATA ERROR
027630                          2$:
027630  005300                            DEC     R0              ;DECREMENT COUNTER
027632  001364                            BNE     1$              ;BR IF NOT DONE

                                          ;CHECK TO SEE THAT IN BCC MATCH IS SET
                                          ;AND THAT THE BCC WAS RECEIVED CORRECTLY

027634  004737  030614                    JSR     PC,INRDY        ;WAIT FOR INRDY
027640  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027642  021204                            021204                  ;GET FIRST HALF OF CRC
027644  116137  000004  001302            MOVB    4(R1),$TMP2     ;PUT IN $TMP2
027652  042737  177400  001302            BIC     #177400,$TMP2   ;CLEAR HI BYTE
027660  004737  030614                    JSR     PC,INRDY        ;WAIT FOR INRDY
027664  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027666  021244                            021244
027670  016104  000004                    MOV     4(R1),R4        ;PUT "FOUND" IN R4
027674  042704  000376                    BIC     #376,R4         ;CLEAR UNWANTED BITS
027700  012705  000001                    MOV     #1,R5           ;PUT "EXPECTED" IN R5
027704  120504                            CMPB    R5,R4           ;IS IN BCC MATCH SET?
027706  001401                            BEQ     25$
027710  104015                            ERROR   15              ;IN BCC MATCH ERROR
027712                          25$:
027712  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027714  021204                            021204                  ;GET LAST HALF
027716  116137  000004  001301            MOVB    4(R1),$TMP1+1   ;PUT IN $TMP1
027724  042737  000377  001300            BIC     #377,$TMP1      ;CLEAR LO BYTE
027732  053737  001300  001302            BIS     $TMP1,$TMP2     ;16 BIT BCC NOW IN $TMP2
027740  023737  030756  001302            CMP     CALBCC,$TMP2    ;IS IT CORRECT?
027746  001401                            BEQ     3$              ;BR IF OK
027750  104027                            ERROR   27
027752  104420                  3$:       ADVANCE         ; ADVANCE TO NEXT TEST



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

027754                          GETSI:
                                          ;THIS SUBROUTINE READS LU 17, AND PUTS IT INTO NITCH.
                                          ;NITCH IS ROTATED LEFT UNTILL THE SI BIT IS IN CARRY

027754  104412                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
027756  021364                            021364                  ;PORT4←LU 17
027760  017737  152110  030004            MOV     @KMP04,NITCH    ;STORE LU 17
```

```
027766  106137  030004                  ROLB    NITCH
027772  106137  030004                  ROLB    NITCH
027776  106137  030004                  ROLB    NITC ı             ;PUT SI IN THE CARRY BIT
030002  000207                          RTS     PC
030004  000000                  NITCH:  0


030006                          OCOR:
                                        ;THIS SUBROUTINE SPINS ON OCOR

030006  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030010  021364                          021364                     ;PORT4+LU 17
030012  032777  000020  152054          BIT     #BIT4,@KMP04       ;IS OCOR SET?
030020  001772                          BEQ     OCOR               ;BR IF NO
030022  000207                          RTS     PC                 ;OK OCOR IS SET, GO BACK


030024                          SYNC·
                                        ;THIS SUBROUNTINE LOADS THE SILO WITH THE NUMBER OF SYNC
                                        ;CHARACTERS PASSED TO IT IN THE WORD AFTER THE JSR CALL
                                        ;AND A NON-SYNC CHARACTER (301)

030024  013637  001276                  MOV     @(SP)+,$TMP0       ;GET COUNT
030030  062746  000002                  ADD     #2,-(SP)           ;ADJUST STACK
030034  012761  000026  000004          MOV     #26,4(R1)          ;LOAD PORT4
030042  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030044  122114                          122114                     ;LOAD SYNC REGISTER
030046  004737  030140          1$:     JSR     PC,OUTRDY          ;WAIT FOR OUTRDY
030052  012761  000001  000004          MOV     #1,4(R1)           ;LOAD PORT4
030060  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030062  122111                          122111                     ;SET SOM
030064  012761  000026  000004          MOV     #26, 4(R1)         ;LOAD PORT4
030072  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030074  122110                          122110                     ;LOAD OUT DATA
030076  005337  001276                  DEC     $TMP0              ;ALL DONE?
030102  001361                          BNE     1$                 ;BR IF NOT
030104  004737  030140                  JSR     PC,OUTRDY          ;WAIT FOR OUTRDY
030110  005061  000004                  CLR     4(R1)              ;LOAD PORT4
030114  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030116  122111                          122111                     ;SET SOM
030120  012761  000301  000004          MOV     #301,4(R1)         ;LOAD PORT4
030126  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030130  122110                          122110                     ;LOAD OUT DATA
030132  004737  030006                  JSR     PC,OCOP            ;WAIT FOR OCOR
030136  000207                          RTS     PC


030140                          OUTRDY:
                                        ;THIS SUBROUTINE SPINS ON OUT READY

030140  005037  001306                  CLR     $TMP4              ;CLEAR TIMER
030144                          1$:
030144  104412                          ROMCLK                     ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030146  021224                          021224                     ;PORT4+LU11
030150  032777  000020  151716          BIT     #BIT4,@KMP04       ;IS OUT RDY SET?
030156  001004                          BNE     2$                 ;BR IF YES
```

```
030160  005237  001306                    INC     $TMP4             ;INC TIMER
030164  001367                            BNE     1$                ;KEEP CHECKING IF NOT DONE
030166  104036                            ERROR   36                ;ERROR, OUT READY NOT SET
030170  000207                    2$:     RTS     PC


030172                            CHAR:
                                          ;THIS SUBROUTINE LOADS THE SILO WITH 3 SYNCS
                                          ;AND THE CHARACTER PASSED TO IT.

030172  013637  001300                    MOV     @(SP)+,$TMP1      ;GET CHARACTER
030176  062746  000002                    ADD     #2,-(SP)          ;ADJUST STACK
030202  012737  000003  001276            MOV     #3,$TMP0          ;SET FOR 3 SYNCS
030210  012761  000026  000004            MOV     #26,4(R1)         ;LOAD PORT4
030216  104412                            ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030220  122114                            122114                    ;LOAD SYNC REGISTER
030222  004737  030140            1$:     JSR     PC,OUTRDY         ;WAIT FOR OUTRDY
030226  012761  000001  000004            MOV     #1,4(R1)          ;LOAD PORT4
030234  104412                            ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030236  122111                            122111                    ;SET SOM
030240  012761  000026  000004            MOV     #26,4(R1)         ;LOAD PORT4
030246  104412                            ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030250  122110                            122110                    ;LOAD OUT DATA
030252  005337  001276                    DEC     $TMP0             ;ALL DONE?
030256  001361                            BNE     1$                ;BR IF NOT
030260  004737  030140                    JSR     PC,OUTRDY         ;WAIT FOR OUTRDY
030264  013761  001300  000004            MOV     $TMP1,4(R1)       ;LOAD PORT4
030272  104412                            ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030274  122110                            122110                    ;LOAD OUT DATA
030276  004737  030006                    JSR     PC,OCOR           ;WAIT FOR OCOR
030302  000207                            RTS     PC


030304                            CHARSD:
                                          ;THIS SUBROUTINE LOADS THE SILO WITH THE CHARACTER PASSED TO IT.

030304  013637  001300                    MOV     @(SP)+,$TMP1      ;GET CHARACTER
030310  062746  000002                    ADD     #2,-(SP)          ;ADJUST STACK
030314  004737  030140                    JSR     PC,OUTRDY         ;WAIT FOR OUTRDY
030320  013761  001300  000004            MOV     $TMP1,4(R1)       ;LOAD PORT4
030326  104412                            ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030330  122110                            122110                    ;LOAD OUT DATA
030332  004737  030140                    JSR     PC,OUTRDY         ;WAIT FOR OUTRDY
030336  104412                            ROMCLK                    ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030340  122110                            122110                    ;LOAD GARBAGE CHAR
030342  004737  030006                    JSR     PC,OCOR           ;WAIT FOR OCOR
030346  000207                            RTS     PC


030350                            SILOLD:
                                          ;THIS SUBROUTINE FILLS THE OUT SILO
                                          ; WITH A BINARY COUNT PATTERN

030350  012737  000073  001300            MOV     #73,$TMP1         ;LOAD COUNT
030356  005737  030610                    TST     SCHAR             ;FIRST TIME HERE?
030362  100470                            BMI     4$                ;BR IF BITSTUFF
```

```
030364  001032                          BNE     2$              ;BR IF NO
030366  062737  000002  001300          ADD     #2,$TMP1        ;ADD 2 TO CHARACTER COUNT
030374  012737  000003  001276          MOV     #3,$TMP0        ;SET FOR 3 SYNCS
030402  012761  000026  000004          MOV     #26,4(R1)       ;LOAD PORT4
030410  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030412  122114                          122114                  ;LOAD SYNC REGISTER
030414  004737  030140          1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
030420  012761  000001  000004          MOV     #1,4(R1)        ;LOAD PORT4
030426  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030430  122111                          122111                  ;SET SOM
030432  012761  000026  000004          MOV     #26,4(R1)       ;LOAD PORT4
030440  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030442  122110                          122110                  ;LOAD OUT DATA
030444  005337  001276                  DEC     $TMP0           ;ALL DONE?
030450  001361                          BNE     1$              ;BR IF NOT
030452  004737  030140          2$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
030456  013761  030610  000004          MOV     SCHAR,4(R1)     ;LOAD PORT4
030464  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030466  122110                          122110                  ;LOAD OUT DATA
030470  005737  030612                  TST     STUFLG          ;BITSTUFF???
030474  001407                          BEQ     6$              ;BR IF NO
030476  013737  030610  030510          MOV     SCHAR,5$        ;IT IS SOLD SO CHECK BITSTUFFING
030504  004537  031340                  JSR     R5,STFFCL       ;ADD ANY BIT STUFF CLOCK TICKS
030510  000000                  5$:     0                       ;CHARACTER
030512  000010                          10                      ;CHIFT COUNT
030514  005237  030610          6$:     INC     SCHAR           ;NEXT CHARACTER
030520  022737  000400  030610          CMP     #400,SCHAR      ;ALL DONE?
030526  001403                          BEQ     3$
030530  005337  001300                  DEC     $TMP1           ;DECREMENT COUNT
030534  001346                          BNE     2$              ;BR IF NOT DONE
030536  004737  030006          3$:     JSR     PC,OCOR         ;WAIT FOR OCOR
030542  000207                          RTS     PC
030544  005037  030610          4$:     CLR     SCHAR           ;START PATTERN AT ZERO
030550  012737  177777  030612          MOV     #-1,STUFLG      ;SET BITSTUFF FLAG
030556  005037  031536                  CLR     BITCON          ;CLEAR STUFF COUNT
030562  062737  000002  001300          ADD     #2,$TMP1        ;ADD 2 TO CHARACTER COUNT
030570  012761  000001  000004          MOV     #1,4(R1)        ;SET BIT0 IN PORT4
030576  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030600  122111                          122111                  ;SET SOM!
030602  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030604  122110                          122110                  ;LOAD GARBAGE CHAR
030606  000721                          BR      2$              ;GO LOAD SILO
030610  000000                  SCHAR:  0
030612  000000                  STUFLG: 0


030614                          INRDY:
                                        ;THIS SUBROUTINE SPINS ON INRDY
                                        ;IF INRDY FAILS TO SET THE DELAY TIMES OUT AND AN
                                        ;ERROR IS REPORTED. FOR BETTER SCOPE LOOPS THIS
                                        ;DELAY CAN BE MADE SHORTER BY ALTERING THE NUMBER
                                        ;INITIALLY LOADED INTO $TMP0, THE SMALLER THE NUMBER
                                        ;THE SHORTER THE DELAY. 0 IS THE LONGEST DELAY.

030614  012737  000000  001276          MOV     #0,$TMP0        ;SET UP DELAY COUNTER
030622                          1$:
```

```
030622  104412                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
030624  021244                              021244                  ;PORT4+LU12
030626  032777  000020  151240              BIT     #BIT4,@KMP04    ;IS INRDY SET?
030634  001004                              BNE     2$              ;BR IF YES
030636  005237  001276                      INC     $TMP0           ;INC DELAY
030642  001367                              BNE     1$              ;TRY AGAIN
030644  104037                              ERROR   37              ;ERROR,NO INRDY
030646  000207                      2$:     RTS     PC              ;RETURN


030650                              SIMBCC:
                                            ;THIS SUBROUTINE CALCULATES THE CRC USING POLYNOMIAL GIVEN
                                            ;IN XPOLY. THE CORRECT CRC IS $LPADRED IN CALBCC, AND THE
                                            ;STATE OF THE LSB OF THE BCC IS $LPADRED IN THE C BIT.

030650  010046                              MOV     R0,-(SP)        ;SAVE R0 ON STACK
030652  012537  001276                      MOV     (R5)+,$TMP0     ;$TMP0 = SHIFT COUNT
030656  012537  001300                      MOV     (R5)+,$TMP1     ;$TMP1 = CHARACTER
030662  012537  030756                      MOV     (R5)+,CALBCC    ;CALBCC = OLD BCC
030666  013700  030756              1$:     MOV     CALBCC,R0       ;PUT OLD BCC IN R0
030672  000241                              CLC
030674  006037  030756                      ROR     CALBCC          ;SHIFT OLD BCC
030700  006037  001300                      ROR     $TMP1           ;SHIFT CHARACTER
030704  005500                              ADC     R0              ;ADD CHAR CARRY TO OLD BCC
030706  006000                              ROR     R0              ;PUT BIT0 TO CARRY BIT
030710  103011                              BCC     2$              ;CARRY IS FEEDBACK BIT
030712  013700  030754                      MOV     XPOLY,R0        ;IF FEEDBACK = 1
030716  043700  030756                      BIC     CALBCC,R0       ;EXCLUSIVLY OR XPOLY TO CALBCC
030722  043737  030754  030756              BIC     XPOLY,CALBCC
030730  050037  030756                      BIS     R0,CALBCC
030734  005337  001276              2$:     DEC     $TMP0           ;DEC SHIFT COUNT
030740  001352                              BNE     1$              ;BR IF NOT DONE
030742  013700  030756                      MOV     CALBCC,R0       ;PUT RESULT IN R0
030746  006000                              ROR     R0              ;SHIFT BIT0 TO CARRY
030750  012600                              MOV     (SP)+,R0        ;RESTORE R0
030752  000205                              RTS     R5              ;$LPADR
030754  000000                      XPOLY:  0
030756  000000                      CALBCC: 0
        000200                      LRC8=200
        120001                      CRC16=120001
        102010                      CRC.CCITT=102010


030760                              BCCLD:
                                            ;THIS SUBROUTINE LOADS THE OUT SILO WITH 2 SYNCS
                                            ;WITH SOM SET, AND ONE CHARACTER PASSED TO IT
                                            ;WITH THE SOM BIT CLEAR (ENABLE CRC)

030760  013637  001300                      MOV     @(SP)+,$TMP1    ;GET CHARACTER
030764  062746  000002                      ADD     #2,-(SP)        ;ADJUST STACK
030770  012737  000002  001276              MOV     #2,$TMP0        ;SET FOR 2 SYNCS
030776  012761  000026  000004              MOV     #26,4(R1)       ;LOAD PORT4
031004  104412                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031006  122114                              122114                  ;LOAD SYNC REGISTER
031010  004737  030140              1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
031014  012761  000001  000004              MOV     #1,4(R1)        ;LOAD PORT4
```

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031022  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031024  122111                          122111                  ;SET SOM
031026  012761  000026  000004          MOV     #26,4(R1)       ;LOAD PORT4
031034  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031036  122110                          122110                  ;LOAD OUT DATA
031040  005337  001276                  DEC     $TMP0           ;ALL DONE?
031044  001361                          BNE     1$              ;BR IF NOT
031046  004737  030140                  JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
031052  013761  001300  000004          MOV     $TMP1,4(R1)     ;LOAD PORT4
031060  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031062  122110                          122110                  ;LOAD OUT DATA
031064  004737  030006                  JSR     PC,OCOR         ;WAIT FOR OCOR
031070  000207                          RTS     PC


031072                          GETQO:
                                        ;THIS SUBROUTINE REAUS THE STATE OF THE TRANSMIT
                                        ;BCC LSB AND PUTS IT IN THE CARRY BIT

031072  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031074  021364                          021364                  ;PORT4+LU-17
031076  106177  150772                  ROLB    @KMP04          ;PUT QO IN CARRY
031102  000207                          RTS     PC              ;RETURN


031104                          GETQI:
                                        ;THIS SUBROUTINE READS THE STATE OF THE RECEIVE
                                        ;BCC LSB AND PUTS IT IN THE CARRY BIT

031104  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031106  021364                          021364                  ;PORT4+LU-17
031110  106177  150760                  ROLB    @KMP04          ;PUT QO IN CARRY
031114  106177  150754                  ROLB    @KMP04          ;PUT QI IN CARRY
031120  000207                          RTS     PC              ;RETURN


031122                          SYNLD:
                                        ;THIS SUBROUTINE LOADS OUT SILO WITH
                                        ;2 SYNC CHARACTERS WITH SOM SET

031122  012737  000002  001276          MOV     #2,$TMP0        ;LOAD COUNTER FOR 2 SYNCS
031130  012761  000026  000004          MOV     #26,4(R1)       ;PORT4+26
031136  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031140  122114                          122114                  ;LOAD SYNC REG
031142  004737  030140          1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
031146  012761  000001  000004          MOV     #1,4(R1)        ;LOAD PORT4
031154  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031156  122111                          122111                  ;SET SOM
031160  012761  000026  000004          MOV     #26,4(R1)       ;PORT+26
031166  104412                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031170  122110                          122110                  ;LOAD OUT DATA WITH SYNC
031172  005337  001276                  DEC     $TMP0           ;DECREMENT COUNTER
031176  001361                          BNE     1$              ;BR IF NOT DONE
031200  000207                          RTS     PC              ;RETURN


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031202                               SOM:
                                             ;THIS SUBROUTINE LOADS SOM AND OUT DATA WITH A
                                             ;GARBAGE CHARACTER (0)

031202  004737  030140                       JSR     PC,OUTRDY           ;WAIT FOR OUTRDY
031206  012761  000001  000004               MOV     #1,4(R1)            ;PORT4+1
031214  104412                               ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031216  122111                               122111                      ;SET SOM
031220  005061  000004                       CLR     4(R1)               ;CLEAR DATA CHAR
031224  104412                               ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031226  122110                               122110                      ;LOAD GARBAGE CHARACTER
031230  000207                               RTS     PC                  ;RETURN


031232                               EOM:
                                             ;THIS SUBROUTINE LOADS EOM AND OUT DATA WITH A
                                             ;GARBAGE CHARACTER (2) TO ENABLE TRANSMISSION OF BCC

031232  004737  030140                       JSR     PC,OUTRDY           ;WAIT FOR OUTRDY
031236  012761  000002  000004               MOV     #2,4(R1)            ;PORT4+2
031244  104412                               ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031246  122111                               122111                      ;SET EOM
031250  104412                               ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031252  122110                               122110                      ;LOAD GARBAGE CHARACTER
031254  000207                               RTS     PC                  ;RETURN


031256                               MESLD:
                                             ;THIS SUBROUTINE LOADS SILO WITH MESSAGE
                                             ;THE FIRST ARUGUMENT IS THE ADDRESS OF THE MESSAGE
                                             ;THE SECOND ARGUMENT IS THE NUMBER OF CHARACTERS IN THE MESSAGE

031256  010046                               MOV     R0,-(SP)            ;SAVE R0
031260  012500                               MOV     (R5)+,R0            ;R0=MESSAGE POINTER
031262  012537  001276                       MOV     (R5)+,$TMP0         ;$TMP0=CHARACTER COUNT
031266  004737  030140               1$:     JSR     PC,OUTRDY           ;WAIT FOR OUT RDY
031272  112061  000004                       MOVB    (R0)+,4(R1)         ;LOAD PORT4 WITH CHARACTER
031276  104412                               ROMCLK                      ;NEXT WORD IS INSTRJCTION, ROMCLK PC=5304
031300  122110                               122110                      ;LOAD OUT DATA SILO
031302  005337  001276                       DEC     $TMP0               ;DEC CHAR COUNT
031306  001367                               BNE     1$                  ;BR IF NOT DONE
031310  004737  030006                       JSR     PC,OCOR             ;WAIT FOR OCOR
031314  012600                               MOV     (SP)+,R0            ;RESTORE R0
031316  000205                               RTS     R5                  ;RETURN


031320                               CLRIO:
                                             ;THIS SUBROUTINE SETS IN CLR AND OUT CLR TO
                                             ;CLEAR THE TRANSMIT AND RECEIVE BCC REGISTERS

031320  012761  000200  000004               MOV     #BIT7,4(R1)         ;LOAD PORT4
031326  104412                               ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031330  122112                               122112                      ;SET IN CLR!
031332  104412                               ROMCLK                      ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
031334  122111                               122111                      ;SET OUT CLR!
031336  000207                               RTS     PC                  ;RETURN
```

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031340                          STFFCL:
                                        ;THIS SUBROUTINE ADDS ANY NECESSSARY BIT STUFF CLOCK TICKS
                                        ;FIRST ARGUMENT IS CHAR, SECOND ARGUMENT IS SHIFT COUNT.

031340  010046                          MOV     R0,-(SP)        ;SAVE R0
031342  012500                          MOV     (R5)+,R0        ;PUT CHAR IN R0
031344  012537  001302                  MOV     (R5)+,$TMP2     ;PUT SHIFT COUNT IN $TMP2
031350  106000                  1$:     RORB    R0              ;LOOK AT NEXT BIT
031352  103403                          BCS     2$              ;BR IF A MARK
031354  005037  031536                  CLR     BITCON          ;IT WAS A SPACE, CLEAR 1'S COUNTER
031360  000412                          BR      3$              ;CONTINUE
031362  005237  031536          2$:     INC     BITCON          ;INC CONSECUTIVE 1'S COUNTER
031366  022737  000005  031536          CMP     #5,BITCON       ;IS IT 5 YET?
031374  001004                          BNE     3$              ;BR IF NO
031376  005037  031536                  CLR     BITCON          ;YES!  SO START AGAIN
031402  104413  000001                  DATACLK,        1       ;GIVE EXTRA TICK TO STUFF ZERO
031406  005337  001302          3$:     DEC     $TMP2           ;DEC SHIFT COUNT
031412  001356                          BNE     1$              ;BR IF NOT DONE
031414  012600                          MOV     (SP)+,R0        ;RESTORE R0
031416  000205                          RTS     R5              ;RETURN


031420                          STFFCK:
                                        ;THIS SUBROUTINE CHECKS TO SEE IF TRANSMITTER
                                        ;IS STUFFING ZEROS WHEN IT SHOULD. FIRST ARGUMENT
                                        ;IS THE CHARACTER, SECOND ARGUMENT IS SHIFT COUNT.

031420  010046                          MOV     R0,-(SP)        ;SAVE R0
031422  012500                          MOV     (R5)+,R0        ;PUT CHAR IN R0
031424  012537  001302                  MOV     (R5)+,$TMP2     ;PUT SHIFT COUNT IN $TMP2
031430  106000                  1$:     RORB    R0              ;SHIFT OUT NEXT BIT
031432  103403                          BCS     2$              ;BR IF IT IS A MARK
031434  005037  031536                  CLR     BITCON          ;IT WAS A SPACE, CLEAR 1'S COUNTER
031440  000416                          BR      3$              ;CONTINUE
031442  005237  031536          2$:     INC     BITCON          ;INC CONSECUTIVE 1'S COUNTER
031446  022737  000005  031536          CMP     #5,BITCON       ;5 IN A ROW YET?
031454  001010                          BNE     3$              ;BR IF NO
031456  005037  031536                  CLR     BITCON          ;YES, SO START OVER
031462  104413  000001                  DATACLK,        1       ;EXTRA TICK TO STUFF ZERO
031466  004737  027754                  JSR     PC,GETSI        ;LOOK AT WINDOW
031472  103001                          BCC     3$              ;IS IT A ZERO, BR IF YES
031474  104030                          ERROR   30              ;NO, ERROR ZERO WAS NOT STUFFED
031476  005337  001302          3$:     DEC     $TMP2           ;DEC SHIFT COUNT
031502  001352                          BNE     1$              ;BR IF NOT DONE
031504  012600                          MOV     (SP)+,R0        ;RESTORE R0
031506  000205                          RTS     R5              ;RETURN


031510                          CTSDLY:
                                        ;THIS SUBROUTINE WASTES TIME UNTIL CTS SETS,
                                        ;BUT HOPEFULLY NOT SO LONG THAT THE SILO RUNS OUT

031510  010046                          MOV     R0,-(SP)        ;SAVE R0
031512  012700  000032                  MOV     #32,R0          ;LOAD R0 WITH COUNT
```

```
031516  027777  147522  147520  1$:     CMP     @STKS,@STKS     ;WASTE TIME
031524  005300                          DEC     RC              ;DECREMENT COUNTER
031526  001373                          BNE     1$              ;DO IT AGAIN IF NOT = 0
031530  012600                          MOV     (SP)+,R0        ;RESTORE R0
031532  000207                          RTS     PC              ;RETURN


031534  000176                          FLAG:   ↑B<01111110>            ;FLAG CHARACTER
031536  000000                          BITCON: 0
031540     000     125     252  MESDAT: .BYTE   0,125,252,377
031543     377
031544     001     002     004  FLTDAT: .BYTE   1,2,4,10,20,40,100,200,376,375,373,367,357,337,277,177
031547     010     020     040
031552     100     200     376
031555     375     373     367
031560     357     337     277
031563     177
031564     100     140     160  STUFDT: .BYTE   100,140,160,170,3,300,174,176,177,1
031567     170     003     300
031572     174     176     177
031575     001
031576     363     347     317          .BYTE   363,347,317,200,0,377,377,377,200,37
031601     200     000     377
031604     377     377     200U
031607     037
                                .EVEN
031610  046200  047111  020105  EM1:    .ASCIZ  <200>/LINE UNIT INITALIZATION TEST/
031646  046200  047111  020105  EM2:    .ASCIZ  <200>↑LINE UNIT REGISTER READ/ONLY TEST↑
031711     200  044514  042516  EM3:    .ASCIZ  <200>↑LINE UNIT REGISTER WRITE/READ TEST↑
031755     200  044514  042516  EM4:    .ASCIZ  <200>/LINE UNIT INTERNAL CLOCK FAILURE/
032017     200  051124  047101  EM5:    .ASCIZ  <200>/TRANSMITTER DATA ERROR/
032047     200  042522  042503  EM6:    .ASCIZ  <200>/RECEIVER TEST/
032066  051200  041505  044505  EM7:    .ASCIZ  <200>/RECEIVER DATA ERROR/
032113     200  047515  042504  EM10:   .ASCIZ  <200>/MODEM SIGNAL ERROR/
032137     200  051124  047101  EM11:   .ASCIZ  <200>/TRANSMITTER CRC ERROR/
032166  051200  041505  044505  EM12:   .ASCIZ  <200>/RECEIVER CRC ERROR/
032212  044600  020116  041502  EM13:   .ASCIZ  <200>/IN BCC MATCH ERROR (LU REG 12)/
032252  052200  040522  051516  EM14:   .ASCIZ  <200>/TRANSMITTER FAILED TO GO TO MARK STATE/
032322  041600  041101  042514  EM15:   .ASCIZ  <200>/CABLE DATA TEST/
032343     200  046106  043501  EM16:   .ASCIZ  <200>/FLAG ERROR/
032357     200  051124  047101  EM17:   .ASCIZ  <200>/TRANSMITTER FAILED TO STUFF A ZERO/
032423     200  053523  052111  EM20:   .ASCIZ  <200>/SWITCH PAC TEST/
032444  040600  047502  052122  EM21:   .ASCIZ  <200>/ABORT ERROR/
032461     200  C51124  047101  EM22:   .ASCIZ  <200>/TRANSMITTER ERROR/
032504  044200  046101  020106  EM23:   .ASCIZ  <200>/HALF DUPLEX TEST/
032526  047600  052125  051040  EM24:   .ASCIZ  <200>/OUT READY NOT SET/
032551     200  047111  051040  EM25:   .ASCIZ  <200>/IN READY NOT SET/

032573     200  054105  042520  DH1:    .ASCIZ  <200>/EXPECTED  FOUND/
032614  042600  050130  041505  DH2:    .ASCIZ  <200>/EXPECTED  FOUND  LU-REGISTER/
032652  041600  040510  040522  DH3:    .ASCIZ  <200>/CHARACTER    BIT THAT FAILED/
032710  041600  051117  042522  DH4:    .ASCIZ  <200>/CORRECT CRC    BIT THAT FAILED/
032750  042600  050130  041505  DH5:    .ASCIZ  <200>/EXPECTED   FOUND   SHIFT/
033002  042600  050130  041505  DH6:    .ASCIZ  <200>/EXPECTED   FOUND   CHARACTER   SHIFT/
033050  041200  047514  045503  DH7:    .ASCIZ  <200>/BLOCK END NOT SET/
033073     200  052122  020123  DH10:   .ASCIZ  <200>/RTS DID NOT CLEAR/
```

```
                                        .EVEN

        033116  000002                  DT1:    2
        033120     003      007                 .BYTE   3,7
        033122  001274                          $REG5
        033124     003      002                 .BYTE   3,2
        033126  001272                          $REG4
        033130  000003                  DT2:    3
        033132     003      007                 .BYTE   3,7
        033134  001274                          $REG5
        033136     003      010                 .BYTE   3,10
        033140  001272                          $REG4
        033142     003      002                 .BYTE   3,2
        033144  001266                          $REG2
        033146  000002                  DT3:    2
        033150     003      017                 .BYTE   3,17
        033152  001274                          $REG5
        033154     002      002                 .BYTE   2,2
        033156  001270                          $REG3
        033160  000002                  DT4:    2
        033162     006      021                 .BYTE   6,21
        033164  030756                          CALBCC
        033166     002      002                 .BYTE   2,2
        033170  001270                          $REG3
        033172  000003                  DT5:    3
        033174     001      011                 .BYTE   1,11
        033176  001462                          ZERO
        033200     001      011                 .BYTE   1,11
        033202  001464                          ONE
        033204     002      002                 .BYTE   2,2
        033206  001262                          $REG0
        033210  000003                  DT6:    3
        033212     001      011                 .BYTE   1,11
        033214  001464                          ONE
        033216     001      011                 .BYTE   1,11
        033220  001462                          ZERO
        033222     002      002                 .BYTE   2,2
        033224  001262                          $REG0
        033226  000004                  DT7:    4
        033230     001      011                 .BYTE   1,11
        033232  001462                          ZERO
        033234     001      011                 .BYTE   1,11
        033236  001464                          ONE
        033240     003      007                 .BYTE   3,7
        033242  001274                          $REG5
        033244     002      001                 .BYTE   2,1
        033246  001270                          $REG3
        033250  000004                  DT10:   4
        033252     001      011                 .BYTE   1,11
        033254  001464                          ONE
        033256     001      011                 .BYTE   1,11
        033260  001462                          ZERO
        033262     003      007                 .BYTE   3,7
        033264  001274                          $REG5
        033266     002      001                 .BYTE   2,1
        033270  001270                          $REG3
        033272  000002                  DT11:   2
        033274     003      007                 .BYTE   3,7
        033276  031534                          FLAG
        033300     002      002                 .BYTE   2,2
        033302  001270                          $REG3
        033304  000002                  DT12:   2
        033306     006      004                 .BYTE   6,4
        033310  030756                          CALBCC
        033312     006      002                 .BYTE   6,2
        033314  001302                          $TMP2

        033316                          CJRMAX:
                000001                  .END
```

```
ABASE = 000000            266     307
ACDW1 = 000000            266     309
ACDW2 = 000000            266     310
ACPUOP= 000000            266     281
ADDW0 = 000000            266     311
ADDW1 = 000000            266     312
ADDW10= 000000            266     321
ADDW11= 000000            266     322
ADDW12= 000000            266     323
ADDW13= 000000            266     324
ADDW14= 000000            266     325
ADDW15= 000000            266     326
ADDW2 = 000000            266     313
ADDW3 = 000000            266     314
ADDW4 = 000000            266     315
ADDW5 = 000000            266     316
ADDW6 = 000000            266     317
ADDW7 = 000000            266     318
ADDW8 = 000000            266     319
ADDW9 = 000000            266     320
ADEVCT= 000000            266     272
ADEVM = 000000            266     308
ADRCNT  006057           1410*   1425*   1434#
ADVANC= 104420           1579#   4958    5041
AENV  = 000002              1#    266     277
AENVM = 000000            266     278
AFATAL= 000000            266     269
AMADR1= 000000            266     294
AMADR2= 000000            266     298
AMADR3= 000000            266     301
AMADR4= 000000            266     304
AMAMS1= 000000            266     288
AMAMS2= 000000            266     296
AMAMS3= 000000            266     299
AMAMS4= 000000            266     302
AMSGAD= 000000            266     274
AMSGLG= 000000            266     275
AMSGTY= 000000            266     268
AMTYP1= 000000            266     289
AMTYP2= 000000            266     297
AMTYP3= 000000            266     300
AMTYP4= 000000            266     303
APASS = 000000            266     271
APRIOR= 000000            266
APTCSU= 000040           1135    1240#
APTENV= 000001           1128    1196    1238#   1640
APTSIZ= 000200           1237#
APTSPO= 000100           1130    1198    1239#
APT.SI  013510            803    2214#
ASWREG= 000000            266     279
ATESTN= 000000            266     270
AUDONE  003354            840     861     900#
AUNIT = 000000            266     273
AUSTRT  003126            839#
AUSWR = 000000            266     280
AUTO.S  012110            801    1958#
```

```
AVECT1= 000000          266      305
AVECT2= 000000          266      306
BASE    013726         2225*    2236     2250*    2260#
BCCLD   030760         3649     3678     3726     3755     3803     3832     3880     3909     5265#
BINWRD  006412         1482*    1485*    1486     1523#
BITCON  031536         5200*    5401*    5403*    5404     5406*    5424*    5426*    5427     5429*    5454#
BIT0  = 000001          129#    1747     1748
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#     808     1741     1747     1748     2035
BIT10 = 002000          109#    2076
BIT11 = 004000          108#    1071     2668     2702     2747     2806     2859     2912     2965     3019     3079     3109     3139
                       3169     3201     3251     3290     3329     3368     3410     3495     3597     3643     3720     3797     3874
                       3949     4017     4090     4189     4255     4504     4777     4842     4884     4980
BIT12 = 010000          107#    2030     2093
BIT13 = 020000          106#    2033     2079     2097     2362     3541     3555     3570     3593     3616
BIT14 = 040000          105#    1053     2044     2046     2097     2108     3543     3595     4882     4978
BIT15 = 100000          104#     748
BIT2  = 000004          127#     808      949     1748
BIT3  = 000010          126#    2099     2106     3572
BIT4  = 000020          125#    1731     1754     1756     2783     3210     3260     3299     3338     3377     4843     5066     5108
                       5224
BIT5  = 000040          124#    2211     2365     2725     2837     2890     2943     2996     3454     4794
BIT6  = 000100          123#    1736     1737     2101     3118     3178
BIT7  = 000200          122#    1737     1856     2211     2755     3215     3557     3618     5384
BIT8  = 000400          121#    2088     2090     2103     2105     2111     2114     2171
BIT9  = 001000          120#    2085     2111     2114     2169     2171
BM      010631         1779#    2057
BPTVEC= 000014          136#
BRLVL   013442         2166     2176     2184     2197#
BRW     004360          954     1088#
CALBCC  030756         3668     3697     3745     3774     3822     3851     3899     3928     3986     4054     4115     4136     4284
                       4305     4335     4356     4432     4475     4534     4555     4604     4625     4701     4755     4896     4952
                       4992     5038     5240*    5241     5243*    5249     5250*    5251*    5254     5259#    5472
CHAR    030172         3202     3252     3291     3330     3369     3496     5116#
CHARSD  030304         5143#
CHRCNT  006410         1480*    1493     1487     1503*    1521#    1522
CKSWR   011212          779     1094     1586     1804#
CKSWR1  011266         1816#    1828
CKSWR2  011300         1819#
CKSWR3  011304         1821#
CKSWR4  011310         1822#    1830     1837
CKSWRS  011414         1805     1807     1811     1846#
CLKX    001452          341#
CLRIO   031320         3644     3673     3721     3750     3798     3827     3875     3904     5380#
CNERR   011027          873     1779#
CNT.MA  002302          355      628#     747      749      751     1884
CNVRT = 104417          870      979      981      983      985     1578#    1621     1623     1698     1819
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```
CONERR  010762                  868    1779#
CONN    010671                 1779#   2035
CONTAB  003330                  877     885#
CONVRT= 104416                  820     876    1577#   1637    1980
CORMAX  033316                 5472#
CR    = 000015                   44#   1174    1184
CRC.CC= 102010                 5262#
CRC16 = 120001                 3646    3675    3723    3752    3800    3829    3877    3906    3954    4022    4109    4278    4329
                               4528    4598    4887    4983    5261#

CREAM   G01502                  354#    746*   1880*   1881    1883*   1887
CRLF  = 000200                   45#   1145    1184
CSR     010363                 1779#   1984
CSRMAP  012112                 1960#
CTSDLY  031510                 5440#
CYCLE   011460                  955    1016    1871#
DATABP  006764                 1610*   1613    1635    1638#
DATACL= 104413                 1574#   2709    2754    2758    2819    2820    2834    2872    2873    2887    2925    2926    2940
                               2978    2979    2993    3037    3040    3083    3113    3143    3173    3204    3254    3293    3332
                               3371    3412    3413    3458    3459    3498    3651    3652    3680    3681    3728    3729    3757
                               3758    3805    3806    3834    3835    3882    3883    3911    3912    3968    3970    4036    4038
                               4102    4116    4137    4155    4162    4164    4199    4271    4285    4306    4336    4357    4375
                               4382    4384    4395    4521    4535    4556    4576    4605    4626    4644    4651    4653    4664
                               4786    4791    4797    4852    5407    5430
DATAHD  006752                 1609*   1631    1634#
DDISP = 177570                   51#    207#    236
DELAY = 104411                 1572#
DEVTAB  003342                  843     890#
DH1     032573                  404     407     410     446     452     458     485    5472#
DH10    033073                  467    5472#
DH2     032614                  386     389     392     398     470     479    5472#
DH3     032652                  401     449     464    5472#
DH4     032710                  419    5472#
DH5     032750                  413     416     425     428     482    5472#
DH6     033002                  431     434     437     440    5472#
DH7     033050                  461    5472#
DISPLA  001242                  236#    765*    771*   1083*
DISPRE  000174                  197#    771
DSWR  = 177570                   50#    206#    235
DT1     033116                  405     408     411     447     459     486    5472#
DT10    033250                  435     441    5472#
DT11    033272                  450    5472#
DT12    033304                  453    5472#
DT2     033130                  387     390     393     399     471     480    5472#
DT3     033146                  402     465    5472#
DT4     033160                  420    5472#
DT5     033172                  414     417     483    5472#
DT6     033210                  426     429    5472#
DT7     033226                  432     438    5472#
DZDME = 000000                  382
DZDMG = ****** U                382     487
EMTVEC= 000030                  139#
EM1     031610                  385    5472#
EM10    032113                  409    5472#
EM11    032137                  412     418     424     430     433    5472#
EM12    032166                  415     427     436     439     451    5472#
EM13    032212                  421     484    5472#
```

```
EM14     032252             442     5472#
EM15     032322             445     5472#
EM16     032343             448     5472#
EM17     032357             454     5472#
EM2      031646             388     5472#
EM20     032423             457     5472#
EM21     032444             460      463     5472#
EM22     032461             466     5472#
EM23     032504             469     5472#
EM24     032526             472     5472#
EM25     032551             475     5472#
EM3      031711             391     5472#
EM4      031755             394     5472#
EM5      032017             397      400      481     5472#
EM6      032047             403      478     5472#
EM7      032066             406     5472#
EOM      031232            4099     4197     4264     4268     4513     4518     4902     4906     4910     4998     5348#
ERCT00   002304             630#
ERCT01   002310             633#
ERCT02   002314             636#
ERCT03   002320             639#
ERCT04   002324             642#
ERCT05   002330             645#
ERCT06   002334             648#
ERCT07   002340             651#
ERCT10   002344             654#
ERCT11   002350             657#
ERCT12   002354             660#
ERCT13   002360             663#
ERCT14   002364             666#
ERCT15   002370             669#
ERCT16   002374             672#
ERCT17   002400             675#
ERR      003244             852      865#     869
ERRMSG   006740            1608*    1626     1629#
ERRPC    003322             871      882#
ERRVEC=  000004             132#    1058     1059*    1061*    1064*
ERTABO   007112            1623     1663#
EXIT   = 000205             159#
EXITER   007046            1649     1654#
FLAG     031534            5453#    5472
FLOAT    003156             845#     851
FLTDAT   031544            4890     4900     4904     4908     4915     4955     5457#
FY       003202             853#     857      862
GETQI    031104            3688     3692     3765     3769     3842     3846     3919     3923     4044     4048     5303#
GETQO    031072            3659     3663     3736     3740     3813     3817     3890     3894     3976     3980     5293#
GETSI    027754            2823     2827     2876     2880     2929     2933     2982     2986     3043     3047     4119     4123     4140
                           4144     4156     4165     4288     4292     4309     4313     4339     4343     4360     4364     4376     4385
                           4538     4542     4559     4563     4579     4583     4608     4612     4629     4633     4645     4654     5047#
                           5431
GNS    = ****** U          1562     1565     1566     1567     1568     1569     1570     1571     1572     1573     1574     1575     1576
                           1577     1578     1579
HALTS    006770            1593     1640#
HILIM    006052            1407*    1415     1431#
HT     = 000011              42#    1143     1184
INCHAR   011420            1822     1850#
```

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DZKCE   MACY11 27(1006)  01-JUN-77  10:03  PAGE 111                                                            PAGE:  0131
DZKCE.P11     12-MAY-77 12:23             CROSS REFERENCE TABLE -- USER SYMBOLS

INIFLG  001506          359#    774     804     811*
INLP1   005766         1412#   1421
INPUT = 104415         1576#   1920    1971    1983    1991    2048    2056
INRDY   030614         3414    3460    3499    3507    3515    4200    4213    4218    4398    4412    4417    4441    4455
                       4460    4667    4581    4686    4707    4721    4735    4740    4798    4808    4816    4916    4932
                       4937    5003    5018    5023    5212#
INTTY   013456         2001    2020    2036    2205#
IOTVEC= 000020          137#
KMACTV  001470          348#    788     913*    914    1871    1885    1966*   2126*   2132*   2133*   2137    2162    2228*
                       2229
KMCM    011050          879    1779#
KMCR00  002100          543#
KMCR01  002110          548#
KMCR02  002120          553#
KMCR03  002130          558#
KMCR04  002140          563#
KMCR05  002150          568#
KMCR06  002160          573#
KMCR07  002170          578#
KMCR10  002200          583#
KMCR11  002210          588#
KMCR12  002220          593#
KMCR13  002230          598#
KMCR14  002240          603#
KMCR15  002250          608#
KMCR16  002260          613#
KMCR17  002270          618#
KMCSR   002066          526#    839*    854     860*    889    1019    1086    1701    1755    1889*   1898    1946    2278*
KMCSRH  002070          527#   1736*   1737*   1741*   1747*   1748*   1754*   1756*   1898*   1899*   1900
KMCTL   002072          528#   1900*   1901*   1302
KMNUM   001472          349#    742     996    1964*   1978*   2118*   2119    2127    2129
KMP04   002074          529#   1725*   1731    1768    1773    1902*   1903*   1904    5053    5066    5108    5224    5299*
                       5309*   5310*
KMP06   002076          530#   1742*   1904*   1905*
KMRLVL  002060          523#    989     930*   1907*   1908*   1909
KMRVEC  002056          522#    989*   1022    1890*   1891*   1907
KMS100  002102          544#
KMS101  002112          549#
KMS102  002122          554#
KMS103  002132          559#
KMS104  002142          564#
KMS105  002152          569#
KMS106  002162          574#
KMS107  002172          579#
KMS110  002202          584#
KMS111  002212          589#
KMS112  002222          594#
KMS113  002232          599#
KMS114  002242          604#
KMS115  002252          609#
KMS116  002262          614#
KMS117  002272          619#
KMS200  002104          545#
KMS201  002114          550#
KMS202  002124          555#
KMS203  002134          560#
```

```
KMS204  002144               565#
KMS205  002154               570#
KMS206  002164               575#
KMS207  002174               580#
KMS210  002204               585#
KMS211  002214               590#
KMS212  002224               595#
KMS213  002234               600#
KMS214  002244               605#
KMS215  002254               610#
KMS216  002264               615#
KMS217  002274               620#
KMS300  002106               546#
KMS301  002116               551#
KMS302  002126               556#
KMS303  002136               561#
KMS304  002146               566#
KMS305  002156               571#
KMS306  002166               576#
KMS307  002176               581#
KMS310  002206               586#
KMS311  002216               591#
KMS312  002226               596#
KMS313  002236               601#
KMS314  002246               606#
KMS315  002256               611#
KMS316  002266               616#
KMS317  002276               621#
KMTLVL  002064               525#     991      992*     1911*    1912*
KMTVEC  002062               524#     991*     1909*    1910*    1911
KM.END  002300               623#     1962     2233
KM.MAP  002100               354      542#     746      813      823      1881     1883     1960     1965     2154     2231     2235
LF    = 000012                43#     1178     1184
LINE    010573              1779#     2049
LOBITS  006056              1409*     1433#
LOCK    001444               335#     1085*    1097     1099     1440*    1617     2384*    2400*    2427*    2443*    2470*    2493*    2529*
                            2549*     3640*    3672*    3717*    3749*    3794*    3826*    3871*    3903*
LOKFLG  001510               361#
LOLIM   006050              1406*     1417     1430#
LRCB  = 000200              5260#
LUTYPE= ****** U               1      5232
MASKX   001454               342#
MASTEK  010015              1619      1779#
MCSRX   007745               978      1779#
MDATA   011150              1501      1511     1796#
MEMLIM  001466               347#      937*
MEPASS  007620               977      1779#
MERRPC  010072              1622      1779#
MERRX   007772               984      1779#
MERR2   007645              1779#     2139
MERR3   007672               910      1779#
MESDAT  031540              3606      4091     4097     4190     4195     4256     4262     4266     4322     4397     4440     4505     4511
                            4516      4591     4666     4720     4778     4783     4788     4849     4986     4996     5002     5455#
MESLD   031256              3605      4096     4194     4261     4265     4510     4515     4782     4787     4849     4899     4903     4907
                            4995      5361#
MILK    001504               355#      747*     986      1879*    '   +#   1888
```

```
MLOCK    007716         951     1779#
MNEW     010017         905     1779#
MODU     010461        1779#    2019
MPASSX   007761         982     1779#
MPFAIL   007562        1697     1714     1779#
MR       007642         958     1779#    1936
MRESET=  004000         159#
MSTCLR=  104410        1571#    1703     2329     2355     2386     2429     2472     2531     2583     2607     2631     2667     2701
                       2746     2805     2858     2911     2964     3018     3078     3108     3138     3168     3199     3249     3288
                       3327     3366     3405     3448     3494     3540     3592     3642     3719     3796     3873     3948     4016
                       4086     4188     4251     4500     4776     4840     4881     4977
MTITLE   001000         205#     778
MTSTN    010003        1620     1779#    1921
MVECX    007753         980     1779#
NEXT     001442         334#    1439     1659     2276*    2302*    2327*    2353*    2393*    2426*    2469*    2528*    2581*    2605*
                       2629*    2665*    2699*    2744*    2803*    2856*    2909*    2962*    3016*    3076*    3106*    3136*    3166*
                       3197*    3247*    3286*    3325*    3364*    3403*    3446*    3492*    3538*    3590*    3639*    3716*    3793*
                       3870*    3946*    4014*    4084*    4186*    4249*    4498*    4774*    4838*    4879*    4975*
NITCH    030004        5053*    5054*    5055*    5056*    5058#
NOACT    010731         790     1779#    1873
NODEV    003240         841      863#
NUM      010323        1779#    1972
OCOR     030006        2708     2753     2816     2869     2922     2975     3036     3967     4035     4100     4198     4269     4519
                       4785     4790     4851     4911     4999     5061#    5067     5097     5139     5155     5196     5257     5375
OK       003220         855      858#     881
ONE      001464         346#    5472
OUTRDY   030140        2807     2812     2860     2865     2913     2918     2966     2971     3023     3027     3032     3055     4095
                       4193     4260     4509     4781     4847     5081     5090     5101#    5126     5135     5148     5152     5172
                       5181     5276     5285     5322     5338     5352     5369
PACT00   002302         629#
PACT01   002306         632#
PACT02   002312         635#
PACT03   002316         638#
PACT04   002322         641#
PACT05   002326         644#
PACT06   002332         647#
PACT07   002336         650#
PACT10   002342         653#
PACT11   002346         656#
PACT12   002352         659#
PACT13   002356         662#
PACT14   002362         665#
PACT15   002366         668#
PACT16   002372         671#
PACT17   002376         674#
PARBIT=  040000         159#
PERFOR=  004537         159#
PFTAB    007324        1698     1720#
PIRQ   = 177772          49#
PIRQVE=  000240         143#
POPRO  = 012600         154#    1653
POP1SP=  005726         152#
POP2SP=  022626         156#
PRIO     010422        1779#    2000
PRIRTY   013730        2221*    2227*    2240     2261#
PRO    = 000000          66#    2197     2198
```

```
PR1   = 000040       67#
PR2   = 000100       68#
PR3   = 000140       69#
PR4   = 000200       70#   2199
PR5   = 000240       71#   2200
PR6   = 000300       72#   2201
PR7   = 000340       73#    178     180     182     184    2202
PS    = 177776       46#     47     739*    948*   2166*   2176*
PSW   = 177776       47#
PUSHR0= 010046      153#   1650
PUSH1S= 005746      151#
PUSH2S= 024646      155#
PWRVEC= 000024      138#   1676*   1677*   1686*   1692*   1711*   1712*
QV.FLG  001511      362#    745*    995*
RDCHR = 104402     1292    1565#
RDLIN = 104403     1365    1566#
RDOCT = 104404     1414    1567#
RESREG  006766     1636    1639#
RESVEC= 000010      133#
RESOS = 104407     1570#   1639
ROMCLK= 104412     1573#   1726    1729    1766    1771    2280    2305    2331    2357    2389    2391    2402    2404
                   2432    2434    2445    2447    2478    2480    2499    2501    2536    2538    2554    2556    2584
                   2608    2634    2643    2670    2672    2676    2704    2706    2711    2721    2749    2751    2756
                   2760    2770    2780    2809    2814    2835    2862    2867    2888    2915    2920    2941    2968
                   2973    2994    3025    3029    3034    3057    3084    3114    3144    3174    3206    3216    3218
                   3256    3265    3295    3304    3334    3343    3373    3382    3415    3455    3461    3500    3508
                   3516    3547    3550    3562    3565    3599    3603    3611    3957    3961    3965    3995    4025
                   4029    4033    4063    4201    4214    4219    4228    4399    4413    4418    4427    4442    4456
                   4461    4470    4668    4682    4687    4696    4708    4722    4736    4741    4750    4792    4799
                   4809    4817    4844    4853    4917    4933    4938    4947    5004    5019    5024    5033    5051
                   5064    5079    5083    5086    5092    5095    5106    5124    5128    5131    5137    5150    5153
                   5170    5174    5177    5183    5203    5205    5222    5274    5278    5281    5287    5297    5307
                   5320    5324    5327    5340    5343    5354    5356    5371    5385    5387
RUN     001500      352#    748*   1877*   1878*   1885
SAVACT  001474      350#    908    2137*   2229*
SAVNUM  001476      351#    742*    993*    996*   2130*   2223*
SAVPC   001460      344#    869*    884    1446*   1665
SAVSP   001456      343#
SAVOS = 104406     1569#   1598
SCHAR   030610     3406*   3449*   5164    5182    5187    5191*   5192    5198*   5208#
SCOP1 = 104405     1568#   2399    2412    2442    2455    2489    2510    2545    2563    3671    3700    3748    3777
                   3825    3854    3902    3931
SILOLD  030350     3411    3427    3457    3473    5159#
SIMBCC  030650     3654    3683    3731    3760    3808    3837    3885    3914    3971    4039    4111    4280    4331
                   4530    4600    4892    4988    5232#
SOFTSW  011452     1820    1859#
SOM     031202     4514    5334#
SPACNT= 006411     1481*   1505    1508*   1522#
STACK = 001200       37#    740     927    1660
STAT    00145C      340#
STAT1   002050      515#   1892*   2362    3541    3543    3555    3570    3593    3595    3616    4882    4978
STAT2   002052      516#   1893*   2587    2611
STAT3   002054      517#   1894*
STFFCK  031420     5414#
STFFCL  031340     5188    5392#
STKLMT= 177774       48#
```

```
STRTSW  001446         339#    780*    783*    784     786     800*    806     808     903     949     956     1914    1937*
                       1967    2150
STUFDT  031564         5463#
STUFLG  030612         3407*   3450*   5185    5199*   5209#
SVOS    006100         1450#
SWFLG   011416          743*   1815*   1842*   1848
SWR     001240          235#    764*    766     770*    780     908     913    1053    1071    1095    1587    1592    1648
                       1655    1657    1684    1704*   1744    1804    1841*
SWREG   000176          198#    759*    770    1804    1861
SW0   = 000001          101#
SW00  = 000001           91#    101     784     800    1967    2150
SW01  = 000002           90#    100     956    1914    1937
SW02  = 000004           89#     99
SW03  = 000010           88#     98     903
SW04  = 000020           87#     97
SW05  = 000040           86#     96
SW06  = 000100           85#     95    1744
SW07  = 000200           84#     94
SW08  = 000400           83#     93    1655
SW09  = 001000           82#     92    1095
SW1   = 000002          100#
SW10  = 002000           81#   1657
SW11  = 004000           80#
SW12  = 010000           79#   1587
SW13  = 020000           78#   1592
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#
SYNC    030024         3081    3111    3141    3171    5071#
SYNLD   031122         3955    4023    4094    4192    4259    4508    4780    4846    4885    4886    4981    4982    5314#
TBITVE= 000014          134#
TEMP    011106         1488    1752*   1757*   1763*   1775*   1794#   2632*   2638*   2641*   2647*
TIMER = 104414         1575#   2674    3205    3255    3294    3333    3372    3549    3564    3601
TKVEC = 000060          141#
TLAST = 027434         1940    5042#
TPVEC = 000064          142#
TRAPVE= 000034          140#
TRTVEC= 000014          135#
TST1    013732         1047    1927    1945    2274#
TST10   014730         2469    2526#
TST11   015104         2528    2579#
TST12   015146         2581    2603#
TST13   015210         2605    2627#
TST14   015310         2629    2663#
TST15   015410         2665    2697#
TST16   015546         2699    2742#
TST17   015744         2744    2801#
TST2    014006         2276    2300#
TST20   016126         2803    2854#
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TST21    016310         2856     2907#
TST22    016472         2909     2960#
TST23    016654         2962     3014#
TST24    017062         3016     3074#
TST25    017150         3076     3104#
TST26    017240         3106     3134#
TST27    017326         3136     3164#
TST3     014054         2302     2325#
TST30    017416         3166     3195#
TST31    017570         3197     3245#
TST32    017704         3247     3284#
TST33    020022         3286     3323#
TST34    020140         3325     3362#
TST35    020256         3364     3401#
TST36    020406         3403     3444#
TST37    020546         3446     3490#
TST4     014126         2327     2351#
TST40    020706         3492     3536#
TST41    021104         3538     3588#
TST42    021264         3590     3637#
TST43    021600         3639     3714#
TST44    022114         3716     3791#
TST45    022430         3793     3868#
TST46    022744         3870     3944#
TST47    023202         3946     4012#
TST5     014220         2353     2381#
TST50    023440         4014     4082#
TST51    023772         4084     4184#
TST52    024174         4186     4247#
TST53    025274         4249     4496#
TST54    026474         4498     4772#
TST55    026726         4774     4836#
TST56    027044         4838     4877#
TST57    027434         4879     4973#    5042
TST6     014360         2383     2424#
TST60 =  ****** U       4975
TST7     014520         2426     2467#
TTST     004146          952*     954*    1049#
TWOSYN=  010000          159#
TYPDAT   006754         1614     1632     1635#
TYPE  =  104401          778      790      812      867      872      878      905      910      951      958      977      978      980
                         982      984     1148     1299     1305     1310     1314     1319     1320     1322     1325     1329     1394
                        1396     1412     1419     1420     1471     1511     1562#    1615     1616     1619     1620     1622     1624
                        1628     1633     1697     1713     1818     1821     1873     1919     1936     1942     1979     1999     2013
                        2018     2027     2034     2041     2139
TYPMSG   006654         1612     1615#
VEC      010401         1779#    1992
VECMAP   013172         2138     2150#
VECTR    013724         2220*    2226*    2245     2251*    2259#
WHAT     005770         1405*    1413#
WHERE    006054         1408*    1422     1432#
WHICH    013164         1981     2146#
WRDCNT   006406         1479*    1512*    1520#
WRKO.F   006742         1627     1630#
XBX      006542         1588     1590     1592#
XCSR     004104          979     1017#
```

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XERR     004126          985     1026#
XHEAD    010077          812     1779#
XPASS    004120          983     1023#
XPOLY    030754         3646*    3675*    3723*    3752*    3800*    3829*    3877*    3906*    3954*    4022*    4109*    4278*    4329*
                        4528*    4598*    4887*    4983*    5248     5250     5258#
XSTATQ   011060          821     1779#
XTSTN    007120         1621     1666#
XVEC     004112          981     1020#
ZERO     001462          345#    5472
$APTHD   002034          497      503#
$ASTAT=  ****** U       1218     1233
$ATYC    004722         1189     1191#
$ATY1    004676         1187#
$ATY3    004704         1133     1188#
$ATY4    004714         1190#    1643
$AUTOB   001234          232#
$BASE    001372          307#    2225
$BDADR   001222          227#
$BDDAT   001226          229#
$CDW1    001376          309#    2222
$CDW2    001400          310#
$CHARC   004672         1150*    1160*    1167     1176*    1181#
$CKSWR=  ****** U       1565
$CMTAG   001200          215#
$CM1   = 000006          247#     248#     249#     250#     251#     252#     253#
$CM2   = 000014          247#     248#     249#     250#     251#     252#     253#
$CM3   = 000006          245#     247
$CM4   = 000005          253#     254#     255#     256#     257#     258#
$CNTLG   005534         1340#
$CNTLU   005527         1314     1339#
$COD   = ****** U          1
$CPUOP   001344          281#
$CRAP =  177777            1#    2263#    2266     2269#    2289#    2292     2295#    2314#    2317     2320#    2340#    2343     2346#
                        2370#    2373     2376#    2413#    2416     2419#    2456#    2459     2462#    2515#    2518     2521#    2568#
                        2571     2574#    2592#    2595     2598#    2616#    2619     2622#    2651#    2654     2658#    2685#    2688
                        2692#    2730#    2733     2737#    2788#    2791     2796#    2841#    2844     2849#    2894#    2897     2902#
                        2947#    2950     2955#    3000#    3003     3009#    3063#    3066     3069#    3093#    3096     3099#    3123#
                        3126     3129#    3153#    3156     3159#    3183#    3186     3190#    3234#    3237     3240#    3273#    3276
                        3279#    3312#    3315     3318#    3351#    3354     3357#    3390#    3393     3396#    3431#    3434     3439#
                        3477#    3480     3485#    3524#    3527     3531#    3577#    3580     3583#    3625#    3628     3632#    3702#
                        3705     3709#    3779#    3782     3786#    3856#    3859     3863#    3933#    3936     3939#    4001#    4004
                        4007#    4069#    4072     4077#    4172#    4175     4179#    4231#    4234     4242#    4479#    4482     4491#
                        4759#    4762     4767#    4825#    4828     4831#    4862#    4865     4872#    4959#    4962     4968#
$CRLF    001313          260#    1149     1184     1319     1339     1399     1420     1471     1615     1616     1624     1919     1979
$DDW0    001402          311#    2230
$DDW1    001404          312#
$DDW10   001426          321#
$DDW11   001430          322#
$DDW12   001432          323#
$DDW13   001434          324#
$DDW14   001436          325#
$DDW15   001440          326#
$DDW2    001406          313#
$DDW3    001410          314#
$DDW4    001412          315#
$DDW5    001414          316#
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$DOW6   001416            317#
$DOW7   001420            318#
$DOW8   001422            319#
$DOW9   001424            320#
$DEVCT  001326            272#
$DEVM   001374            308#   2228
$DOAGN  004100            994    1003    1008    1014#
$ENDAD  004070            191     776    1010#   1646
$ENDCT  004054           1005#
$ENV    001336            277#    757     793     795    1128    1196    1220    1640    1806
$ENVM   001337            278#    798    1130    1135    1198
$EOP    003662            973#   4975
$EOPCT  004046           1002#   1006
$ERFLG  001203            218#    744*    976*   1038    1067    1069*   1090    1597*   1611    1625*   1699*
$ERMAX  001215            224#   1090
$ERROR  006512            181    1586#
$ERRPC  001216            225#    753*    997*   1046*   1594    1596*   1700*
$ERRTB  001512            379#   1607
$ERTTL  001212            222#    988    1028    1654*   1896*
$ETABL  001336            276#
$ETEND  001442            329#    509
$FATAL  001320            269#   1224*
$FFLG   005142           1187*   1190*   1218    1227*   1235#
$FILLC  001256            243#   1153    1184
$FILLS  001255            242#   1184
$GDADR  001220            226#
$GDDAT  001224            228#
$GET42  004060           1007#
$GTSWR= ****** U         1564
$HD   = 000000             11
$HIBTS  002034            504#
$HIOCT  005722           1387*   1398#
$ICNT   001204            219#   1075*   1076    1078*   1089
$ILLUP  007316           1676    1692    1716#
$INPUT  005724           1403#   1576
$INTAG  001235            233#
$ITEMB  001214            223#   1602*   1642
$LF     001314            261#   1184    1329    1339    1399
$LFLG   005141           1228*   1234#
$LPADR  001206            220#    755*    955*    959    1082*   1084    1089    1659*   1661    1935*   1945*   1947
$LPERR  001210            221#
$MADR1  001350            294#
$MADR2  001354            298#
$MADR3  001360            301#
$MADR4  001364            304#
$MAIL   001316            267#    505     509    1081    1128
$MAMS1  001346            288#   2224
$MAMS2  001352            296#
$MAMS3  001356            299#
$MAMS4  001362            302#
$MBADR  002036            505#
$MFLG   005140           1188*   1194    1229*   1233#
$MNEW   005552           1343#   1821
$MSGAD  001332            274#   1204*   1207
$MSGLG  001334            275#   1209*
$MSGTY  001316            268#   1202    1210*   1222    1226*
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$MSWR   005541          1341#   1818
$MTYP1  001347           289#
$MTYP2  001353           297#
$MTYP3  001357           300#
$MTYP4  001363           303#
$MXCNT  004362          1079    1089#
$N    = 000057             1#   2263    2269    2271    2278#   2289    2295    2297    2304#   2314    2320    2322    2329
                        2330#   2340    2346    2348    2355    2356#   2370    2376    2378    2386    2387#   2413    2419
                        2421    2429    2430#   2456    2462    2464    2472    2473#   2515    2521    2523    2531    2532#
                        2568    2574    2576    2583    2584#   2592    2598    2600    2607    2608#   2616    2622    2624
                        2631    2632#   2651    2658    2660    2667    2668#   2685    2692    2694    2701    2702#   2730
                        2737    2739    2746    2747#   2798    2796    2798    2805    2806#   2841    2849    2851    2858
                        2859#   2894    2902    2904    2911    2912#   2947    2955    2957    2964    2965#   3000    3009
                        3011    3018    3019#   3063    3069    3071    3078    3079#   3093    3099    3101    3108    3109#
                        3123    3129    3131    3138    3139#   3153    3159    3161    3168    3169#   3183    3190    3192
                        3199    3200#   3234    3240    3242    3249    3250#   3273    3279    3281    3288    3289#   3312
                        3318    3320    3327    3328#   3351    3357    3359    3366    3367#   3390    3396    3398    3405
                        3406#   3431    3439    3441    3448    3449#   3477    3485    3487    3494    3495#   3524    3531
                        3533    3540    3541#   3577    3583    3585    3592    3593#   3625    3632    3634    3642    3643#
                        3702    3709    3711    3719    3720#   3779    3786    3788    3796    3797#   3856    3863    3865
                        3873    3874#   3933    3939    3941    3948    3949#   4001    4007    4009    4016    4017#   4069
                        4077    4079    4086    4087#   4172    4179    4181    4188    4189#   4231    4242    4244    4251
                        4252#   4479    4491    4493    4500    4501#   4759    4767    4769    4776    4777#   4825    4831
                        4833    4840    4841#   4862    4872    4874    4881    4882#   4959    4968    4970    4977    4978#
                        5042#
$NULL   001254           241#   1155    1184
$NWTST= 000000          2273#   2299#   2324#   2350#   2380#   2423#   2466#   2525#   2578#   2602#   2626#   2662#   2696#
                        2741#   2800#   2853#   2906#   2959#   3013#   3073#   3103#   3133#   3163#   3194#   3244#   3283#
                        3322#   3361#   3400#   3443#   3489#   3535#   3587#   3636#   3713#   3790#   3867#   3943#   4011#
                        4081#   4183#   4246#   4495#   4771#   4835#   4876#   4972#
$OVER   004334          1051    1054    1065    1077    1083#
$PASS   001324           271#    975*    987     999*   1000*   1017    1025    1073    1090    1895*
$PASTM  002042           507#
$PWRON  007126           179     741    1676#   1711
$PWRMG  007312          1714#
$PWRUP  007200          1686    1692#
$QUES   001312           259#   1184    1322    1339    1396    1399    1419    1942    2014    2028    2042
$RDCHR  005144          1259#   1565
$RDDEC= ****** U        1568
$RDLIN  005264          1287#   1566
$RDOCT  005564          1360#   1567
$RDSZ = 000007          1280#
$REGAD  001260           245#
$REG0   001262           247#   1455*   1460    5472
$REG1   001264           248#    875*    887    1454*   1461
$REG2   001266           249#   1453*   1462    5472
$REG3   001270           250#   1452*   1463    5472
$REG4   001272           251#   1451*   1464    5472
$REG5   001274           252#   1450*   1465    5472
$RTNAD  004102          1016#
$R2A  = ****** U        1568
$S    = 000061             1#   2276    2278#   2302    2304#   2327    2330#   2353    2356#   2383    2387#   2426    2430#
                        2469    2473#   2528    2532#   2581    2584#   2605    2608#   2629    2632#   2665    2668#   2699
                        2702#   2744    2747#   2803    2806#   2856    2859#   2909    2912#   2962    2965#   3016    3019#
                        3076    3079#   3106    3109#   3136    3139#   3166    3169#   3197    3200#   3247    3250#   3286
                        3289#   3325    3328#   3364    3367#   3403    3406#   3446    3449#   3492    3495#   3538    3541#
```

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                          3590    3593#   3639    3643#   3716    3720#   3793    3797#   3870    3874#   3946    3949#   4014
                          4017#   4084    4087#   4186    4189#   4249    4252#   4498    4501#   4774    4777#   4838    4841#
                          4879    4882#   4975    4978#
$SAVRE= ****** U          1568
$SAVR6  007322            1685*   1693    1694*   1695*   1718#
$SCOPE  004134             177    1045#   2194
$SETUP= 000000             998    1046    1248    1345
$SVLAD  004316            1062    1080#
$SVPC = 000040             189#    194
$SWR  = 164000               1#     11     258     259     970     998    1009    1015    1017    1039    1040    1041    1042
                          1053    1065    1067    1068    1069    1070    1071    1083    1089    1715    2275    2301    2326
                          2352    2382    2425    2468    2527    2580    2604    2628    2664    2698    2743    2802    2855
                          2908    2961    3015    3075    3105    3135    3165    3196    3246    3285    3324    3363    3402
                          3445    3491    3537    3589    3638    3715    3792    3869    3945    4013    4083    4185    4248
                          4497    4773    4837    4878    4974
$SWREG  001340             279#    759
$SWRMK= 000000            1042
$TESTN  001322             270#   1081*
$TIMES  001310             258#    998*   1070*   1076    1079*   1089
$TKB    001246             238#   1052    1246    1263    1269    1808    1810    1852    2207
$TKS    001244             237#   1050    1246    1261    1267    1850    2205    5446
$TMP0   001276             253#    814*   1781    2162*   2163*   5076*   5088*   5122*   5133*   5168*   5179*   5220*   5226*
                          5238*   5252*   5272*   5283*   5318*   5329*   5368*   5373*
$TMP1   001300             254#    815*   1783    4429*   4430*   4431    4472*   4473*   4474    4698*   4699*   4700    4752*
                          4753*   4754    4949*   4950*   4951    5035*   5036*   5037    5120*   5136    5146*   5149    5163*
                          5167*   5194*   5201*   5239*   5244*   5270*   5286
$TMP2   001302             255#    817*    838*    865     874*   1785    1975    1978    2065*   4216*   4217*   4415*   4416*
                          4431*   4432    4458*   4459*   4474*   4475    4684*   4685*   4700*   4701    4738*   4739*   4754*
                          4755    4935*   4936*   4951*   4952    5021*   5022*   5037*   5038    5398*   5408*   5421*   5434*
                          5472
$TMP3   001304             256#    818*   1787    1987    1990    1995    1998    2052    2055    2060    2063
$TMP4   001306             257#    819*   1789    1970*   1982*   2148    5104*   5110*
$TN   = 000060               1#     11    2273    2275#   2299    2301#   2324    2326#   2350    2352#   2380    2382#   2423
                          2425#   2466    2468#   2525    2527#   2578    2580#   2602    2604#   2626    2628#   2662    2664#
                          2696    2698#   2741    2743#   2800    2802#   2853    2855#   2906    2908#   2959    2961#   3013
                          3015#   3073    3075#   3103    3105#   3133    3135#   3163    3165#   3194    3196#   3244    3246#
                          3283    3285#   3322    3324#   3361    3363#   3400    3402#   3443    3445#   3489    3491#   3535
                          3537#   3587    3589#   3636    3638#   3713    3715#   3790    3792#   3867    3869#   3943    3945#
                          4011    4013#   4081    4083#   4183    4185#   4246    4248#   4495    4497#   4771    4773#   4835
                          4837#   4876    4878#   4972    4974#
$TPB    001252             240#   1173*   1184    1591*   1855*   2210*
$TPFLG  001257             244#   1122    1184
$TPS    001250             239#   1171    1184    1589    1853    2208
$TRAP   006414             183    1539#
$TRAP2  006436            1550#   1561
$TRP  = 000021            1554#   1563#   1565    1566#   1567#   1568#   1569#   1570#   1571#   1572#   1573#   1574#   1575#
                          1576#   1577#   1578#   1579#   1580#
$TRPAD  006450            1544    1561#
$TSTM   002040             506#
$TSTNM  001202             217#    754*   1038    1080*   1081    1083    1090    1668    1722    1924    1931    1933    2275*
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                          2802*   2855*   2908*   2961*   3015*   3075*   3105*   3135*   3165*   3196*   3246*   3285*   3324*
                          3363*   3402*   3445*   3491*   3537*   3589*   3638*   3715*   3792*   3869*   3945*   4013*   4083*
                          4185*   4248*   4497*   4773*   4837*   4878*   4974*
$TTYIN  005520            1289    1290    1302    1320    1334    1338#
$TYPBN= ****** U          1563
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$TYPE   004414          1122#   1215    1554    1562
$TYPEC  004626          1152    1159    1166    1171#   1172
$TYPEX  004674          1177    1179    1182#
$TYPOC= ****** U        1563
$UNIT   001330           273#
$UNITM  002044           508#
$USWR   001342           280#
$VECT1  001366           305#   2226    2227
$VECT2  001370           306#
$XTSTR  004174          1048    1056#
$Y    = 000000             1#    510#
$$GET4= 000000          1009#
$4OCAT= ****** U        1053
.     = 033316           171#    173     176#    189     190#    192#    194#    196#    200#    204#    214#    262     348#
                         349#    350#    351#    360#    487#    493     494#    496#    498#    541#    543#    544#    545#
                         546#    548#    549#    550#    551#    553#    554#    555#    556#    558#    559#    560#    561#
                         563#    564#    565#    566#    568#    569#    570#    571#    573#    574#    575#    576#    578#
                         579#    580#    581#    583#    584#    585#    586#    588#    589#    590#    591#    593#    594#
                         595#    596#    598#    599#    600#    601#    603#    604#    605#    606#    608#    609#    610#
                         611#    613#    614#    615#    616#    618#    619#    620#    621#    782     792     899#    912
                        1017    1089    1090    1184    1236#   1246    1338#   1339    1345#   1399    1688    1717    1760#
                        1795#   1797#   1851    1854    1875    1968    2009    2092    2096    2142    2173    2206    2209
                        2363    3542    3556    3571    3594    3617    4166    4386    4655
.ADVAN  006060          1439#   1579
.BEGIN  003464           927#
.CNVRT  006170          1472#   1578
.CONVR  006164          1471#   1577
 DATAC  007446          1574    1751#
.DELAY  007332          1572    1724#
.MSTCL  007362          1571    1735#
.RESOS  006132          1460#   1570
.ROMCL  007400          1573    1740#
.SAVOS  006072          1446#   1569
.SCOP1  004364          1094#   1568
.START  002402           201     739#    755    1838
.TIMER  007512          1575    1762#
.$ASTA= ****** U        1188    1191
.$X   = 002034           493#    498
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COMMEN    144#
ENDCOM    144#
ERROR      38#   2287    2312    2338    2368    2398    2411    2441    2454    2488    2509    2544    2562    2590    2614
         2640    2649    2683    2718    2728    2767    2777    2786    2825    2829    2839    2878    2882    2892    2931
         2935    2945    2984    2988    2998    3045    3049    3091    3121    3151    3181    3213    3225    3232    3263
         3271    3302    3310    3341    3349    3380    3388    3421    3467    3506    3514    3522    3560    3575    3623
         3661    3665    3690    3694    3738    3742    3767    3771    3815    3819    3844    3848    3892    3896    3921
         3925    3978    3982    4046    4050    4121    4125    4142    4146    4158    4167    4207    4226    4290    4294
         4311    4315    4341    4345    4362    4366    4378    4387    4405    4425    4434    4448    4468    4477    4540
         4544    4561    4565    4581    4585    4610    4614    4631    4635    4647    4656    4674    4694    4703    4714
         4728    4748    4757    4796    4805    4815    4823    4860    4923    4945    4954    5010    5031    5040    5112
         5228    5433
ESCAPE    144#
GETPRI    144#
GETSWR    144#
HLT       157#
KMEND       1#    960
KMFRNT      1#
MULT      144#
NEWTST    144#   2273    2299    2324    2350    2380    2423    2466    2525    2578    2602    2626    2662    2696    2741
         2800    2853    2906    2959    3013    3073    3103    3133    3163    3194    3244    3283    3322    3361    3400
         3443    3489    3535    3587    3636    3713    3790    3867    3943    4011    4081    4183    4246    4495    4771
         4835    4876    4972
POP       144#   1230    1231    1388    1704    1705    2253
PUSH      144#   1191    1193    1214    1362    1678    1684    2216
REPORT      1#    144#
SCOPE      39#   2274    2300    2325    2351    2381    2424    2467    2526    2579    2603    2627    2663    2697    2742
         2801    2854    2907    2960    3014    3074    3104    3134    3164    3195    3245    3284    3323    3362    3401
         3444    3490    3536    3588    3637    3714    3791    3868    3944    4012    4082    4184    4247    4496    4772
         4636    4877    4973
SETPRI    144#
SETTRA   1554#   1565    1566    1567    1568    1569    1570    1571    1572    1573    1574    1575    1576    1577    1578
         1579
SETUP     144#
SKIP      144#
SLASH     144#
SPACE     144#
STARS     144#    187     210     262     265     490     492     499     968    1035    1107    1186    1245    1251    1280
         1348    1533    1674    1690    2273    2299    2324    2350    2380    2423    2466    2525    2578    2602    2626
         2662    2696    2741    2800    2853    2906    2959    3013    3073    3103    3133    3163    3194    3244    3283
         3322    3361    3400    3443    3489    3535    3587    3636    3713    3790    3867    3943    4011    4081    4183
         4246    4495    4771    4835    4876    4972
SWRSU     144#
TRMTRP   1554#
TYPBIN    144#
TYPDEC    144#
TYPNAM    144#
TYPNUM    144#
TYPOCS    144#
TYPOCT    144#
TYPTXT    144#
$ABORT      1#
$AUTO       1#    824
$BCC        1#   3625    3702    3779    3856
$BINCR      1#   3933    4001
$BINWI      1#   3000
```

```
$BUFFE        1#     1791
$CDATA        1#     4862    4959
$CLOCK        1#     2616
$COMP         1#     3208    3220    3227    3258    3267    3297    3306    3336    3345    3375    3384    3502    3510    3518
             3552    3567    4221    4420    4463    4689    4743    4940    5026
$CRC          1#     3644    3673    3721    3750    3798    3827    3875    3904
$CRCSH        1#     3949    4017
$CYCLE        1#     1862
$EMPTY        1#     4759
$EOP          1#      960
$ERTBL        1#      381
$FINI         1#     5042
$FLAG         1#
$FLOAT        1#     2474    2494    2533    2550
$GETPA        1#
$HALF         1#     4825
$HEADE        1#       11
$INACT        1#     3063    3093    3123    3153
$INIT         1#
$LINE1        1#     2456    2515
$LU1          1#     2263    2289    2314    2340
$LU12         1#     2370
$LU17         1#     2413
$MARHI        1#
$MARK         1#     3477
$MATCH        1#     4210    4408    4451    4677    4731    4928    5014
$MOCK         1#
$MODEM        1#     3524
$MSG          1#     1779
$MULT         1#
$PASEN        1#      974
$PATTE        1#     3390    3431
$PFAIL        1#     1669
$QOQI         1#     5293    5303
$QUEST        1#     1971    1983    1991    2048    2056
$RAMCL        1#     1723
$RCLK         1#     1726    1729    1766    1771    2280    2305    2331    2357    2389    2391    2402    2404    2432    2434
             2445    2447    2478    2480    2499    2501    2536    2538    2554    2556    2584    2608    2634    2643    2670
             2672    2676    2704    2706    2711    2721    2749    2751    2756    2760    2770    2780    2809    2814    2835
             2862    2867    2888    2915    2920    2941    2968    2973    2994    3025    3029    3034    3057    3084    3114
             3144    3174    3206    3216    3218    3256    3265    3295    3304    3334    3343    3373    3382    3415    3455
             3461    3500    3508    3516    3547    3550    3562    3565    3599    3603    3610    3957    3961    3965    3995
             4025    4029    4033    4063    4201    4214    4219    4228    4399    4413    4418    4427    4442    4456    4461
             4470    4668    4682    4687    4696    4708    4722    4736    4741    4750    4792    4799    4809    4817    4844
             4853    4917    4933    4938    4947    5004    5019    5024    5033    5051    5064    5079    5083    5086    5092
             5095    5106    5124    5128    5131    5137    5150    5153    5170    5174    5177    5183    5203    5205    5222
             5274    5278    5281    5287    5297    5307    5320    5324    5327    5340    5343    5354    5356    5371    5385
             5387
$RCRC         1#     4172
$PEC          1#     3183    3234    3273    3312    3351
$ROVAR        1#      331
$SCADO        1#     1046
$SCAD1        1#     1085
$SIMBC        1#     5232
$SINAC        1#
$SOFTC        1#     1799
```

```
$STUFF       1#
$SWPAC       1#    2568    2592
$TCHAR       1#    4090    4189    4255    4504
$TCRC        1#    4069    4231    4479
$TRANW       1#    4109    4278    4329    4528    4598
$TRAN1       1#    2651    2685    2730
$TSTN        1#    2271    2297    2322    2348    2378    2421    2464    2523    2576    2600    2624    2660    2694    2739
           2798    2851    2904    2957    3011    3071    3101    3131    3161    3192    3242    3281    3320    3359    3398
           3441    3487    3533    3585    3634    3711    3788    3865    3941    4009    4079    4181    4244    4493    4769
           4833    4874    4970
$UPADD       1#    1697
$VARIA       1#     203
$WINDO       1#    2788    2841    2894    2947
$XZ          1#    2263    2269    2289    2295    2314    2320    2340    2346    2370    2376    2413    2419    2456    2462
           2515    2521    2568    2574    2592    2598    2616    2622    2651    2658    2685    2692    2730    2737    2798
           2796    2841    2949    2894    2902    2947    2955    3000    3009    3063    3069    3093    3099    3123    3129
           3153    3159    3183    3190    3234    3240    3273    3279    3312    3318    3351    3357    3390    3396    3431
           3439    3477    3485    3524    3531    3577    3583    3625    3632    3702    3709    3779    3786    3856    3863
           3933    3939    4001    4007    4069    4077    4172    4179    4231    4242    4479    4491    4759    4767    4825
           4831    4862    4872    4959    4968
$ZEROS       1#
$$CMRE     208#     247     248     249     250     251     252
$$CMTM     208#     253     254     255     256     257
$$ESCA     144#
$$NEWT     144#    2273    2299    2324    2350    2380    2423    2465    2525    2578    2602    2626    2662    2696    2741
           2800    2853    2906    2959    3013    3073    3103    3133    3163    3194    3244    3283    3322    3361    3400
           3443    3489    3535    3587    3636    3713    3790    3867    3943    4011    4081    4183    4246    4495    4771
           4835    4876    4972
$$SCOP       1#    1029
$$SET     1554#    1565    1566    1567    1568    1569    1570    1571    1572    1573    1574    1575    1576    1577    1578
           1579
$$SKIP     144#
.EQUAT       1#      34
.HEADE       1#
.SETUP       1#
.$ACT1       1#     185
.$APTB       1#     263#
.$APTH       1#     488
.$APTY       1#    1184
.$CATC       1#
.$CMTA       1#     208
.$EOP        1#     966
.$ERRO       1#
.$ERRT       1#
.$POWE       1#    1672
.$RDOC       1#    1346
.$READ       1#    1243
.$SCOP       1#    1033
.$TRAP       1#    1531
.$TYPE       1#    1105
.$TYPO       1#

. ABS.  033316      000
```

```
 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 DZKCE0,DZKCE/SOL/CRF←DZKCE.MAC,DZKCE.P11/EQ:DZDME
 RUN-TIME: 30 27 2 SECONDS
 RUN-TIME RATIO: 2064/60=34.3
 CORE USED:  53K  (106 PAGES)
```