DMC11

HIGH SPD JUMP/FREE RUN

MD-11-DZDMH-A

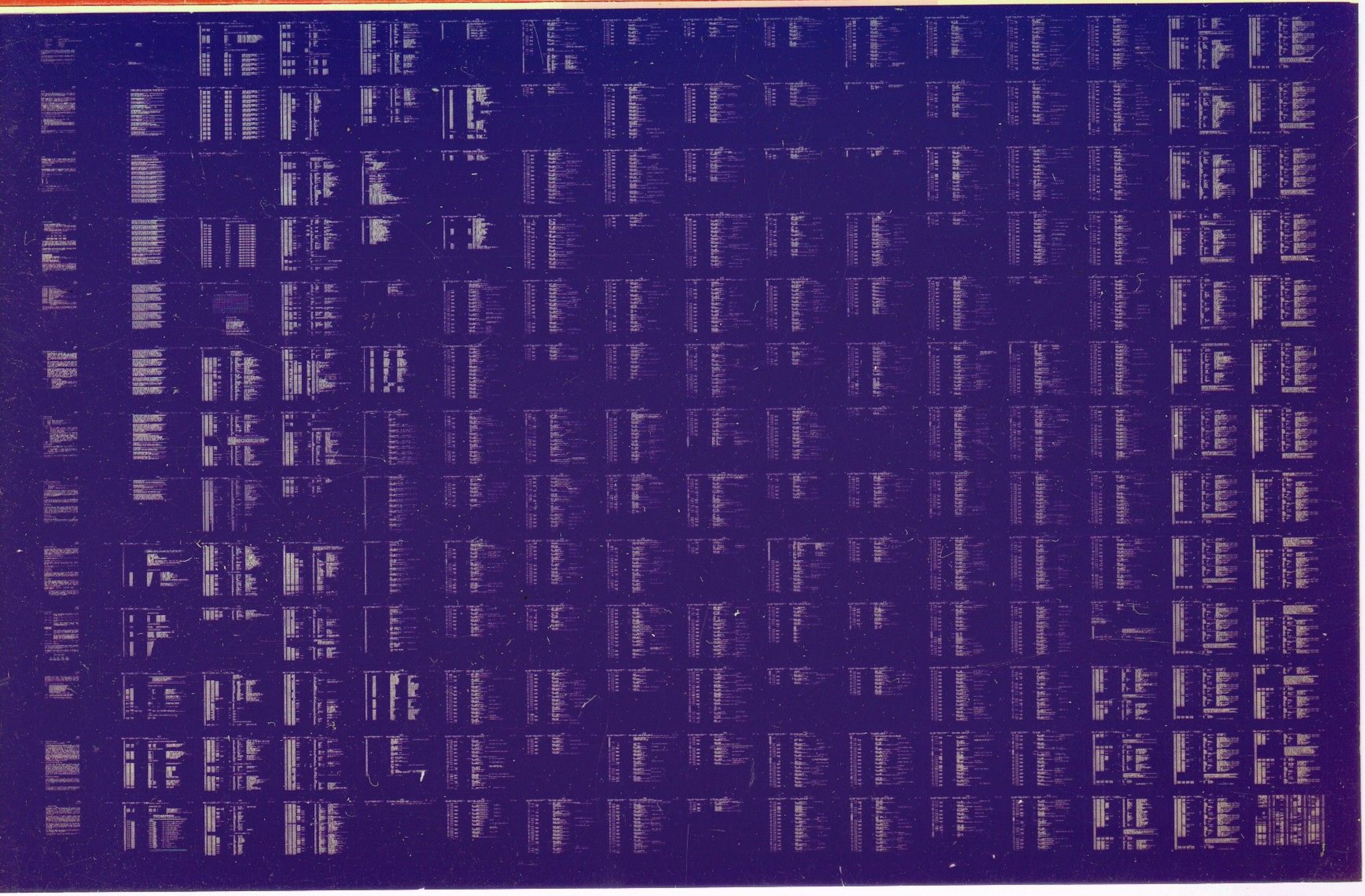
EP DZDMH A DL A

FICHE 1 OF 2

MAR 1977

digital

MADE IN USA



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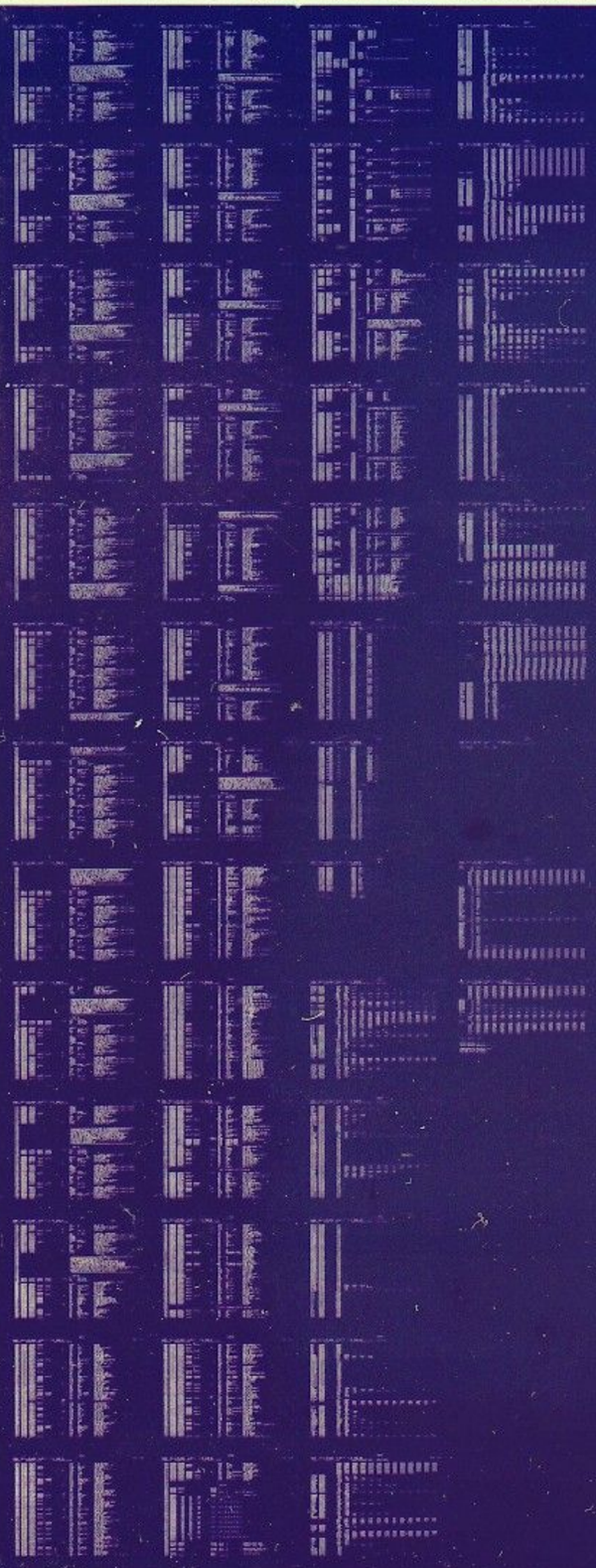


IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDMH-A-D

PRODUCT NAME: DMC11 HIGH SPEED JUMP AND FREE RUNNING TESTS

DATE: JANUARY 1977

MAINTAINER: DIAGNOSTICS

AUTHOR: FAY BASHAW

1. ABSTRACT

The function of the DMC11 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 DMC11 are correct in its environment.

Parameters must be set up to alert the diagnostics to the DMC11 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.

DZDMH tests the DMC11-AL micro-processor (M8200-YB) with high speed crom, or the KMC11 micro-processor (M8204). It performs jump tests on the micro-processor, verifies the control ROM of the M8200-YB, and tests the CRAM and other unique functions of the M8204. If a DMC11-AL (M8200-YB) and line unit (M8202-YA or M8202-YD) are present, free-running tests are performed. These tests are skipped if a KMC (M8204) or no line-unit is present. The best test is with a line-unit installed. DZDMH can be used as a Heat Test Diagnostic by Manufacturing.

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

NOTE: Additional diagnostics may be added in the future.

The four diagnostics are:

1. DZDMC [REV] Basic W/R and Micro-processor tests
2. DZDME [REV] DDCMP Line unit tests
3. DZDMF [REV] BITSTUFF Line unit tests
4. DZDMG [REV] Low speed jump and Free-running tests (Heat test tape) NOTE: DZDMG IS RUN ONLY ON A DMC11-AR (M8200-YA).
   DZDMH [REV] High speed jump and Free-running tests (Heat test tape) NOTE: DZDMH IS RUN ONLY ON A DMC11-AL (M8200-YB).

2. REQUIREMENTS

2.1 EQUIPMENT

Any PDP11 family CPU (except an LSI-11) with minimum 8k memory
ASR 33 (or equilivalent)
DMC11-AL (M8200-YB) or an KMC11-A (M8204) with a DMC11-MA or a DMC11-MD

2.2 STORAGE

Program will use all 8K of memory except where ABL and BOOTSTRAP LOADER reside. Locations 1500 thru 1640; 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 DMC11 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 DMC11 STATUS

PC	CSR	STAT1	STAT2	STAT3
001500	160010	145310	177777	000000
001510	160020	145320	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. 1500 in the program. In this example the table contains the information and status of two DMC11'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 DMC11'S TO BE TESTED?1

01
CSR ADDRESS?160010
VECTOR ADDRESS?310
BR PRIORITY LEVEL?  (4,5,6,7)?5
DOES MICRO-PROCESSOR HAVE CRAM?  (Y OR N)N
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 DMC11'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 DMC11'S DESIRED ACTIVE. Please note that a message is typed out for setting the switch register equal to DMC11's active. this means if the system has four DMC11s; bits 00,01,02,03 will be set in loc 'DMACTV' from the switch register. Using this switch(SW00) alters that location;therefore if four DMC11s 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 DMC11s 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 DMC desired active. EXAMPLE: If you have 4 DMC'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 DMC11 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 DMC11'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 DMC11 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 'TSTNO' (address 1226)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 DMC11 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 DMC11 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 DMC 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

DMC11(M8200)- Jumper W1 must be in, and switch 7 of E76 must be in the OFF position.

KMC(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 DMC11 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 DMC11'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 DZDMH CSR:  175000 VEC:  0300 PASSES:  000001
ERRORS:  000000
```

NOTE: The pass count and error counts are cummulitive for each DMC11 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 DMC11 since the diagnostic was started are reflected in PASSES: and ERRORS:.

8.4 KEY LOCATIONS

RETURN (1214) Contains the address where program will return when iteration count is reached or if loop on test is asserted.

NEXT (1216) Contains the address of the next test to be peformed.

TSTNO (1226) Contains the number of the test now being peformed.

RUN (1316) The bit in 'RUN' always points to the DMC11 currently being tested. EXAMPLE: (RUN) 1302/0000000001000000 Means that DMC11 no.06 is the DMC11 now running.

DMCR00-DMCR17
DMST00-DMST17
(1500)-(1640)

These locations contain the information needed to test up to 16 (decimal) DMC11s sequentialy. they contain the CSR,VECTOR and STATOS concerning the configuration of each DMC11.

DMACTV (1306) Each bit set in this location indicates that the associated DMC11 will be tested in turn. EXAMPLE: (DMACTV) 1276/0000000000011111 means that DMC11 no. 00,01,02,03,04 will be tested. EXAMPLE: (DMACTV) 1276/0000000000010001 Means that DMC11 no. 00,04 will be tested.

DMCSR (1404) Contains the CSR of the current DMC11 under test.

8.4A 'STATUS TABLE' (1500-1640)

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 DMC11'S. the table can contain up to 16 DMC11'S. Following the map is a description of the bits for each map entry

MAP OF DMC11 STATUS

PC	CSR	STAT1	STAT2	STAT3
001500	160010	145310	177777	000000
001510	160020	016320	000000	000000

Each map entry contains 4 words which contain the status information for 1 DMC11. The PC shows where in core memory the first of the 4 words is. In the example above the first DMC'S status is in locations, 1500, 1502, 1504, and 1506. The second DMC status is located at 1510, 1512, 1514, and 1516. The information contained in each 4 word entry is defined as follows:

CSR: Contains DMC11 CSR address

STAT1: BITS 00-08 IS DMC11 VECTOR ADDRESS
BIT15=1 MICRO-PROCESSOR HAS CRAM
BIT15=0 MICRO-PROCESSOR HAS CROM
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 DMC11 BR PRIORITY LEVEL

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

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

8.5 METHOD OF AUTO SIZING

8.5.1 FINDING THE CONTROL STATUS REGISTER.

The auto-sizing routine finds a DMC11 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 CROM address is written to a 125252 then it is read back. If it contains a -1 or 125252 or 63220 a DMC11 or KMC11 has been found, if not, the address is updated by 10 and the search continues. A -1 indicates a DMC11 with no CROM, a 125252 indicates a KMC11 with CRAM and a 63220 indicates a DMC11 with the DDCMP CROM. 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 DMC11's in the system will be found by the auto-sizer. If it does not find a DMC11 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 DMC is programmed to interrupt. The PS is lowered by 1 until the DMC interrupts, a delay is made and if no interupt occures at PS level 3 (because of a bad DMC11) 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 DMC11 interupted to is picked up and reported as the vector. NOTE: if the vector reported is not the vector set up by you; there is a problem and AUTO SIZING should not be done.

8.6 SOFTWARE SWITCH REGISTER

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

Control:

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

SWR=XXXXXX NEW?

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

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

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

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

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

DOCUMENT
****
DZDMH LST
****

```
6       MAINDEC-11-DZDMH-A   DMC11 LOCAL CROM, JUMP, AND FREE RUNNING TESTS
        COPYRIGHT 1976, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
        ------------------------------------------------------------------------

1626    ************************** TEST 1 **************************
        TEST OF BR RIGHT SHIFT
        VERIFY THAT A DEST OF BR RSH (011) OF A MICRO-INSTRUCTION
        SHIFTS THE RESULTING BR DATA RIGHT ONCE.

1666    ************************** TEST 2 **************************
        IOP CRAM WRITE/READ TEST
        FLOAT A 1 THROUGH EACH CRAM LOCATION

1700    ************************** TEST 3 **************************
        IOP CRAM WRITE/READ TEST
        FLOAT A 0 THROUGH EACH CRAM LOCATION

1737    ************************** TEST 4 **************************
        IOP CRAM DUAL ADDRESSING TEST
        WRITE EACH ADDRESS INTO ITSELF,READ EACH
        ADDRESS TO VERIFY CORRECT ADDRESSING

1783    ************************** TEST 5 **************************
        IOP CRAM READ TEST
        THIS TEST WRITES THE CRAM WITH THE CROM MICRO-CODE MAP
        THEN READS IT BACK AND COMPARES EACH ADDRESS WITH THE
        DUPLICATE OF THE CROM MICRO-CODE.

1820    ************************** TEST 6 **************************
        IOP MAIN MEMORY TEST
        FLOAT A 1 THROUGH ALL MAIN MEMORY LOCATIONS

1866    ************************** TEST 7 **************************
        IOP MAIN MEMORY TEST
        FLOAT A 0 THROUGH ALL MAIN MEMORY LOCATIONS

1914    ************************** TEST 10 *************************
        IOP MAIN MEMORY DUAL ADDRESSING TEST
        LOAD EACH MEMORY LOCATION WITH ITS OWN ADDRESS
        READ BACK EACH LOCATION TO VERIFY CORRECT ADDRESSING

1982    ************************** TEST 11 *************************
        IOP MAR TEST
        PERFORM DUAL ADDRESSING TEST
        USING MAR AUTO-INC FEATURE

2022    ************************** TEST 12 *************************
        IOP (CRAM) ODT BITS TEST
        LOAD MAR WITH A 0 INC MAR UNTIL IT OVERFLOWS (2000 TIMES)
        VERIFY THAT IBUS* 10 BITS IS SET ONLY WHEN MAR BIT 8 IS A ONE
        AND THAT IBUS* 10 BIT6 IS SET ON MAR OVERFLOW(2000)
```

```
2083    ********************** TEST 13 **************************
        CROM READ TEST
        THIS TEST READS EACH ROM LOCATION AND COMPARES

2086    IT TO A SOFTWARE DUPLICATE OF THE CROM. THIS TEST
        ALSO TESTS THE JUMP(I) MICRO-PROCESSOR INSTRUCTION.

2132    ********************** TEST 14 **************************
        CROM TEST OF JUMP(I) NEVER MICRO-PROCESSOR INSTRUCTION.
        PERFORM THE JUMP INSTRUCTION
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).

2189    ********************** TEST 15 **************************
        CROM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
        PERFORM THE JUMP INSTRUCTION
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2242    ********************** TEST 16 **************************
        CROM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
        SET THE C BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2298    ********************** TEST 17 **************************
        CROM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
        SET THE Z BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2354    ********************** TEST 20 **************************
        CROM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2410    ********************** TEST 21 **************************
        CROM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2466    ********************** TEST 22 **************************
        CROM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2522    ********************** TEST 23 **************************
        CROM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC

2578    ********************** TEST 24 **************************
        CROM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
```

```
2635    ************************** TEST 25 ****************************
        CROM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).

2692    ************************** TEST 26 ****************************
        CROM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).

2749    ************************** TEST 27 ****************************
        CROM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).

2806    ************************** TEST 30 ****************************
        CROM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).

2863    ************************** TEST 31 ****************************
        CROM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THAT THE JUMP DID NOT OCCUR BY READING
        THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).

2920    ************************** TEST 32 ****************************
        CRAM TEST OF JUMP(I) NEVER MICRO-PROCESSOR INSTRUCTION.
        PERFORM THE JUMP INSTRUCTION
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT

2926    THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

2982    ************************** TEST 33 ****************************
        CRAM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
        PERFORM THE JUMP INSTRUCTION
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37
```

```
3041    ************************** TEST 34 ****************************
        CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
        SET THE C BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3103    ************************** TEST 35 ****************************
        CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
        SET THE Z BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3165    ************************** TEST 36 ****************************
        CRAM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3227    ************************** TEST 37 ****************************
        CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3289    ************************** TEST 40 ****************************
        CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37
```

```
3351    ************************** TEST 41 ****************************
        CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
        SET THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
        THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
        THEN PORT4 WILL CONTAIN A 37

3413    ************************** TEST 42 ****************************
        CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3475    ************************** TEST 43 ****************************
        CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3537    ************************** TEST 44 ****************************
        CRAM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE

3542    BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3599    ************************** TEST 45 ****************************
        CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37
```

```
3661    ************************** TEST 46 ***************************
        CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3723    ************************** TEST 47 ***************************
        CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
        CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
        VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
        IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
        BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
        THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
        THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
        THEN PORT4 CONTAINS A 37

3785    ************************** TEST 50 ***************************
        FREE RUNNING FLAG MODE DATA TEST
        TRANSMIT A MESSAGE AND VERIFY THE RECEIVED DATA
        IF NO TURNAROUND CONNECTOR IS ON LINE UNIT LOOP IS SET.
        ALL FOLLOWING TESTS ARE FREE RUNNING AND ARE PERFORMED
        ONLY ON DMC'S WITH LINE UNITS. IF YOU WISH TO PERFORM
        THESE FREE RUNNING TESTS ON A KMC (NORMALLY THE FREE RUNNING TESTS
        WILL FAIL ON A KMC, THE TIMER IS TOO FAST) THEN YOU MUST
        MANUALLY SET BIT0 OF STAT3 IN THE STATUS MAP.

3960    ************************** TEST 51 ***************************
        OVERUN TEST
        IN FREE RUNNING MODE SEND MESSAGE WITH NO RECEIVE
        BUFFER AVAILABLE, VERIFY THAT AN OVERRUN ERROR OCCURS

4016    ************************** TEST 52 ***************************
        LOST DATA TEST
        IN FREE RUNNING MODE SEND A MESSAGE LONGER THAN THE RECEIVE
        BUFFER, VERIFY THAT A LOST DATA ERROR OCCURS.

4065    ************************** TEST 53 ***************************
        TRANSMIT NON-EXISTENT MEMORY TEST
        IN FREE RUNNING MODE, LOAD A TRANSMIT BA THAT WILL TIME OUT
        VERIFY THAT A NON-EXISTENT MEMORY ERROR OCCURS

4111    ************************** TEST 54 ***************************
        RECEIVE NON-EXISTENT MEMORY TEST
        IN FREE RUNNING MODE, LOAD A RECEIVE BA THAT WILL TIME OUT
        VERIFY THAT A NON-EXISTENT MEMORY ERROR OCCURS
```

```
4160    ************************** TEST 55 **************************
        PROCESSOR ERROR TEST
        IN FREE RUNNING MODE, DO A BASE TRANSFER REQUEST AFTER A
        BASE HAS BEEN SET UP, VERIFY THAT A PROCESSOR ERROR OCCURS.

4204    ************************** TEST 56 **************************
        PROCESSOR ERROR TEST
        IN FREE RUNNING MODE DO A RQI WITH AN ILLEGAL IO CODE
        VERIFY THAT A PROCESSOR ERROR OCCURS

4248    ************************** TEST 57 **************************
        HALF DUPLEX TEST
        IN FREE RUNNING MODE, SET HALF DUPLEX AND L U LOOP
        SEND A MESSAGE AND VERIFY THAT THERE ARE NO DONES

4288    ************************** TEST 60 **************************
        FREE RUNNING DATA TEST (INTERRUPT DRIVEN EXERCISER)
        THIS TEST REPEATEDLY QUEUES UP 7 RECEIVE BUFFERS AND
        7 TRANSMIT BUFFERS AND CHECKS DATA WHEN ALL 7 BUFFERS
        ARE RECEIVED. TRANSMIT COUNTS RANGE FROM 1 TO 104, ALSO
        ODD AND EVEN TRANSMIT AND RECEIVE BA'S ARE USED. DATA
        IS A BINARY COUNT PATTERN. THE RESUME FUNCTION IS CHECKED IN THIS TEST
```

```
                        ;*MAINDEC-11-DZDMH-A   DMC11 LOCAL CROM, JUMP, AND FREE RUNNING TESTS
                        ;*COPYRIGHT 1976, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        ;*-------------------------------------------------------------

                        ;STARTING PROCEDURE
                        ;LOAD PROGRAM
                        ;LOAD ADDRESS 000200
                        ;SWR=0  AUTOSIZE DMC11
                        ;SW07=1  USE CURRENT DMC11 PARAMETERS
                        ;SW00=1  INPUT NEW DMC11 PARAMETERS
                        ;PRESS START
                        ;PROGRAM WILL TYPE "MAINDEC-11-DZDMH-A   DMC11 LOCAL CROM, JUMP, AND FREE RUNNIN
                        ;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


                        ;SWITCH REGISTER OPTIONS
                        ;----------------------

100000                  SW15=100000             ;=1,HALT ON ERROR
040000                  SW14=40000              ;=1,LOOP ON CURRENT TEST
020000                  SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
010000                  SW12=10000              ;=1,DELETE TYPEOUT/BELL ON ERROR.
004000                  SW11=4000               ;=1,INHIBIT ITERATIONS
002000                  SW10=2000               ;=1,ESCAPE TO NEXT TEST ON ERROR
001000                  SW09=1000               ;=1,LOOP WITH CURRENT DATA
000400                  SW08=400                ;=1,LOOP ON ERROR
000200                  SW07=200                ;=1,USE CURRENT DMC11 PARAMETERS, =0,AUTOSIZE DMC11
000100                  SW06=100                ;=1, HALT BEFORE CLOCKING MICRO-PROCESSOR INSTRUCTION
000040                  SW05=40
000020.                 SW04=20

000010                  SW03=10                 ;RESELECT DMC11'S TO BE TESTED (ACTIVE)
000004                  SW02=4                  ;LOCK ON TEST SELECT
000002                  SW01=2                  ;RESTART PROGRAM AT SELECTED TEST
000001                  SW00=1                  ;INPUT DMC11 PARAMETERS
```

```
                                ;REGISTER DEFINITIONS
                                ;--------------------

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

                                ;LOCATION EQUIVALENCIES
                                ;----------------------

177776                          PS=177776       ;PROCESSOR STATUS WORD
001200                          STACK=1200      ;START OF PROCESSOR STACK

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

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

                                ;BIT DEFINITIONS
                                ;---------------

100000                          BIT15=100000
040000                          BIT14=40000
020000                          BIT13=20000
010000                          BIT12=10000
004000                          BIT11=4000
002000                          BIT10=2000
001000                          BIT9=1000
000400                          BIT8=400
000200                          BIT7=200
000100                          BIT6=100
000040                          BIT5=40
000020                          BIT4=20
000010                          BIT3=10
000004                          BIT2=4
000002                          BIT1=2
000001                          BIT0=1
```

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

                                        .=0
                                        ;STANDARD INTERRUPT VECTORS
                                        ;-------------------------

                                        .=24
000024  005240                                  .PFAIL                  ;POWER FAIL HANDLER
000026  000340                                  340                     ;SERVICE AT LEVEL 7
000030  004656                                  .HLT                    ;ERROR HANDLER
000032  000340                                  340                     ;SERVICE AT LEVEL 7
000034  004624                                  .TRPSRV                 ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                                  340                     ;SERVICE AT LEVEL 7
                                        .=40
000040  000000                                  0                       ;SAVE FOR ACT-11 OR XXDP
000042  000000                                  0                       ;RETURN ADDRESS IF UNDER ACT-11 OR XXDP
000044  000000                                  0                       ;SAVE FOR ACT-11 OR XXDP
000046  003432                                  $ENDAD                  ;FOR USE WITH ACT-11 OR XXDP
                                        .=52
000052  000000                                  0                       ;ACT-11 PROGRAM CHARACTERISTICS

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

                                        .=200
000200  000137  002002                          JMP     .START          ;GO TO START OF PROGRAM

                                        .=1000
001000  005377  040515  047111         MTITLE: .ASCII  <377><12>/MAINDEC-11-DZDMH-A/<377>
(2)  001025     104     041515  030461         .ASCIZ  /DMC11 LOCAL CROM, JUMP, AND FREE RUNNING TESTS/<377>
(2)
                                        .=1200

                                        ;INDIRECT POINTERS TO SWITCH REGISTER AND LIGHT DISPLAY
                                        ;-----------------------------------------------------

001200  177570                         DISPLAY:177570
001202  177570                         SWR:    177570
```

```
                                ;INDIRECT POINTERS TO TELETYPE VECTORS AND REGISTERS
                                ;---------------------------------------------------

001204  177560                 TKCSR:  177560          ;TELETYPE KEYBOARD CONTROL REGISTER
001206  177562                 TKDBR:  177562          ;TELETYPE KEYBOARD DATA BUFFER
001210  177564                 TPCSR:  177564          ;TELEPRINTER CONTROL REGISTER
001212  177566                 TPDBR:  177566          ;TELEPRINTER DATA BUFFER

                                ;PROGRAM CONTROL PARAMETERS
                                ;--------------------------

001214  000000                 RETURN: 0               ;SCOPE ADDRESS FOR LOOP ON TEST
001216  000000                 NEXT:   0               ;ADDRESS OF NEXT TEST TO BE EXECUTED
001220  000000                 LOCK:   0               ;ADDRESS FOR LOCK ON CURRENT DATA
001222  000003                 ICOUNT: 3               ;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE
001224  000000                 LPCNT:  0               ;NUMBER OF ITEREATIONS COMPLETED
001226  000000                 TSTNO:  0               ;NUMBER OF TEST IN PROGRESS
001230  000000                 PASCNT: 0               ;NUMBER OF PASSES COMPLETED
001232  000000                 ERRCNT: 0               ;TOTAL NUMBER OF ERRORS
001234  000000                 LSTERR: 0               ;PC OF LAST ERROR CALL

                                ;PROGRAM VARIABLES
                                ;-----------------

001236  000000                 STRTSW: 0               ;SWITCHES AT START OF PROGRAM
001240  000000                 STAT:   0               ;DM STATUS WORD STORAGE
001242  000000                 CLKX:   0
001244  000000                 MASKX:  0
001246  000000                 TEMP1:  0               ;TEMPORARY STORAGE
001250  000000                 TEMP2:  0               ;TEMPORARY STORAGE
001252  000000                 TEMP3:  0               ;TEMPORARY STORAGE
001254  000000                 TEMP4:  0               ;TEMPORARY STORAGE
001256  000000                 TEMP5:  0               ;TEMPORARY STORAGE
001260  000000                 SAVR0:  0               ;R0 STORAGE
001262  000000                 SAVR1:  0               ;R1 STORAGE
001264  000000                 SAVR2:  0               ;R2 STORAGE
001266  000000                 SAVR3:  0               ;R3 STORAGE
001270  000000                 SAVR4:  0               ;R4 STORAGE
001272  000000                 SAVR5:  0               ;R5 STORAGE
001274  000000                 SAVSP:  0               ;STACK POINTER STORAGE
001276  000000                 SAVPC:  0               ;PROGRAM COUNTER STORAGE
001300  000000                 ZERO:   0
001302  000001                 ONE:    1
001304  000000                 MEMLIM: 0               ;HIGHEST LOCATION FOR NPR'S
001306  000001                 DMACTV: .BLKW 1         ;DMC11'S SELECTED ACTIVE.
001310  000001                 DMNUM:  .BLKW 1         ;OCTAL NUMBER OF DMC11'S.
001312  000001                 SAVACT: .BLKW 1         ;ORIGINAL ACTV  DEVICES
001314  000001                 SAVNUM: .BLKW 1         ;WORKABLE NUMBER
001316  000000                 RUN:    0               ;POINTER TO RUNNING DEVICE.
                               .EVEN
001320  001472                 CREAM:  DM.MAP-6        ;TABLE POINTER.
001322  001676                 MILK:   CNT.MAP-4       ;TABLE POINTER
```

```
                                        ;PROGRAM CONTROL FLAGS
                                        ;--------------------

001324  000                           INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
001325  000                           ERRFLG: .BYTE   0               ;ERROR OCCURED FLAG
001326  000                           LOKFLG: .BYTE   0               ;LOCK ON CURRENT TEST FLAG
001327  000                           QV.FLG: .BYTE   0               ;QUICK VERIFY FLAG.
                                                                      ;ON FIRST PASS OF EACH DMC11 ITERATIONS WILL BE
                                        .EVEN

                                                ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
                                                ;POINTERS TO SUBROUTINES CAN BE FOUND
                                                ;IN THE TABLE IMMEDIATLY FOLLOWING THE DEFINITIONS

                                        ;:*****************************************************************
                                        ;-----------------------------------------------------------------
001330                                  .TRPTAB:
        104400                          SCOPE=TRAP+0                    ;CALL TO SCOPE LOOP AND ITERATION HANDLER
001330  003506                                  .SCOPE
        104401                          SCOP1=TRAP+1                    ;CALL TO LOOP ON CURRENT DATA HANDLER
001332  003644                                  .SCOP1
        104402                          TYPE=TRAP+2                     ;CALL TO TELETYPE OUTPUT ROUTINE
001334  003674                                  .TYPE
        104403                          INSTR=TRAP+3                    ;CALL TO ASCII STRING INPUT ROUTINE
001336  003756                                  .INSTR
        104404                          INSTER=TRAP+4                   ;CALL TO INPUT ERROR HANDLER
001340  004062                                  .INSTER
        104405                          PARAM=TRAP+5                    ;CALL TO NUMERICAL DATA INPUT ROUTINE
001342  004102                                  .PARAM
        104406                          SAVO5=TRAP+6                    ;CALL TO REGISTER SAVE ROUTINE
001344  004302                                  .SAVO5
        104407                          RESO5=TRAP+7                    ;CALL TO REGISTER RESTORE ROUTINE
001346  004342                                  .RESO5
        104410                          CONVRT=TRAP+10                  ;CALL TO DATA OUTPUT ROUTINE
001350  004374                                  .CONVRT
        104411                          CNVRT=TRAP+11                   ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001352  004400                                  .CNVRT
        104412                          MSTCLR=TRAP+12                  ;CALL TO ISUE A MASTER CLEAR
001354  005370                                  .MSTCLR
        104413                          DELAY=TRAP+13                   ;CALL TO DELAY
001356  005340                                  .DELAY
        104414                          ROMCLK=TRAP+14                  ;CALL TO CLOCK ROM ONCE
001360  005406                                  .ROMCLK
        104415                          DATACLK=TRAP+15                 ;CALL TO CLK DATA
001362  005454                                  .DATACLK
        104416                          TIMER=TRAP+16                   ;CALL TO DELAY A CLOCK TICK
001364  005520                                  .TIMER

                                        ;-----------------------------------------------------------------
                                        ;:*****************************************************************
```

```
                                        ;DMC11 CONTROL INDICATORS FOR CURRENT DMC11 UNDER TEST
                                        ;----------------------------------------------------

001366  000000                          STAT1:  0
001370  000000                          STAT2:  0
001372  000000                          STAT3:  0

                                        ;DMC11 VECTOR AND REGISTER INDIRECT POINTERS
                                        ;-------------------------------------------

001374  000000                          DMRVEC: 0               ;POINTER TO DMC11 RECEIVER INTERRUPT VECTOR
001376  000000                          DMRLVL: 0               ;POINTER TO DMC11 RECEIVER INTERRUPT SERVICE PS
001400  000000                          DMTVEC: 0               ;POINTER TO DMC11 TRANSMITTER INTERRUPT VECTOR
001402  000000                          DMTLVL: 0               ;POINTER TO DMC11 TRANSMITTER INTERRUPT SERVICE PS
001404  000000                          DMCSR:  0               ;POINTER TO DMC11 CONTROL STATUS REGISTER
001406  000000                          DMCSRH: 0               ;POINTER TO DMC11 CONTROL STATUS REGISTER HIGH BYTE.
001410  000000                          DMCTL:  0               ;POINTER TO DMC11 CONTOL OUT REGISTER
001412  000000                          DMP04:  0               ;POINTER TO DMC11 PORT REGISTER(SEL 4)
001414  000000                          DMP06:  0               ;POINTER TO DMC11 PORT REGISTER(SEL 6)

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

001416  000000                          TEMP:   0
        001460                          .=.+40

                                        ;DMC11 STATUS TABLE AND ADDRESS ASSIGNMENTS
                                        ;------------------------------------------

        001500                          .=1500
001500                                  DM.MAP:
001500  000001                          DMCR00: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 00
001502  000001                          DMS100: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 00
001504  000001                          DMS200: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 00
001506  000001                          DMS300: .BLKW   1               ;3RD STATUS WORD

001510  000001                          DMCR01: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 01
001512  000001                          DMS101: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 01
001514  000001                          DMS201: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 01
001516  000001                          DMS301: .BLKW   1               ;3RD STATUS WORD

001520  000001                          DMCR02: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 02
001522  000001                          DMS102: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 02
001524  000001                          DMS202: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 02
001526  000001                          DMS302: .BLKW   1               ;3RD STATUS WORD

001530  000001                          DMCR03: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 03
001532  000001                          DMS103: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 03
001534  000001                          DMS203: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 03
001536  000001                          DMS303: .BLKW   1               ;3RD STATUS WORD

001540  000001                          DMCR04: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 04
001542  000001                          DMS104: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 04
001544  000001                          DMS204: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 04
001546  000001                          DMS304: .BLKW   1               ;3RD STATUS WORD
```

```
304
305  001550  000001                DMCR05: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 05
306  001552  000001                DMS105: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 05
307  001554  000001                DMS205: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 05
308  001556  000001                DMS305: .BLKW   1       ;3RD STATUS WORD
309
310  001560  000001                DMCR06: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 06
311  001562  000001                DMS106: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 06
312  001564  000001                DMS206: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 06
313  001566  000001                DMS306: .BLKW   1       ;3RD STATUS WORD
314
315  001570  000001                DMCR07: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 07
316  001572  000001                DMS107: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 07
317  001574  000001                DMS207: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 07
318  001576  000001                DMS307: .BLKW   1       ;3RD STATUS WORD
319
320  001600  000001                DMCR10: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 10
321  001602  000001                DMS110: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 10
322  001604  000001                DMS210: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 10
323  001606  000001                DMS310: .BLKW   1       ;3RD STATUS WORD
324
325  001610  000001                DMCR11: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 11
326  001612  000001                DMS111: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 11
327  001614  000001                DMS211: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 11
328  001616  000001                DMS311: .BLKW   1       ;3RD STATUS WORD
329
330  001620  000001                DMCR12: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 12
331  001622  000001                DMS112: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 12
332  001624  000001                DMS212: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 12
333  001626  000001                DMS312: .BLKW   1       ;3RD STATUS WORD
334
335  001630  000001                DMCR13: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 13
336  001632  000001                DMS113: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 13
337  001634  000001                DMS213: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 13
338  001636  000001                DMS313: .BLKW   1       ;3RD STATUS WORD
339
340  001640  000001                DMCR14: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 14
341  001642  000001                DMS114: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 14
342  001644  000001                DMS214: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 14
343  001646  000001                DMS314: .BLKW   1       ;3RD STATUS WORD
344
345  001650  000001                DMCR15: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 15
346  001652  000001                DMS115: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 15
347  001654  000001                DMS215: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 15
348  001656  000001                DMS315: .BLKW   1       ;3RD STATUS WORD
349
350  001660  000001                DMCR16: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 16
351  001662  000001                DMS116: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 16
352  001664  000001                DMS216: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 16
353  001666  000001                DMS316: .BLKW   1       ;3RD STATUS WORD
354
355  001670  000001                DMCR17: .BLKW   1       ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 17
356  001672  000001                DMS117: .BLKW   1       ;VECTOR FOR DMC11 NUMBER 17
357  001674  000001                DMS217: .BLKW   1       ;DDCMP LINE# FOR DMC11 NUMBER 17
358  001676  000001                DMS317: .BLKW   1       ;3RD STATUS WORD
359
```

360 001700 000000 DM.END: 000000

```
                                ;DMC11 PASS COUNT AND ERROR COUNT TABLE
                                ;--------------------------------------

001702                          CNT.MAP:
001702  000000                  PACT00: 0               ;PASS COUNT FOR DMC11 NUMBER 00
001704  000000                  ERCT00: 0               ;ERROR COUNT FOR DMC11 NUMBER 00

001706  000000                  PACT01: 0               ;PASS COUNT FOR DMC11 NUMBER 01
001710  000000                  ERCT01: 0               ;ERROR COUNT FOR DMC11 NUMBER 01

001712  000000                  PACT02: 0               ;PASS COUNT FOR DMC11 NUMBER 02
001714  000000                  ERCT02: 0               ;ERROR COUNT FOR DMC11 NUMBER 02

001716  000000                  PACT03: 0               ;PASS COUNT FOR DMC11 NUMBER 03
001720  000000                  ERCT03: 0               ;ERROR COUNT FOR DMC11 NUMBER 03

001722  000000                  PACT04: 0               ;PASS COUNT FOR DMC11 NUMBER 04
001724  000000                  ERCT04: 0               ;ERROR COUNT FOR DMC11 NUMBER 04

001726  000000                  PACT05: 0               ;PASS COUNT FOR DMC11 NUMBER 05
001730  000000                  ERCT05: 0               ;ERROR COUNT FOR DMC11 NUMBER 05

001732  000000                  PACT06: 0               ;PASS COUNT FOR DMC11 NUMBER 06
001734  000000                  ERCT06: 0               ;ERROR COUNT FOR DMC11 NUMBER 06

001736  000000                  PACT07: 0               ;PASS COUNT FOR DMC11 NUMBER 07
001740  000000                  ERCT07: 0               ;ERROR COUNT FOR DMC11 NUMBER 07

001742  000000                  PACT10: 0               ;PASS COUNT FOR DMC11 NUMBER 10
001744  000000                  ERCT10: 0               ;ERROR COUNT FOR DMC11 NUMBER 10

001746  000000                  PACT11: 0               ;PASS COUNT FOR DMC11 NUMBER 11
001750  000000                  ERCT11: 0               ;ERROR COUNT FOR DMC11 NUMBER 11

001752  000000                  PACT12: 0               ;PASS COUNT FOR DMC11 NUMBER 12
001754  000000                  ERCT12: 0               ;ERROR COUNT FOR DMC11 NUMBER 12

001756  000000                  PACT13: 0               ;PASS COUNT FOR DMC11 NUMBER 13
001760  000000                  ERCT13: 0               ;ERROR COUNT FOR DMC11 NUMBER 13

001762  000000                  PACT14: 0               ;PASS COUNT FOR DMC11 NUMBER 14
001764  000000                  ERCT14: 0               ;ERROR COUNT FOR DMC11 NUMBER 14

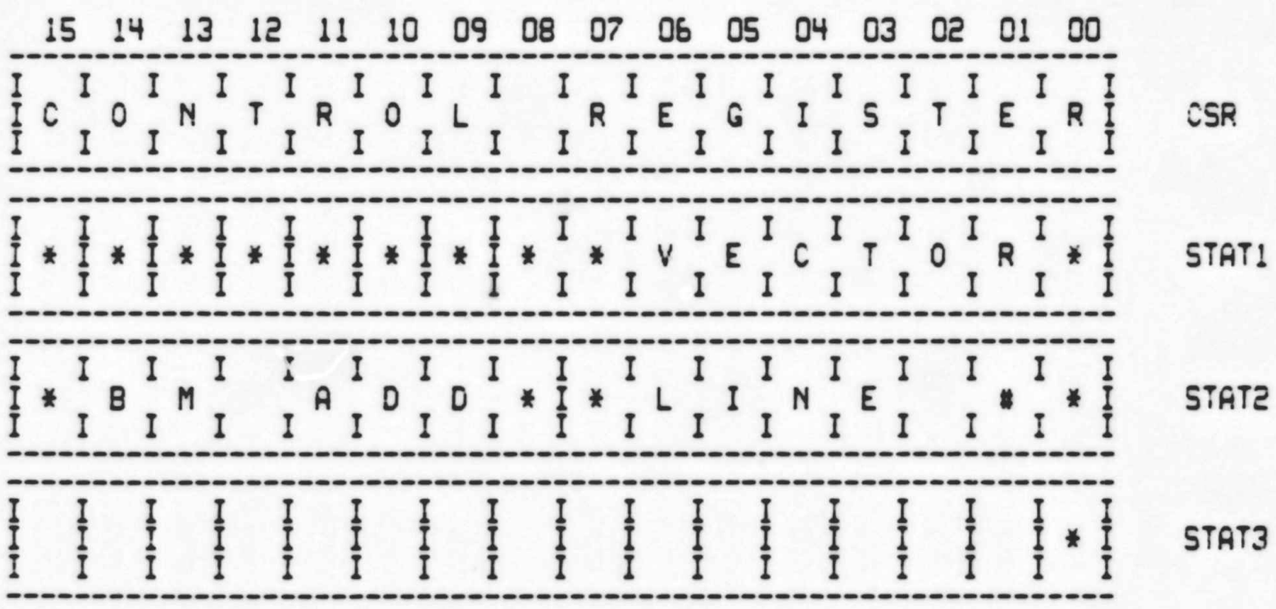
001766  000000                  PACT15: 0               ;PASS COUNT FOR DMC11 NUMBER 15
001770  000000                  ERCT15: 0               ;ERROR COUNT FOR DMC11 NUMBER 15

001772  000000                  PACT16: 0               ;PASS COUNT FOR DMC11 NUMBER 16
001774  000000                  ERCT16: 0               ;ERROR COUNT FOR DMC11 NUMBER 16

001776  000000                  PACT17: 0               ;PASS COUNT FOR DMC11 NUMBER 17
002000  000000                  ERCT17: 0               ;ERROR COUNT FOR DMC11 NUMBER 17
```

```
414
415
416
417
418
419
```

FORMAT OF STATUS TABLE



DEFINITION OF FORMAT

CSR: CONTAINS DMC11 CSR ADDRESS

STAT1: BITS 00-08 IS DMC11 VECTOR ADDRESS
BIT15=1 MICRO-PROCESSOR HAS CRAM
BIT15=0 MICRO-PROCESSOR HAS CROM
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 DMC11 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

002002  012737  000340  177776        .START: MOV     #340,PS         ;LOCK OUT INTERRUPTS
002010  012706  001200                        MOV     #STACK,SP       ;SET UP STACK
002014  012737  005240  000024                MOV     #.PFAIL,@#24    ;SET UP POWER FAIL VECTOR
002022  013737  001310  001314                MOV     DMNUM,SAVNUM    ;SAVE NUMBER OF DEVICES IN SYSTEM.
002030  005037  007556                        CLR     SWFLG           ;CLEAR SOFT TYPEOUT FLAG
002034  105037  001325                        CLRB    ERRFLG          ;CLEAR ERROR FLAG
002040  105037  001327                        CLRB    QV.FLG          ;ZERO QUICK VERIFY FLAG
002044  012737  001470  001320                MOV     #DM.MAP-10,CREAM;GET MAP POINTER.
002052  012737  001676  001322                MOV     #CNT.MAP-4,MILK ;GET PASS COUNT MAP POINTER
002060  012737  100000  001316                MOV     #BIT15,RUN      ;POINT POINTER TO FIRST DEVICE.
002066  012700  001702                        MOV     #CNT.MAP,R0     ;PASS COUNT POINTER TO R0
002072  005020                        23$:    CLR     (R0)+           ;CLEAR TABLE
002074  022700  002002                        CMP     #CNT.MAP+100,R0 ;DONE YET?
002100  001374                        BNE     23$             ;KEEP GOING
002102  005037  001234                        CLR     LSTERR          ;CLEAR LAST ERROR POINTER
002106  012737  000001  001226                MOV     #1,TSTNO        ;SET UP FOR TEST 1
002114  012737  002002  001214                MOV     #.START,RETURN  ;SET UP FOR POWER FAIL BEFORE
                                                ;TESTING STARTS
002122  013746  000006                        MOV     @#6,-(SP)       ;SAVE CURRENT VECTORS
002126  013746  000004                        MOV     @#4,-(SP)       ;
002132  012737  002166  000004                MOV     #6$,@#4         ;SET UP FOR TIMEOUT
002140  012737  177570  001202                MOV     #177570,SWR     ;SET SWR TO HARD SWR ADDRESS
002146  012737  177570  001200                MOV     #177570,DISPLAY ;SET DISPLAY TO HARD SWR ADDRESS
002154  022777  177777  177020                CMP     #-1,@SWR        ;REFERENCE HARDWARE SWITCH REGISTER
002162  001402                        BEQ     6$+2            ;IF = -1 USE SOFT SWR ANYWAY
002164  000407                        BR      7$              ;IF IT EXISTS AND NOT = -1 USE HARD SWR
002166  022626                        6$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
002170  012737  000176  001202                MOV     #SWREG,SWR      ;POINTER TO SOFT SWR
002176  012737  000174  001200                MOV     #DISPREG,DISPLAY;POINTER TO SOFT DISPLAY REG
002204  012637  000004                7$:     MOV     (SP)+,@#4       ;RESTORE VECTORS
002210  012637  000006                        MOV     (SP)+,@#6       ;
002214  105737  001324                        TSTB    INIFLG          ;HAS INITIALIZATION BEEN PERFORMED
002220  001006                        BNE     20$             ;BR IF YES
002222  022737  003432  000042                CMP     #$ENDAD,@#42    ;IF ACT-11 AUTOMATIC MODE, DON'T TYPE ID
002230  001402                        BEQ     20$
002232  104402  001000                        TYPE    ,MTITLE         ;TYPE TITLE MESSAGE
002236  004737  007362                20$:    JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
002242  017737  176734  001236                MOV     @SWR,STRTSW     ;STORE STARTING SWITCHES
002250  005737  000042                        TST     @#42            ;IS IT RUNNING IN AUTO MODE?
002254  001402                        BEQ     .+6             ;BR IF NO
002256  005037  001236                        CLR     STRTSW          ;IF YES, CLEAR SWITCHES
002262  032737  000001  001236                BIT     #SW00,STRTSW    ;IF SW00=1, QUESTIONS ARE ASKED.
002270  001012                        BNE     17$             ;BR IF SW00=1
002272  105737  001236                        TSTB    STRTSW          ;BIT7=1??
002276  100007                        BPL     17$             ;BR IF SW07=0
002300  005737  001306                        TST     DMACTV          ;ARE ANY DEVICES SELECTED?
002304  001006                        BNE     16$             ;BR IF YES
002306  104402  007056                        TYPE,   NOACT           ;NO DEVICES SELECTED.
```

```
                                                HALT                    ;STOP THE SHOW
                                                BR      .-2             ;DISQUALIFY CONTINUE SWITCH
                                        17$:    JSR     PC,AUTO.SIZE    ;GO DO THE AUTO SIZE
                                        16$:    TSTB    INIFLG          ;FIRST TIME?
                                                BEQ     21$             ;BR IF YES
                                                TSTB    STRTSW          ;IF USING SAME PARAMETERS DONT TYPE MAP
                                                BMI     1$
                                                BIT     #BIT1!BIT2,STRTSW;IS TEST NO. OR LOCK SELECTED
                                                BEQ     24$             ;IF NO THEN TYPE STATUS
                                                BR      1$              ;IF YES DO NOT TYPE STATUS
                                        21$:    COM     INIFLG          ;SET FLAG
                                        24$:    TYPE    ,XHEAD          ;TYPE HEADER
                                                MOV     #DM.MAP,R4      ;SET POINTER
                                        5$:     MOV     R4,TEMP1        ;SET ADDRESS
                                                MOV     (R4)+,TEMP2     ;SET CSR
                                                BEQ     1$              ;ALL DONE IF ZERO
                                                MOV     (R4)+,TEMP3     ;SET STAT1
                                                MOV     (R4)+,TEMP4     ;SET STAT2
                                                MOV     (R4)+,TEMP5     ;SET STAT3
                                                CONVRT                  ;TYPE OUT STATUS MAP
                                                XSTATQ                  ;
                                                BR      5$
                                        1$:     MOV     #DM.MAP,R0      ;R0 POINTS TO STATUS TABLE

                                        ;;**************************************************************************
                                        ;;*AUTO SIZE TEST
                                        ;;*THIS TEST VERIFYS THAT THE DMC11S AND/OR KMC11S ARE AT THE CORRECT FLOATING
                                        ;;*ADDRESSES FOR YOUR SYSTEM. IF THIS TEST FAILS, IT IS NOT A HARDWARE ERROR.
                                        ;;*CHECK THE ADDRESSES OF ALL FLOATING DEVICES (DJ,DH,DQ,DU,DUP,LK,DMC,DZ,KMC).
                                        ;;*IF THERE ARE NO OTHER FLOATING DEVICES BEFORE THE DMC11, THE FIRST
                                        ;;*DMC11 ADDRESS IS 760070, KMC11 IS 760110. NO DEVICE SHOULD EVER BE AT
                                        ;;*ADDRESS 760000.
                                        ;;**************************************************************************

002424  013746  000004                        MOV     @#4,-(SP)       ;SAVE LOC 4
002430  013746  000006                        MOV     @#6,-(SP)       ;SAVE LOC 6
002434  005037  000006                        CLR     @#6             ;CLEAR VEC+2
002440  005037  001252                        CLR     TEMP3           ;CLEAR FLAG
002444  005005                                CLR     R5              ;R5=0=DMC, R5=-1=KMC
002446  011037  001404                AUSTRT: MOV     (R0),DMCSR      ;GET NEXT DMC CSR
002452  001530                                BEQ     AUDONE          ;BR IF DONE
002454  005705                                TST     R5              ;DMC OR KMC?
002456  001005                                BNE     1$              ;BR IF KMC
002460  032760  100000  000002                BIT     #BIT15,2(R0)    ;CHECK FOR DMC CSR
002466  001044                                BNE     OK              ;SKIP IF NOT DMC
002470  000404                                BR      2$              ;ITS A DMC SO CONTINUE
002472  032760  100000  000002        1$:     BIT     #BIT15,2(R0)    ;CHECK FOR KMC CSR
002500  001437                                BEQ     OK              ;SKIP IF NOT KMC
002502  012737  002606  000004        2$:     MOV     #NODEV,@#4      ;SET UP FOR TIMEOUT
002510  005705                                TST     R5              ;DMC OR KMC?
002512  001003                                BNE     3$              ;BR IF KMC
002514  012703  000006                        MOV     #6,R3           ;R3 IS COUNT OF DEVICES BEFORE DMC
002520  000402                                BR      4$              ;GO ON
002522  012703  000010                3$:     MOV     #10,R3          ;R3 IS COUNT OF DEVICES BEFORE KMC
002526  012702  002722                4$:     MOV     #DEVTAB,R2      ;R2 IS DEVICE TABLE PONTER
002532  012701  160010                        MOV     #160010,R1      ;START WITH ADDRESS 160010
```

```
                                FLOAT:  TST     (R1)            ;CHECK ADDRESS IN R1
                                        MOVB    (R2),R4         ;IF NO TIMEOUT, GET NEXT ADDRESS
                                        ADD     R4,R1           ;IN R1
                                        INC     R1              ;
                                        BIC     R4,R1           ;
                                        TST     R3              ;ANY MORE DEVICES TO CHECK FOR?
                                        BNE     FLOAT           ;BR IF YES
                                        MOV     #ERR,@#4        ;OK ONLY DMC'S ARE LEFT, SET UP FOR TIMEOUT
                                FY:     TST     (R1)            ;CHECK DMC ADDRESS
                                        CMP     R1,DMCSR        ;DOES IT MATCH
                                        BEQ     OK              ;BR IF YES
                                        ADD     #10,R1          ;GET NEXT DMC ADDRESS
                                        BR      FY              ;DO IT AGAIN
                                OK:     ADD     #10,R0          ;SKIP TO NEXT DMC CSR
                                        BR      AUSTRT          ;CONTINUE
                                NODEV:  CMPB    (R2)+,-(R3)     ;ON TIMEOUT, INC R2, DEC R3
                                        RTI                     ;RETURN
                                ERR:    TST     TEMP3           ;CHECK FLAG IF = 0 TYPE HEADER
                                        BNE     1$              ;SKIP HEADER
                                        TYPE                    ;TYPEOUT HEADER MESSAGE
                                        CONERR                  ;CONFIGURATION ERROR!!!!
                                        MOV     #ERR,SAVPC      ;SAVE PC FOR TYPEOUT
                                        CNVRT                   ;TYPE OUT ERROR PC
                                        ERRPC                   ;
                                        TYPE                    ;TYPE REST OF HEADER
                                        CNERR                   ;
                                        MOV     #-1,TEMP3       ;SET FLAG SO IT ONLY GETS TYPED ONCE
                                1$:     MOV     R1,SAVR1        ;SAVE R1 FOR TYPEOUT
                                        CONVRT                  ;
                                        CONTAB                  ;TYPE CSR VALUES
                                        TST     R5              ;DMC OR KMC ?
                                        BNE     3$              ;BR IF KMC
                                        TYPE                    ;
                                        DMCM                    ;
                                        BR      4$              ;CONTINUE
                                3$:     TYPE                    ;
                                        KMCM                    ;
                                4$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
                                        BR      OK              ;BR TO GET OUT
                                ERRPC:  1                       ;
                                        .BYTE   6,2             ;
                                        SAVPC                   ;
                                CONTAB: 2                       ;
                                        .BYTE   6,4             ;
                                        SAVR1                   ;
                                        .BYTE   6,2             ;
                                        DMCSR                   ;
                                DEVTAB: .BYTE   7               ;DJ
                                        .BYTE   17              ;DH
                                        .BYTE   7               ;DQ
                                        .BYTE   7               ;DU
                                        .BYTE   7               ;DUP
                                        .BYTE   7               ;LK
                                        .BYTE   7               ;DMC
                                        .BYTE   7               ;DZ
                                        .BYTE   7               ;KMC
```

```
                002734                          .EVEN
002734  005705                          AUDONE: TST     R5              ;DMC?
002736  001005                                  BNE     1$              ;BR IF KMC AND ALL DONE
002740  012705  177777                          MOV     #-1,R5          ;SET R5 TO -1 (KMC)
002744  012700  001500                          MOV     #DM.MAP,R0      ;RESET R0 TO START OF TABLE
002750  000636                                  BR      AUSTRT          ;GO DO KMC'S
002752  012637  000006                  1$:     MOV     (SP)+,@#6       ;RESTORE LOC 6
002756  012637  000004                          MOV     (SP)+,@#4       ;RESTORE LOC 4
002762  032737  000010  001236                  BIT     #SW03,STRTSW    ;SELECT SPECIFIC DEVICES??
002770  001422                                  BEQ     3$              ;BR IF NO.
002772  104402  006046                          TYPE    ,MNEW           ;TYPE THE MESSAGE.
002776  005000                                  CLR     R0              ;ZERO DATA LIGHTS
003000  000000                                  HALT                    ;WAIT FOR USER TO TELL WHAT DEVICES TO RUN
003002  027737  176174  001312                  CMP     @SWR,SAVACT     ;IS THE NUMBER VALID?
003010  101404                                  BLOS    2$              ;BR IF NUMBER IS OK.
003012  104402  005707                          TYPE    ,MERR3          ;TELL USER OF INVALID NUMBER.
003016  000000                                  HALT                    ;STOP EVERY THING.
003020  000776                                  BR      .-2             ;RESTART THE PROGRAM AGAIN.
003022  017737  176154  001306          2$:     MOV     @SWR,DMACTV     ;GET NEW DEVICE PATTERN
003030  013700  001306                          MOV     DMACTV,R0       ;SHOW THE USER WHAT HE SELECTED.
003034  000000                                  HALT                    ;CONTINUE DYNAMIC SWITCHES.
003036  012700  000300                  3$:     MOV     #300,R0         ;PREPARE TO CLEAR THE FLOATING
003042  012701  000302                          MOV     #302,R1         ;VECTOR AREA. 300-776
003046  010120                          4$:     MOV     R1,(R0)+        ;START PUTTING "PC+2 - HALT"
003050  005021                                  CLR     (R1)+           ;IN VECTOR AREA.
003052  022021                                  CMP     (R0)+,(R1)+     ;POP POINTERS
003054  022700  001000                          CMP     #1000,R0        ;ALL DONE??
003060  001372                                  BNE     4$              ;BR IF NO.
003062  012706  001200                  .BEGIN: MOV     #STACK,SP       ;SET UP STACK
003066  013746  000006                          MOV     @#6,-(SP)       ;SAVE LOC 6
003072  013746  000004                          MOV     @#4,-(SP)       ;SAVE LOC 4
003076  005000                                  CLR     R0              ;START AT 0
003100  012737  003144  000004                  MOV     #2$,@#4         ;SET UP FOR TIME OUT
003106  005037  000006                          CLR     @#6             ;TO AUTOSIZE MEMORY
003112  005720                          6$:     TST     (R0)+           ;CHECK ADDRESS IN R0
003114  022700  157776                          CMP     #157776,R0      ;IS IT AT LEAST 28K
003120  001374                                  BNE     6$              ;BR IF NO
003122  162700  007776                          SUB     #7776,R0        ;SAVE 2K FOR MONITORS
003126  010037  001304                  7$:     MOV     R0,MEMLIM       ;STORE MEMORY LIMIT
003132  012637  000004                          MOV     (SP)+,@#4       ;RESTORE LOC 4
003136  012637  000006                          MOV     (SP)+,@#6       ;RESTORE LOC 6
003142  000413                                  BR      10$             ;CONTINUE
003144  022626                          2$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
003146  162700  000004                          SUB     #4,R0           ;GET LAST GOOD ADDRESS
003152  162700  007776                          SUB     #7776,R0        ;SAVE 2K FOR MONITORS
003156  022700  030000                          CMP     #30000,R0       ;IS IT 8K?
003162  001361                                  BNE     7$              ;BR IF NO
003164  012700  037400                          MOV     #37400,R0       ;IF 8K DON'T SAVE 2K
003170  000756                                  BR      7$              ;
003172  012737  000340  177776          10$:    MOV     #340,PS         ;LOCK OUT INTERRUPTS
003200  032737  000004  001236                  BIT     #BIT2,STRTSW    ;CHECK FOR LOCK ON TEST
003206  001411                                  BEQ     1$              ;BR IF NO LOCK DESIRED.
```

```
 694  003210  104402  005745                        TYPE    ,MLOCK          ;TYPE LOCK SELECTED.
 695  003214  012737  000240  003522                MOV     #NOP,TTST       ;ADJUST SCOPE ROUTINE.
 696  003222  012737  000240  003524                MOV     #NOP,TTST+2     ;SET UP TO LOCK
 697  003230  000406                                BR      3$              ;CONTINUE ALONG.
 698  003232  013737  003640  003522        1$:     MOV     BRW,TTST        ;PREPARE NORMAL SCOPE ROUTINE
 699  003240  013737  003642  003524                MOV     BRX,TTST+2      ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
 700  003246  012737  007620  001214        3$:     MOV     #CYCLE,RETURN   ;START AT "CYCLE" FIND WHICH DEVICE TO TEST
 701  003254  032737  000002  001236        4$:     BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED?
 702  003262  001002                                BNE     5$              ;BR IF YES
 703  003264  104402  005657                        TYPE    ,MR             ;TYPE R
 704  003270  000177  175720                5$:     JMP     @RETURN         ;START TESTING
```

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

003274  000005                            .EOP:   RESET                   ;MAKE THE  WORLD CLEAN AGAIN.
003276  005037  001234                            CLR     LSTERR          ;CLEAR LAST ERROR PC
003302  105037  001325                            CLRB    ERRFLG          ;CLEAR ERROR FLAG
003306  005237  001230                            INC     PASCNT          ;UPDATE PASS COUNT
003312  013777  001230  175660                    MOV     PASCNT,@DISPLAY ;DISPLAY PASS COUNT
003320  104402  005635                            TYPE    ,MEPASS         ;TYPE END PASS
003324  104402  005774                            TYPE    ,MCSRX          ;TYPE CSR
003330  104411  003456                            CNVRT   ,XCSR           ;SHOW IT
003334  104402  006002                            TYPE    ,MVECX          ;TYPE VECTOR  .
003340  104411  003464                            CNVRT   ,XVEC           ;SHOW IT
003344  104402  006010                            TYPE    ,MPASSX         ;TYPE PASSES
003350  104411  003472                            CNVRT   ,XPASS          ;SHOW IT
003354  104402  006021                            TYPE    ,MERRX          ;TYPE ERRORS
003360  104411  003500                            CNVRT   ,XERR           ;SHOW IT
003364  013700  001322                            MOV     MILK,R0         ;GET POINTER TO PASS COUNT
003370  013720  001230                            MOV     PASCNT,(R0)+    ;STORE PASS COUNT FOR THIS DMC11
003374  013720  001232                            MOV     ERRCNT,(R0)+    ;STORE ERROR COUNT FOR THIS DMC11
003400  005337  001314                            DEC     SAVNUM          ;ARE ALL DEVICES TESTED?
003404  001017                                    BNE     RESTRT          ;BR IF NO.
003406  112737  000377  001327                    MOVB    #377,QV.FLG     ;SET THE QUICK VERIFY FLAG.
003414  013737  001310  001314                    MOV     DMNUM,SAVNUM    ;RESTORE THE COUNT
003422  013701  000042                            MOV     @#42,R1         ;CHECK FOR ACT-11 OR DDP
003426  001406                                    BEQ     RESTRT          ;IF NOT, CONTINUE TESTING
003430  000005                                    RESET                   ;STOP THE SHOW--CLEAR THE WORLD
003432                                  $ENDAD:
003432  004711                                    JSR     PC,(R1)
003434  000240                                    NOP
003436  000240                                    NOP
003440  000240                                    NOP
003442  000240                                    NOP
003444  012737  007620  001214          RESTRT: MOV     #CYCLE,RETURN
003452  000137  007620                            JMP     CYCLE
003456  000001                          XCSR:   1
003460     006     002                            .BYTE   6,2
003462  001404                                    DMCSR
003464  000001                          XVEC:   1
003466     004     002                            .BYTE   4,2
003470  001374                                    DMRVEC
003472  000001                          XPASS:  1
003474     006     002                            .BYTE   6,2
003476  001230                                    PASCNT
003500  000001                          XERR:   1
003502     006     002                            .BYTE   6,2
003504  001232                                    ERRCNT

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

003506  004737  007362                    .SCOPE: JSR     PC,CKSWR        ;CKECK FOR SOFT SWR
003512  010016                                    MOV     R0,(SP)         ;SAVE R0 ON THE STACK
```

```
761  003514  032777  040000  175460          BIT     #BIT14,@SWR     ;"LOOP ON THIS TEST"?
762  003522  001407                  TTST:   BEQ     1$              ;BR IF NO.  (IF LOCK SW01=1; THIS LOC =240)
763  003524  000437                          BR      3$              ;GOTO 3$    (IF LOCK SW01=1; THIS LOC =240)
764  003526  105777  175452                  TSTB    @TKCSR          ;KEYBOAD DONE?
765  003532  100034                          BPL     3$              ;BR IF NO. (LOCK: HIT KEY TO GOTO NEXT TEST)
766  003534  017700  175446                  MOV     @TKDBR,R0       ;CLEAR DONE BIT
767  003540  000415                          BR      2$              ;CONTINUE
768  003542  032777  004000  175432  1$:     BIT     #SW11,@SWR      ;DELETE ITERATION?  (QUICK PASS)
769  003550  001011                          BNE     2$              ;BR IF YES
770  003552  105737  001327                  TSTB    QV.FLG          ;HAVE PASSES BEECOMPLETED?
771  003556  001406                          BEQ     2$              ;BR IF QUICK PASS.
772  003560  005237  001224                  INC     LPCNT           ;UPDATE ITERATION COUNTER
773  003564  023737  001224  001222          CMP     LPCNT,ICOUNT    ;ARE ALL ITERATIONS DONE??
774  003572  101414                          BLOS    3$              ;BR IF NOT YET
775  003574  105037  001325          2$:     CLRB    ERRFLG          ;PREPARE FOR NEW TEST
776  003600  005037  001224                  CLR     LPCNT           ;START ICOUNTER AT 0
777  003604  005037  001220                  CLR     LOCK
778  003610  012737  000020  001222          MOV     #20,ICOUNT      ;RESET ITERATIONS
779  003616  013737  001216  001214          MOV     NEXT,RETURN     ;GET NEXT TEST
780  003624  011600                  3$:     MOV     (SP),R0         ;POP R0 OFF OF THE STACK
781  003626  022626                          POP2SP                  ;FAKE AN "RTI"
782  003630  013701  001404                  MOV     DMCSR,R1        ;R1 CONTAINS BASE DMC ADDRESS
783  003634  000177  175354                  JMP     @RETURN         ;GO DO THE TEST
784  003640  001407                  BRW:    1407
785  003642  000437                  BRX:    437
786
787                                          ;CHECK FOR FREEZE ON CURRENT DATA
788                                          ;-------------------------------
789
790  003644  004737  007362          .SCOP1: JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
791  003650  032777  001000  175324          BIT     #SW09,@SWR      ;IS SW09=1(SET)?
792  003656  001405                          BEQ     1$              ;BR IF NOT SET.
793  003660  005737  001220                  TST     LOCK
794  003664  001402                          BEQ     1$
795  003666  013716  001220                  MOV     LOCK,(SP)       ;GOTO THE ADDRESS IN LOCK.
796  003672  000002                  1$:     RTI                     ;GO BACK.
797
798                                          ;TELETYPE OUTPUT ROUTINE
799                                          ;----------------------
800
801  003674  010546                  .TYPE:  MOV     R5,-(SP)        ;SAVE R5 ON THE STACK.
802  003676  017605  000002                  MOV     @2(SP),R5       ;GET ADDRESS OF MESSAGE.
803  003702  062766  000002  000002          ADD     #2,2(SP)        ;POP OVER ADDRESS.
804  003710  005737  007556          4$:     TST     SWFLG           ;SOFT SWR MESSAGE?
805  003714  001004                          BNE     1$              ;IF YES TYPE IT OUT REGARDLESS OF SW12
806  003716  032777  010000  175256          BIT     #SW12,@SWR      ;INHIBIT ALL PRINT OUT??
807  003724  001012                          BNE     3$              ;BR IF NO PRINT OUT WANTED (SW12=1)
808  003726  105715                  1$:     TSTB    (R5)            ;IS NUMBER MINUS? (MSB=1(BIT7))
809  003730  100002                          BPL     2$              ;BR IF NUMBER IS PLUS
810  003732  104402  005574                  TYPE    ,MCRLF          ;TYPE A CR/LF!
811  003736  105777  175246          2$:     TSTB    @TPCSR          ;TTY READY?
812  003742  100375                          BPL     2$              ;BR IF NO.
813  003744  112577  175242                  MOVB    (R5)+,@TPDBR    ;PRINT CURRENT CHAR.
814  003750  001357                          BNE     4$              ;IF NOT ZERO KEEP PRINTING!
815  003752  012605                  3$:     MOV     (SP)+,R5        ;END OF OUTPUT. RESTORE R5
816  003754  000002                          RTI                     ;GO HOME
```

```
                                                ;--------------------------
                                                ;
003756  010346                        .INSTR: MOV     R3,-(SP)        ;SAVE R3 ON STACK
003760  010446                                MOV     R4,-(SP)        ;SAVE R4 ON STACK
003762  017637  000004  004000                MOV     @4(SP),.MSG
003770  062766  000002  000004                ADD     #2,4(SP)
003776  104402                        .INST1: TYPE
004000  000000                        .MSG:   0
004002  012704  007256                        MOV     #INBUF,R4
004006  012703  000007                        MOV     #7,R3
004012  105777  175166                1$:     TSTB    @TKCSR
004016  100375                              BPL     1$
004020  117714  175162                        MOVB    @TKDBR,(R4)
004024  142714  000200                        BICB    #200,(R4)
004030  122427  000015                        CMPB    (R4)+,#15
004034  001417                              BEQ     INSTR2
004036  105777  175146                2$:     TSTB    @TPCSR
004042  100375                              BPL     2$
004044  017777  175136  175140              MOV     @TKDBR,@TPDBR
004052  005303                              DEC     R3
004054  001356                              BNE     1$
004056  012604                              MOV     (SP)+,R4
004060  012603                              MOV     (SP)+,R3
004062  104402  005570                .INSTE: TYPE    ,MQM
004066  010346                              MOV     R3,-(SP)
004070  010446                              MOV     R4,-(SP)
004072  000741                              BR      .INST1
004074  012604                  INSTR2: MOV     (SP)+,R4        ;RESTORE R4
004076  012603                          MOV     (SP)+,R3        ;RESTORE R3
004100  000002                          RTI
                                        ;CONVERT ASCII STRING TO OCTAL
                                        ;----------------------------
004102  010546                  .PARAM: MOV     R5,-(SP)
004104  010446                          MOV     R4,-(SP)
004106  016605  000004                  MOV     4(SP),R5
004112  012537  004272                  MOV     (R5)+,LOLIM
004116  012537  004274                  MOV     (R5)+,HILIM
004122  012537  004276                  MOV     (R5)+,DEVADR
004126  112537  004300                  MOVB    (R5)+,LOBITS
004132  112537  004301                  MOVB    (R5)+,ADRCNT
004136  010566  000004                  MOV     R5,4(SP)
004142  005005                  PARAM1: CLR     R5
004144  012704  007256                  MOV     #INBUF,R4
004150  122714  000015                  CMPB    #15,(R4)
004154  001420                          BEQ     PARERR
004156  121427  000060          1$:     CMPB    (R4),#60
004162  002415                          BLT     PARERR
004164  121427  000067                  CMPB    (R4),#67
004170  003012                          BGT     PARERR
004172  142714  000060                  BICB    #60,(R4)
004176  152405                          BISB    (R4)+,R5
004200  122714  000015                  CMPB    #15,(R4)
004204  001406                          BEQ     LIMITS
004206  006305                          ASL     R5
```

```
                                                        ASL     R5
                                                        ASL     R5
                                                        BR      1$
                                            PARERR:     INSTER
                                                        BR      PARAM1

                                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
                                                        ;--------------------------------------

                                            LIMITS:     CMP     R5,HILIM
                                                        BHI     PARERR
                                                        CMP     R5,LOLIM
                                                        BLO     PARERR
                                                        BITB    LOBITS,R5
                                                        BNE     PARERR

                                                        ;STORE NUMBER AT SPECIFIED ADDRESS

                                                        MOV     DEVADR,R4
                                            1$:         MOV     R5,(R4)+
                                                        ADD     #2,R5
                                                        DECB    ADRCNT
                                                        BNE     1$
                                                        MOV     (SP)+,R4
                                                        MOV     (SP)+,R5
                                                        RTI
                                            LOLIM:      0
                                            HILIM:      0
                                            DEVADR:     0
                                            LOBITS:     0
                                            ADRCNT=LOBITS+1

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

 004302  016637  000004  001276               .SAV05:  MOV     4(SP),SAVPC     ;SAVE R7 (PC)

                                                        ;SAVE R0-R5

                                            SV05:       MOV     R5,SAVR5        ;SAVE R5
                                                        MOV     R4,SAVR4        ;SAVE R4
                                                        MOV     R3,SAVR3        ;SAVE R3
                                                        MOV     R2,SAVR2        ;SAVE R2
                                                        MOV     R1,SAVR1        ;SAVE R1
                                                        MOV     R0,SAVR0        ;SAVE R0
 004340  000002                                         RTI                     ;LEAVE.

                                                        ;RESTORE R0-R5

 004342  013700  001260                     .RES05:     MOV     SAVR0,R0        ;RESTORE R0
 004346  013701  001262                                 MOV     SAVR1,R1        ;RESTORE R1
 004352  013702  001264                                 MOV     SAVR2,R2        ;RESTORE R2
 004356  013703  001266                                 MOV     SAVR3,R3        ;RESTORE R3
 004362  013704  001270                                 MOV     SAVR4,R4        ;RESTORE R4
 004366  013705  001272                                 MOV     SAVR5,R5        ;RESTORE R5
 004372  000002                                         RTI                     ;LEAVE
```

```
                                        ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
                                        ;-------------------------------------------------------
004374  104402  005574        .CONVR: TYPE    ,MCRLF
004400  010046                .CNVRT: MOV     R0,-(SP)
004402  010146                        MOV     R1,-(SP)
004404  010346                        MOV     R3,-(SP)
004406  010446                        MOV     R4,-(SP)
004410  010546                        MOV     R5,-(SP)
004412  017601  000012                MOV     @12(SP),R1
004416  062766  000002  000012        ADD     #2,12(SP)
004424  012137  004616                MOV     (R1)+,WRDCNT
004430  112137  004620        1$:     MOVB    (R1)+,CHRCNT
004434  112137  004621                MOVB    (R1)+,SPACNT
004440  013137  004622                MOV     @(R1)+,BINWRD
004444  122737  000003  004620        CMPB    #3,CHRCNT
004452  001003                        BNE     2$
004454  042737  177400  004622        BIC     #177400,BINWRD
004462  013704  004622        2$:     MOV     BINWRD,R4
004466  113705  004620                MOVB    CHRCNT,R5
004472  012700  001416                MOV     #TEMP,R0
004476  010403                3$:     MOV     R4,R3
004500  042703  177770                BIC     #177770,R3
004504  062703  000060                ADD     #060,R3
004510  110320                        MOVB    R3,(R0)+
004512  000241                        CLC
004514  006004                        ROR     R4
004516  000241                        CLC
004520  006004                        ROR     R4
004522  000241                        CLC
004524  006004                        ROR     R4
004526  005305                        DEC     R5
004530  001362                        BNE     3$
004532  012703  007320                MOV     #MDATA,R3
004536  114023                4$:     MOVB    -(R0),(R3)+
004540  105337  004620                DECB    CHRCNT
004544  001374                        BNE     4$
004546  105737  004621                TSTB    SPACNT
004552  001405                        BEQ     6$
004554  112723  000040        5$:     MOVB    #040,(R3)+
004560  105337  004621                DECB    SPACNT
004564  001373                        BNE     5$
004566  105013                6$:     CLRB    (R3)
004570  104402  007320                TYPE    ,MDATA
004574  005337  004616                DEC     WRDCNT
004600  001313                        BNE     1$
004602  012605                        MOV     (SP)+,R5
004604  012604                        MOV     (SP)+,R4
004606  012603                        MOV     (SP)+,R3
004610  012601                        MOV     (SP)+,R1
004612  012600                        MOV     (SP)+,R0
004614  000002                        RTI
004616  000000        WRDCNT: 0
004620  000000        CHRCNT: 0
004621                SPACNT=CHRCNT+1
```

```
 985  004622  000000                          BINWRD: 0
 986
 987
 988                                                  ;TRAP DISPATCH SERVICE
 989                                                  ;ARGUMENT OF TRAP IS EXTRACTED
 990                                                  ;AND USED AS OFFSET TO OBTAIN POINTER
 991                                                  ;TO SELECTED SUBROUTINE
 992
 993  004624  011646                          .TRPSR: MOV     (SP),-(SP)      ;GET PC OF RETURN
 994  004626  162716  000002                          SUB     #2,(SP)         ;=PC OF TRAP
 995  004632  017616  000000                          MOV     @(SP),(SP)      ;GET TRP
 996  004636  006316                          TRPOK:  ASL     (SP)            ;MULTIPLY TRAP ARG BY 2
 997  004640  042716  177001                          BIC     #177001,(SP)    ;CLEAR UNWANTED BITS
 998  004644  062716  001330                          ADD     #.TRPTAB,(SP)   ;POINTER TO SUBROUTINE ADDRESS
 999  004650  017616  000000                          MOV     @(SP),(SP)      ;SUBROUTINE ADDRESS
1000  004654  000136                                  JMP     @(SP)+          ;GO TO SUBROUTINE
1001
1002                                                  ;ERROR HANDLER
1003                                                  ;-------------
1004
1005  004656  004737  007362                  .HLT:   JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
1006  004662  032777  010000  174312                  BIT     #SW12,@SWR      ;BELL ON ERROR?
1007  004670  001406                                  BEQ     XBX             ;BR IF NO BELL
1008  004672  105777  174312                          TSTB    @TPCSR          ;TTY READY.
1009  004676  100003                                  BPL     XBX             ;DON'T WAIT IF TTY NOT READY.
1010  004700  112777  000207  174304                  MOVB    #207,@TPDBR     ;PUSH A BELL AT THE TTY.
1011  004706  032777  020000  174266          XBX:    BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
1012  004714  001105                                  BNE     HALTS           ;BR IF NO PRINT OUT WANTED.
1013  004716  021637  001234                          CMP     (SP),LSTERR     ;WAS THIS ERROR FOUND LAST TIME?
1014  004722  001404                                  BEQ     1$              ;BR IF YES
1015  004724  011637  001234                          MOV     (SP),LSTERR     ;RECORD BEING HERE
1016  004730  105037  001325                          CLRB    ERRFLG          ;PREPARE HEADER
1017  004734  104406                          1$:     SAV05                   ;SAVE ALL PROC REGISTERS
1018  004736  011605                                  MOV     (SP),R5         ;GET THE PC OF ERROR
1019  004740  162705  000002                          SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
1020  004744  011504                                  MOV     (R5),R4         ;GET HLT INSTRUCTION
1021  004746  006304                                  ASL     R4              ;MULT BY TWO
1022  004750  061504                                  ADD     (R5),R4         ;DOUBLE IT
1023  004752  006304                                  ASL     R4              ;MULT AGAIN
1024  004754  042704  177001                          BIC     #177001,R4      ;CLEAR JUNK
1025  004760  062704  037270                          ADD     #.ERRTAB,R4     ;GET POINTER
1026  004764  012437  005100                          MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
1027  004770  012437  005112                          MOV     (R4)+,DATAHD    ;GET DATA HEADRER
1028  004774  011437  005124                          MOV     (R4),DATABP     ;GET DATA TABLE
1029  005000  105737  001325                          TSTB    ERRFLG          ;TYPE HEADREER
1030  005004  001403                                  BEQ     TYPMSG          ;BR IF YES
1031  005006  005737  005124                          TST     DATABP          ;DOES DATA TABLE EXIST?
1032  005012  001040                                  BNE     TYPDAT          ;BR IF YES.
1033  005014  104402  005574          TYPMSG: TYPE    ,MCRLF
1034  005020  104402  005574                  TYPE    ,MCRLF
1035  005024  005737  001220                  TST     LOCK
1036  005030  001402                          BEQ     1$
1037  005032  104402  006044                  TYPE    ,MASTEK
1038  005036  104402  006032          1$:     TYPE    ,MTSTN
1039  005042  104411  005232                  CNVRT   ,XTSTN          ;SHOW IT
1040  005046  104402  006121                  TYPE    ,MERRPC         ;TYPE PC.
```

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1041  005052  104411  005224                        CNVRT   ,ERTABO         ;SHOW IT
1042  005056  104402  005574                        TYPE    ,MCRLF          ;GIVE A CR/LF
1043  005062  112737  177777  001325                MOVB    #-1,ERRFLG      ;NO MORE HEADER UNLESS NO DATA TABLE.
1044  005070  005737  005100                        TST     ERRMSG          ;IS THERE AN ERROR MESSAGE?
1045  005074  001402                                BEQ     WRKO.FM         ;BR IF NO.
1046  005076  104402                                TYPE                    ;TYPE
1047  005100  000000                    ERRMSG:     0                       ;    ERROR MESSAGE
1048  005102                             WRKO.FM:                            ;
1049  005102  005737  005112                        TST     DATAHD          ;DATA HEADER?
1050  005106  001402                                BEQ     TYPDAT          ;BR IF NO
1051  005110  104402                                TYPE                    ;TYPE
1052  005112  000000                    DATAHD:     0                       ;    DATA HEADER
1053  005114  005737  005124                        TST     DATABP          ;DATA TABLE?
1054  005120  001402                    TYPDAT:     BEQ     RESREG          ;BR IF NO.
1055  005122  104410                                CONVRT                  ;SHOW
1056  005124  000000                    DATABP:     0                       ;    DATA TABLE
1057  005126  104407                    RESREG:     RESCOS                  ;RESTORE PROC REGISTERS
1058  005130  022737  003432  000042    HALTS:      CMP     #$ENDAD,@#42    ;IF ACT-11 AUTOMATIC MODE, HALT!!
1059  005136  001403                                BEQ     1$
1060  005140  005777  174036                        TST     @SWR            ;HALT ON ERROR?
1061  005144  100005                                BPL     EXITER          ;BR IF NO HALT ON ERROR
1062  005146  010046                    1$:         PUSHRO                  ;SAVE R0
1063  005150  016600  000002                        MOV     2(SP),R0        ;SHOW ERROR PC IN DATA LIGHTS
1064  005154  000000                                HALT                    ;HALT
1065  005156  012600                                POPRO                   ;GET R0
1066  005160  005237  001232    EXITER:     INC     ERRCNT          ;UPDATE ERROR COUNT
1067  005164  032777  000400  174010                BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
1068  005172  001007                                BNE     1$              ;BR IF YES
1069  005174  032777  002000  174000                BIT     #SW10,@SWR      ;GOTO NEXT TEST?
1070  005202  001407                                BEQ     2$              ;BR IF NO
1071  005204  013737  001216  001214                MOV     NEXT,RETURN     ;SET FOR NEXT TEST
1072  005212  012706  001200                1$:     MOV     #STACK,SP       ;RESET SP
1073  005216  000177  173772                        JMP     @RETURN         ;GOTO SPECIFIED TEST
1074  005222  000002                    2$:         RTI                     ;RETURN
1075  005224  000001                    ERTABO:     1
1076  005226     006     002                        .BYTE   6,2
1077  005230  001276                                SAVPC
1078  005232  000001                    XTSTN:      1
1079  005234     003     002                        .BYTE   3,2
1080  005236  001226                                TSTNO
1081                                               ;ENTER HERE ON POWER FAILURE
1082                                               ;--------------------------
1083
1084
1085  005240                             .PFAIL:
1086  005240  012737  005252  000024                MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
1087  005246  000000                                HALT                            ;HALT ON POWER DOWN NORMAL
1088  005250  000777                                BR      .
1089
1090                                               ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
1091
1092  005252                             RESTAR:
1093  005252  012737  005240  000024                MOV     #.PFAIL,24      ;SET UP FOR POWER FAILURE
1094  005260  012706  001200                        MOV     #STACK,SP       ;RESET THE STACK POINTER
1095  005264  013701  001404                        MOV     DMCSR,R1        ;RESTORE R1
1096  005270  005037  001416                        CLR     TEMP            ;READY FOR TIMMER
```

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1097  005274  005237  001416                          INC     TEMP            ;PLUS ONE TO THE TIMER!
1098  005300  001375                                  BNE     .-4             ;BR IF MORE TO GO
1099  005302  104402  005577                          TYPE    ,MPFAIL         ;TYPE THE MESSAGE
1100  005306  104411  005332                          CNVRT   ,PFTAB          ;TELL WHAT TEST TO RETURN TO.
1101  005312  105037  001325                          CLRB    ERRFLG          ;START CLEAN
1102  005316  005037  001234                          CLR     LSTERR          ;
1103  005322  005011                                  CLR     (R1)            ;CLEAR MAINT BITS
1104  005324  104412                                  MSTCLR                  ;START CLEAN UP OF DEVICE
1105  005326  000177  173662                          JMP     @RETURN         ;START DOING THAT TEST AGAIN.
1106  005332  000001                          PFTAB:  1
1107  005334     003     002                  .BYTE   3,2
1108  005336  001226                                  TSTNO
1109
1110  005340                                  .DELAY:
1111  005340  012777  000020  174044                  MOV     #20,@DMP04
1112  005346  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1113  005350  121111                                  121111                  ;POKE CLOCK DELAY BIT
1114  005352                                  1$:
1115  005352  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1116  005354  121224                                  121224                  ;PORT4←IBUS*11
1117  005356  032777  000020  174026                  BIT     #BIT4,@DMP04    ;IS CLOCK BIT SET?
1118  005364  001772                                  BEQ     1$              ;BR IF NO
1119  005366  000002                                  RTI
1120
1121  005370                                  .MSTCLR:
1122  005370  152777  000100  174010                  BISB    #BIT6,@DMCSRH   ;SET MASTER CLEAR
1123  005376  142777  000300  174002                  BICB    #BIT6!BIT7,@DMCSRH  ;CLEAR MASTER CLEAR AND RUN
1124  005404  000002                                  RTI                     ;RETURN
1125
1126  005406                                  .ROMCLK:
1127  005406  152777  000002  173772                  BISB    #BIT1,@DMCSRH   ;SET ROMI
1128  005414  013677  173774                          MOV     @(SP)+,@DMP06   ;LOAD INSTRUCTION IN SEL6
1129  005420  062746  000002                          ADD     #2,-(SP)        ;ADJUST STACK
1130  005424  032777  000100  173550                  BIT     #SW06,@SWR      ;HALT IF SW06 =1
1131  005432  001401                                  BEQ     1$              ;BR IF SW06 =0
1132  005434  000000                                  HALT                    ;HALT BEFORE CLOCKING INSTRUCTION
1133  005436  152777  000003  173742          1$:     BISB    #BIT1!BIT0,@DMCSRH ;CLOCK INSTRUCTION
1134  005444  142777  000007  173734                  BICB    #BIT2!BIT1!BIT0,@DMCSRH  ;CLEAR ROM0, ROMI, STEP
1135  005452  000002                                  RTI
1136
1137  005454                                  .DATACLK:
1138  005454  013637  001416                          MOV     @(SP)+,TEMP     ;PUT TICK COUNT IN TEMP
1139  005460  062746  000002                          ADD     #2,-(SP)        ;ADJUST STACK
1140  005464  152777  000020  173714          1$:     BISB    #BIT4,@DMCSRH   ;SET STEP LU
1141  005472  027777  173706  173704                  CMP     @DMCSR,@DMCSR   ;WASTE TIME
1142  005500  142777  000020  173700                  BICB    #BIT4,@DMCSRH   ;CLEAR STEP LU
1143  005506  005337  001416                          DEC     TEMP            ;DEC TICK COUNT
1144  005512  001364                                  BNE     1$              ;BR IF NOT DONE
1145  005514  000002                                  RTI                     ;RETURN
1146  005516  000001                          3$:     .BLKW 1
1147
1148  005520                                  .TIMER:
1149  005520  013637  001416                          MOV     @(SP)+,TEMP     ;MOVE COUNT TO TEMP
1150  005524  062746  000002                          ADD     #2,-(SP)        ;ADJUST STACK
1151  005530                                  1$:
1152  005530  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
 1153  005532  021364                                    021364                  ;PORT4←IBUS* REG11
 1154  005534  032777  000002  173650                    BIT     #2,@DMP04       ;IS PGM CLOCK BIT CLEAR?
 1155  005542  001772                                    BEQ     1$              ;BR IF YES
 1156  005544                                    2$:
 1157  005544  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 1158  005546  021364                                    02;364                  ;PORT4←IBUS* REG11
 1159  005550  032777  000002  173634                    BIT     #2,@DMP04       ;IS PGM CLOCK BIT SET?
 1160  005556  001372                                    BNE     2$              ;BR IF YES
 1161  005560  005337  001416                            DEC     TEMP            ;DEC COUNT
 1162  005564  001361                                    BNE     1$              ;BR IF NOT DONE
 1163  005566  000002                                    RTI                     ;RETURN
 1164
 1165  005570  020040  000077                    MQM:    .ASCIZ  /  ?/
   (2) 005574  005015     000                     MCRLF:  .ASCIZ   <15><12>
   (2) 005577     377  053520  020122            MPFAIL: .ASCIZ  <377>/PWR FAILED. RESTART AT TEST /
   (2) 005635     377  047105  020104            MEPASS: .ASCIZ  <377>/END PASS DZDMH  /
   (2) 005657     377  000122                    MR:     .ASCIZ  <377>/R/
   (2) 005662  047377  020117  042504            MERR2:  .ASCIZ  <377>/NO DEVICES PRESENT./
   (2) 005707     377  047111  052523            MERR3:  .ASCIZ  <377>/INSUFFICIENT DATA!/
   (2) 005733     377  042524  052123            MTSTPC: .ASCIZ  <377>/TEST PC-/
   (2) 005745     377  047514  045503            MLOCK:  .ASCIZ  <377>/LOCK ON SELECTED TEST/
   (2) 005774  051503  035122  000040            MCSRX:  .ASCIZ   /CSR: /
   (2) 006002  042526  035103  000040            MVECX:  .ASCIZ  /VEC: /
   (2) 006010  040520  051523  051505            MPASSX: .ASCIZ  /PASSES: /
   (2) 006021     105  051122  051117            MERRX:  .ASCIZ  /ERRORS: /
   (2) 006032  042524  052123  047040            MTSTN:  .ASCIZ  /TEST NO: /
   (2) 006044  000052                            MASTEK: .ASCIZ  /*/
   (2) 006046  051777  052105  051440            MNEW:   .ASCIZ  <377>/SET SWITCH REG TO DMC11'S DESIRED ACTIVE./
   (2) 006121     120  035103  000040            MERRPC: .ASCIZ  /PC: /
   (2) 006126  020212  020040  020040            XHEAD:  .ASCII  <212>/           MAP OF DMC11 STATUS/
   (2) 006165     377  020040  020040                    .ASCII  <377>/           ------------------/
   (2) 006224  020212  050040  020103                    .ASCII  <212>/  PC      CSR     STAT1    STAT2    STAT3/
   (2) 006276  026777  026455  026455                    .ASCIZ  <377>/------   ------   ------   ------   ------/
   (2) 006352  044377  053517  046440            NUM:    .ASCIZ  <377>/HOW MANY DMC11'S TO BE TESTED?/
   (2) 006412  041777  051123  040440            CSR:    .ASCIZ  <377>/CSR ADDRESS?/
   (2) 006430  053377  041505  047524            VEC:    .ASCIZ  <377>/VECTOR ADDRESS?/
   (2) 006451     377  051102  050040            PRIO:   .ASCIZ  <377>/BR PRIORITY LEVEL? (4,5,6,7)?/
   (2) 006510  044777  020106  046504            CRAM:   .ASCIZ  <377>/IF DMC HAS CRAM (M8204) TYPE "Y", IF CROM (M8200) TYPE "N"
   (2) 006606  053777  044510  044103            MODU:   .ASCIZ  <377>/WHICH LINE UNIT? IF NONE TYPE "N", IF M9201 TYPE "1", IF M
   (2) 006720  051777  044527  041524            LINE:   .ASCIZ  <377>/SWITCH PAC#1 (DDCMP LINE #)?/
   (2) 006756  051777  044527  041524            BM:     .ASCIZ  <377>/SWITCH PAC#2 (BM873 BOOT ADD)?/
   (2) 007016  044777  020123  044124            CONN:   .ASCIZ  <377>/IS THE LOOP BACK CONNECTOR ON?/
   (2) 007056  047377  020117  042504            NOACT:  .ASCIZ  <377>/NO DEVICES ARE SELECTED/
   (2) 007107     377  051412  051127            SWMES:  .ASCIZ  <377><12>/SWR= /
   (2) 007117     116  053505  020077            SWMES1: .ASCIZ  /NEW? /
   (2) 007125     377  042377  041515            CONERR: .ASCIZ  <377><377>/DMC11 CONFIGURATION ERROR  PC: /
   (2) 007167     377  054105  042520            CNERR:  .ASCIZ  <377>/EXPECTED  FOUND/
   (2) 007210  024040  046504  024503            DMCM:   .ASCIZ  / (DMC) /
   (2) 007220  024040  046513  024503            KMCM:   .ASCIZ  / (KMC) /
   (2)                                           .EVEN
   (2) 007230  000005                            XSTATQ: 5
 1166  007232     006     003                            .BYTE   6,3
 1167  007234  001246                                    TEMP1
 1168  007236     006     003                            .BYTE   6,3
 1169  007240  001250                                    TEMP2
 1170  007242     006     003                            .BYTE   6,3
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1171  007244  001252                                    TEMP3
1172  007246  006   003                                 .BYTE   6,3
1173  007250  001254                                    TEMP4
1174  007252  006   002                                 .BYTE   6,2
1175  007254  001256                                    TEMP5
1176                                          .EVEN
1177
1178                                          ;BUFFERS FOR INPUT-OUTPUT
1179
1180  007256  000000                          INBUF:  0
1181          007320                          .=.+40
1182  007320  000000                          MDATA:  0
1183          007362                          .=.+40
1184
1185
1186                                          ;ROUTINE USED TO CHANGE SOFTWARE SWITCH
1187                                          ;REGISTER USING THE CONSOLE TERMINAL
1188                                          ;--------------------------------------
1189
1190  007362  022737  000176  001202  CKSWR:  CMP     #SWREG,SWR      ;IS THE SOFT SWR BEING USED?
1191  007370  001071                          BNE     CKSWR5          ;BR IF NO
1192  007372  022777  000007  171606          CMP     #7,@TKDBR       ;WAS CTRL G TYPED? (7 BIT ASCII)
1193  007400  001404                          BEQ     1$              ;BR IF YES
1194  007402  022777  000207  171576          CMP     #207,@TKDBR     ;WAS CTRL G TYPED? (8 BIT ASCII)
1195  007410  001061                          BNE     CKSWR5          ;BR IF NO
1196  007412  010246                  1$:     MOV     R2,-(SP)        ;STORE R2
1197  007414  010346                          MOV     R3,-(SP)        ;STORE R3
1198  007416  010446                          MOV     R4,-(SP)        ;STORE R4
1199  007420  012737  177777  007556          MOV     #-1,SWFLG       ;SET SOFT TYPE OUT FLAG
1200  007426  005002          CKSWR1: CLR     R2              ;CLEAR NEW SWR CONTENTS
1201  007430  012704  177777                  MOV     #-1,R4          ;SET FLAG TO ALL ONES
1202  007434  104402  007107                  TYPE    ,SWMES          ;TYPE "SWR= "
1203  007440  104411          CKSWR2: CNVRT                   ;TYPE OUT PRESENT CONTENTS
1204  007442  007612                  SOFTSW                  ;OF SOFT SWITCH REGISTER
1205  007444  104402  007117  CKSWR3: TYPE    ,SWMES1         ;TYPE "NEW? "
1206  007450  004737  007560  CKSWR4: JSR     PC,INCHAR       ;GET RESPONSE
1207  007454  022703  000015          CMP     #15,R3          ;WAS IT A CR?
1208  007460  001424                  BEQ     5$              ;BR IF YES
1209  007462  022703  000012          CMP     #12,R3          ;WAS IT A LF?
1210  007466  001416                  BEQ     4$              ;BR IF YES
1211  007470  022703  000025          CMP     #25,R3          ;WAS IT CTRL U?
1212  007474  001754                  BEQ     CKSWR1          ;BR IF YES(START OVER)
1213  007476  022703  000007          CMP     #7,R3           ;IF CNTL G GET NEXT CHAR
1214  007502  001762                  BEQ     CKSWR4
1215  007504  005004                  CLR     R4              ;IT MUST BE A DIGIT SO CLR FLAG
1216  007506  042703  177770          BIC     #177770,R3      ;ONLY 0-7 ARE LEGAL SO MASK OFF BITS
1217  007512  006302                  ASL     R2              ;SHIFT R2 3 TIMES
1218  007514  006302                  ASL     R2
1219  007516  006302                  ASL     R2
1220  007520  050302                  BIS     R3,R2           ;ADD LAST DIGIT
1221  007522  000752                  BR      CKSWR4          ;GET NEXT CHARACTER
1222  007524  012766  002002  000006  4$:     MOV     #.START,6(SP)   ;LF WAS TYPED SO GO TO START
1223  007532  005704          5$:     TST     R4              ;IS FLAG CLEAR?
1224  007534  001002                  BNE     6$              ;IF NOT DON'T CHANGE SOFT SWR
1225  007536  010277  171440                  MOV     R2,@SWR         ;IF YES THEN WRITE NEW CONTENTS TO SOFT SWR
1226  007542  005037  007556          6$:     CLR     SWFLG           ;CLEAR TYPEOUT FLAG
```

```
1227  007546  012604                          MOV     (SP)+,R4        ;RESTORE R4
1228  007550  012603                          MOV     (SP)+,R3        ;RESTORE R3
1229  007552  012602                          MOV     (SP)+,R2        ;RESTORE R2
1230  007554  000207                  CKSWR5: RTS     PC              ;RETURN
1231
1232  007556  000000                  SWFLG:  0
1233
1234  007560  105777  171420          INCHAR: TSTB    @TKCSR
1235  007564  100375                          BPL     .-4
1236  007566  017703  171414                  MOV     @TKDBR,R3
1237  007572  105777  171412                  TSTB    @TPCSR
1238  007576  100375                          BPL     .-4
1239  007600  010377  171406                  MOV     R3,@TPDBR
1240  007604  042703  000200                  BIC     #BIT7,R3
1241  007610  000207                          RTS     PC
1242
1243  007612  000001                  SOFTSW: 1
1244  007614     006      002                 .BYTE   6,2
1245  007616  000176                          SWREG
```

```
1246
1247                                                    ;
1248                                                    ;ROUTINE USED TO "CYCLE" THROUGH UP TO 16 DMC11'S
1249                                                    ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
1250                                                    ;AND RUNS THE SPECIFIED DMC11'S.  THIS ROUTINE *MUST*
1251                                                    ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
1252                                                    ;SETUP NECESSARY.
1253                                                    ;
1254
1255  007620  005737  001306              CYCLE:  TST     DMACTV          ;ARE ANY DMC11'S TO BE TESTED?
1256  007624  001004                              BNE     1$              ;BR IF OK.
1257  007626  104402  007056                      TYPE    ,NOACT          ;NO DMC11'S SELECTED!!
1258  007632  000000                              HALT                    ;STOP THE SHOW.
1259  007634  000776                              BR      .-2             ;DISQUALIFY CONT. SW.
1260  007636  000241                      1$:     CLC                     ;CLEAR PROC. CARRY BIT.
1261  007640  006137  001316                      ROL     RUN             ;UPDATE POINTER
1262  007644  005537  001316                      ADC     RUN             ;CATCH CARRY FROM RUN
1263  007650  062737  000004  001322              ADD     #4,MILK         ;UPDATE POINTER
1264  007656  062737  000010  001320              ADD     #10,CREAM       ;UPDATE ADDRESS POINTER.
1265  007664  022737  001700  001320              CMP     #DM.MAP+200,CREAM
1266  007672  001006                              BNE     2$              ;KEEP GOING; NOT ALL TESTED FOR.
1267  007674  012737  001500  001320              MOV     #DM.MAP,CREAM   ;RESET ADDRESS POINTER.
1268  007702  012737  001702  001322              MOV     #CNT.MAP,MILK   ;RESET PASS COUNT POINTER
1269  007710  033737  001316  001306      2$:     BIT     RUN,DMACTV      ;IS THIS ONE ACTIVE?
1270  007716  001747                              BEQ     1$              ;BR IF NO
1271  007720  013700  001320                      MOV     CREAM,R0        ;GET ADDRESS POINTER
1272  007724  013702  001322                      MOV     MILK,R2         ;GET PASS COUNT POINTER
1273  007730  012037  001404                      MOV     (R0)+,DMCSR     ;LOAD SYSTEM CTRL. REG
1274  007734  011037  001374                      MOV     (R0),DMRVEC     ;LOAD VECTOR
1275  007740  042737  177000  001374              BIC     #177000,DMRVEC  ;CLEAR UNWANTED BITS
1276  007746  012037  001366                      MOV     (R0)+,STAT1     ;LOAD STAT1
1277  007752  012037  001370                      MOV     (R0)+,STAT2     ;LOAD STAT2
1278  007756  012037  001372                      MOV     (R0)+,STAT3     ;LOAD STAT3
1279  007762  012237  001230                      MOV     (R2)+,PASCNT    ;LOAD PASS COUNT
1280  007766  012237  001232                      MOV     (R2)+,ERRCNT    ;LOAD ERROR COUNT
1281  007772  012700  000002                      MOV     #2,R0           ;SAVE CORE THIS WAY!
1282  007776  013737  001404  001406              MOV     DMCSR,DMCSRH
1283  010004  005237  001406                      INC     DMCSRH
1284  010010  013737  001406  001410              MOV     DMCSRH,DMCTL
1285  010016  005237  001410                      INC     DMCTL
1286  010022  013737  001410  001412              MOV     DMCTL,DMP04
1287  010030  060037  001412                      ADD     R0,DMP04
1288  010034  013737  001412  001414              MOV     DMP04,DMP06
1289  010042  060037  001414                      ADD     R0,DMP06
1290
1291  010046  013737  001374  001376              MOV     DMRVEC,DMRLVL   ;PTY LVL
1292  010054  060037  001376                      ADD     R0,DMRLVL       ;
1293  010060  013737  001376  001400              MOV     DMRLVL,DMTVEC   ;TX VEC
1294  010066  060037  001400                      ADD     R0,DMTVEC       ;
1295  010072  013737  001400  001402              MOV     DMTVEC,DMTLVL   ;TX LVL
1296  010100  060037  001402                      ADD     R0,DMTLVL
1297
1298  010104  032737  000002  001236              BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED
1299  010112  001450                              BEQ     7$              ;BR IF NO
1300  010114                              4$:
1301  010114  005737  000042                      TST     @#42            ;RUNNING IN AUTO MODE?
```

```
1302  010120  001045                          BNE     7$              ;BR IF YES
1303  010122  104402  005574                  TYPE    ,MCRLF
1304  010126  104403                          INSTR                   ;GET TEST NO.
1305  010130  006032                          MTSTN
1306  010132  104405                          PARAM
1307  010134  000001                          1
1308  010136  001000                          1000
1309  010140  001226                          TSTNO
1310  010142     000                  .BYTE   0
1311  010143     001                  .BYTE   1
1312  010144  012700  015766                  MOV     #TST1,R0
1313  010150  022710                  5$:     CMP     (PC)+,(R0)      ;CMP FIRST WORD TO 12737
1314  010152  012737                          MOV     (PC)+,@(PC)+
1315  010154  001020                          BNE     6$              ;BR IF NOT SAME
1316  010156  023760  001226  000002          CMP     TSTNO,2(R0)     ;DOES TSTNO MATCH?
1317  010164  001014                          BNE     6$              ;BR IF NO
1318  010166  022760  001226  000004          CMP     #TSTNO,4(R0)    ;IS LAST WORD OK?
1319  010174  001010                          BNE     6$              ;BR IF NO
1320  010176  010037  001214                  MOV     R0,RETURN       ;IT IS A LEGAL TEST SO DO IT
1321  010202  104402  005657                  TYPE    ,MR
1322  010206  042737  000002  001236          BIC     #SW01,STRTSW
1323  010214  000412                          BR      8$
1324  010216  005720                  6$:     TST     (R0)+           ;POP R0
1325  010220  020027  031442                  CMP     R0,#TLAST+10    ;AT END YET?
1326  010224  001351                          BNE     5$              ;BR IF NO
1327  010226  104402  005570                  TYPE    ,MQM            ;YES ILLEGAL TEST NO.
1328  010232  000730                          BR      4$              ;TRY AGAIN
1329
1330  010234  012737  015766  001214  7$:     MOV     #TST1,RETURN    ;PREPARE RETURN ADDRESS
1331  010242  013701  001404          8$:     MOV     DMCSR,R1        ;R1 = BASE DMC11 ADDRESS
1332  010246  000177  170742                  JMP     @RETURN         ;GO START TESTING.
1333
1334
1335                                          ;ROUTINE USED TO "AUTO SIZE" THE DMC11
1336                                          ;CSR AND VECTOR.
1337                                          ;NOTE:   THE CSR MAY BE ANY WHERE IN THE FLOATING
1338                                          ;        ADDRESS RANGE (160000:164000)
1339                                          ;        AND THE VECTOR MAY BE ANY WHERE IN THE
1340                                          ;        FLOATING VECTOR RANGE (300:770)
1341                                          ;
1342
1343  010252                          AUTO.SIZE:
1344  010252  000005                          RESET                   ;INSURE A BUS INIT.
1345  010254  012702  001500          CSRMAP: MOV     #DM.MAP,R2      ;LOAD MAP POINTER.
1346  010260  005022                  1$:     CLR     (R2)+           ;ZERO ENTIRE MAP
1347  010262  022702  001700                  CMP     #DM.END,R2      ;ALL DONE?
1348  010266  001374                          BNE     1$              ;BR IF NO
1349  010270  005037  001310                  CLR     DMNUM           ;SET OCTAL NUMBER OF DMC11'S TO 0
1350  010274  012702  001500                  MOV     #DM.MAP,R2      ;R2 POINTS TO DMC MAP
1351  010300  005037  001306                  CLR     DMACTV          ;CLEAR ACTIVE
1352  010304  032737  000001  001236          BIT     #SW00,STRTSW    ;QUESTIONS?
1353  010312  001002                          BNE     .+6             ;BR IF YES
1354  010314  000137  010744                  JMP     7$              ;IF NO SKIP QUESTIONS
1355  010320  012737  000001  001256          MOV     #1,TEMP5        ;START WITH 1
1356  010326  104403                          INSTR
1357  010330  006352                          NUM
```

```
1358  010332  104405                          PARAM
1359  010334  000001                          1
1360  010336  000020                          16.
1361  010340  001252                          TEMP3
1362  010342     000                          .BYTE   0
1363  010343     001                          .BYTE   1
1364  010344  013737  001252  001310          MOV     TEMP3,DMNUM     ;DMNUM = HOW MANY
1365  010352  104402  005574            12$:  TYPE    ,MCRLF
1366  010356  104410                          CONVRT                  ;TYPE WHICH DMC IS BEING DONE
1367  010360  011450                          WHICH                   ;TEMP5 IS WHICH DMC
1368  010362  005237  001256                  INC     TEMP5
1369  010366  104403                          INSTR
1370  010370  006412                          CSR
1371  010372  104405                          PARAM
1372  010374  160000                          160000
1373  010376  164000                          164000
1374  010400  001254                          TEMP4
1375  010402     000                          .BYTE   0
1376  010403     001                          .BYTE   1
1377  010404  013722  001254                  MOV     TEMP4,(R2)+     ;STORE CSR IN MAP
1378  010410  104403                          INSTR
1379  010412  006430                          VEC
1380  010414  104405                          PARAM
1381  010416  000000                          0
1382  010420  000776                          776
1383  010422  001254                          TEMP4
1384  010424     000                          .BYTE   0
1385  010425     001                          .BYTE   1
1386  010426  013712  001254                  MOV     TEMP4,(R2)      ;STORE VECTOR IN MAP
1387  010432  104402            10$:  TYPE
1388  010434  006451                          PRIO                    ;ASK WHAT BR LEVEL
1389  010436  004737  011734                  JSR     PC,INTTY        ;GET RESPONSE
1390  010442  022703  000024                  CMP     #24,R3          ;
1391  010446  101014                          BHI     50$             ;BR IF LESS THAN 4
1392  010450  022703  000027                  CMP     #27,R3          ;
1393  010454  103411                          BLO     50$             ;BR IF GREATER THAN 7
1394  010456  012704  000011                  MOV     #11,R4          ;R4 = NUMBER OF SHIFTS
1395  010462  006303                          ASL     R3              ;SHIFT R3 LEFT
1396  010464  005304                          DEC     R4              ;DEC SHIFT COUNT
1397  010466  001375                          BNE     .-4             ;BR IF NOT DONE
1398  010470  042703  170777                  BIC     #170777,R3      ;BIC UNWANTED BITS
1399  010474  050312                          BIS     R3,(R2)         ;PUT BR LEVEL IN STATUS MAP
1400  010476  000403                          BR      8$              ;CONTINUE
1401  010500  104402            50$:  TYPE
1402  010502  005570                          MQM                     ;RESPONSE IS OUT OF LIMITS
1403  010504  000752                          BR      10$             ;TRY AGAIN
1404  010506  104402             8$:  TYPE
1405  010510  006510                          CRAM                    ;DOES DMC HAVE CRAM?
1406  010512  004737  011734                  JSR     PC,INTTY        ;GET REPLY
1407  010516  022703  000131                  CMP     #131,R3
1408  010522  001406                          BEQ     9$              ;YES
1409  010524  022703  000116                  CMP     #116,R3         ;NO
1410  010530  001405                          BEQ     16$             ;NOT A Y OR N
1411  010532  104402                          TYPE
1412  010534  005570                          MQM                     ;TYPE "?"
1413  010536  000763                          BR      8$              ;ASK AGAIN
```

```
1414  010540  052712  100000          9$:   BIS   #BIT15,(R2)     ;SET BIT 15 IF CRAM
1415  010544  104402                16$:  TYPE
1416  010546  006606                      MODU                    ;ASK WHICH LINE UNIT
1417  010550  004737  011734              JSR   PC,INTTY          ;GET REPLY
1418  010554  022703  000021              CMP   #21,R3            ;"1"
1419  010560  001417                      BEQ   30$
1420  010562  022703  000022              CMP   #22,R3            ;"2"
1421  010566  001412                      BEQ   31$
1422  010570  022703  000116              CMP   #116,R3           ;"N"
1423  010574  001403                      BEQ   32$
1424  010576  104402                      TYPE
1425  010600  005570                      MQM                     ;IF NOT A 1,2 OR N TYPE "?"
1426  010602  000760                      BR    16$               ;TRY AGIAN
1427  010604  052722  010000        32$:  BIS   #BIT12,(R2)+      ;SET BIT 12 IN STAT2 IF NO LU
1428  010610  022222                      CMP   (R2)+,(R2)+       ;POP OVER STAT2 AND STAT3
1429  010612  000447                      BR    33$
1430  010614  052712  020000        31$:  BIS   #BIT13,(R2)       ;SET BIT 13 IN STAT2 IF M82C2
1431  010620  104402                30$:  TYPE
1432  010622  007016                      CONN                    ;ASK IF LOOP-BACK IS ON
1433  010624  004737  011734              JSR   PC,INTTY          ;GET REPLY
1434  010630  022703  000131              CMP   #131,R3           ;Y
1435  010634  001406                      BEQ   17$
1436  010636  022703  000116              CMP   #116,R3           ;N
1437  010642  001406                      BEQ   18$
1438  010644  104402                      TYPE
1439  010646  005570                      MQM                     ;IF NOT Y OR N TYPE "?"
1440  010650  000763                      BR    30$               ;TRY AGAIN
1441  010652  052722  040000        17$:  BIS   #BIT14,(R2)+      ;TURNAROUND IS CONNECTED
1442  010656  000402                      BR    19$
1443  010660  042722  040000        18$:  BIC   #BIT14,(R2)+      ;NO TURNAROUND
1444  010664                        19$:
1445  010664  104403                      INSTR
1446  010666  006720                      LINE
1447  010670  104405                      PARAM
1448  010672  000000                      0
1449  010674  000377                      377
1450  010676  001254                      TEMP4
1451  010700     000                      .BYTE 0
1452  010701     001                      .BYTE 1
1453  010702  113722  001254              MOVB  TEMP4,(R2)+       ;STORE SWITCH PAC IN MAP
1454  010706  104403                      INSTR
1455  010710  006756                      BM
1456  010712  104405                      PARAM
1457  010714  000000                      0
1458  010716  000377                      377
1459  010720  001254                      TEMP4
1460  010722     000                      .BYTE 0
1461  010723     001                      .BYTE 1
1462  010724  113722  001254              MOVB  TEMP4,(R2)+       ;STORE SWITCH PAC IN MAP
1463  010730  005722                      TST   (R2)+             ;POP OVER STAT3
1464  010732  005337  001252        33$:  DEC   TEMP3             ;DEC DMC COUNT
1465  010736  001205                      BNE   12$               ;BR IF MORE TO DO
1466  010740  000137  011350              JMP   13$               ;CONTINUE
1467  010744  012701  160000         7$:  MOV   #160000,R1        ;SET FOR FIRST ADDRESS TO BE TESTED
1468  010750  012737  011442  000004      MOV   #6$,@#4           ;SET FOR NON-EXISTANT DEVICE TIME OUT
1469  010756  005011                2$:   CLR   (R1)              ;CLEAR SELO
```

```
1470  010760  005711                        TST     (R1)            ;IF DMC11 DMCSR S/B 0
1471  010762  001162                        BNE     3$              ;IF NO DEV ; TRAP TO 4. IF NO BIT 8 THEN NO DMC1
1472  010764  005061  000006                CLR     6(R1)           ;CLEAR SEL6
1473  010770  005761  000006                TST     6(R1)           ;IF DMC11 THEN DMRIC S/B =0!
1474  010774  001155                        BNE     3$              ;BR IF NOT DMC11
1475  010776  012711  002000                MOV     #BIT10,(R1)     ;SET ROMO
1476  011002  005061  000004                CLR     4(R1)           ;CLEAR SEL4
1477  011006  012761  125252  000006        MOV     #125252,6(R1)   ;WRITE THIS TO SEL6
1478  011014  052711  020000                BIS     #BIT13,(R1)     ;WRITE IT!
1479  011020  022761  125252  000004        CMP     #125252,4(R1)   ;WAS IT WRITTEN?
1480  011026  001004                        BNE     21$             ;IF NO IT IS NOT CRAM
1481  011030  052762  100000  000002        BIS     #BIT15,2(R2)    ;SET BIT15 IF CRAM
1482  011036  000421                        BR      22$
1483  011040  012711  001000        21$:    MOV     #BIT9,(R1)      ;SET ROMI
1484  011044  012761  100400  000006        MOV     #100400,6(R1)   ;PUT INSTRUCTION IN SEL6
1485  011052  012711  001400                MOV     #BIT9!BIT8,(R1) ;CLOCK INSTRUCTION (MICRO PROC PC TO 0)
1486  011056  012711  002000                MOV     #BIT10,(R1)     ;SET ROMO
1487  011062  022761  063220  000006        CMP     #63220,6(R1)    ;IS IT CROM
1488  011070  001404                        BEQ     22$             ;BR IF YES
1489  011072  022761  177777  000006        CMP     #-1,6(R1)       ;IF = -1 IT HAS NO CROM
1490  011100  001113                        BNE     3$              ;BR IF NOT DMC11
1491                          ;AT THIS POINT IT IS ASSUMED THAT R1 HOLDS A DMC11 CSR ADDRESS.
1492  011102  010122        22$:    MOV     R1,(R2)+        ;STORE CSR IN CORE TABLE.
1493  011104  012711  001000        15$:    MOV     #BIT9,(R1)      ;CLEAR LINE UNIT LOOP
1494  011110  005061  000004                CLR     4(R1)           ;CLEAR PORT4
1495  011114  012761  122113  000006        MOV     #122113,6(R1)   ;LOAD INSTRUCTION (CLR DTR)
1496  011122  052711  000400                BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION
1497  011126  012761  021264  000006        MOV     #021264,6(R1)   ;LOAD INSTRUCTION
1498  011134  052711  000400                BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION
1499  011140  122761  000377  000004        CMPB    #377,4(R1)      ;IS IT ALL ONES?
1500  011146  001003                        BNE     .+10            ;BR IF NO
1501  011150  052712  010000                BIS     #BIT12,(R2)     ;IF YES, NO LINE UNIT, SET STATUS BIT
1502  011154  000436                        BR      20$
1503  011156  032761  000002  000004        BIT     #BIT1,4(R1)     ;IS SWITCH A ONE?
1504  011164  001403                        BEQ     .+10            ;BR IF M8201
1505  011166  052712  060000                BIS     #BIT13!BIT14,(R2) ;M8202 ASSUME CONNECTOR
1506  011172  000427                        BR      20$             ;CONNECTOR ON)
1507  011174  032761  000010  000004        BIT     #BIT3,4(R1)     ;IS MRDY SET
1508  011202  001023                        BNE     20$             ;BR IF M8201 NO CONNECTOR (ON LINE)
1509  011204  012761  000100  000004        MOV     #BIT6,4(R1)     ;LOAD PORT4
1510  011212  012761  122113  000006        MOV     #122113,6(R1)   ;LOAD INSTRUCTION
1511  011220  052711  000400                BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION(SET DTR)
1512  011224  012761  021264  000006        MOV     #021264,6(R1)   ;LOAD INSTRUCTION
1513  011232  052711  000400                BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION(READ MODEM REG)
1514  011236  032761  000010  000004        BIT     #BIT3,4(R1)     ;IS MRDY SET NOW?
1515  011244  001402                        BEQ     20$             ;BR IF NO CONNECTOR
1516  011246  052712  040000                BIS     #BIT14,(R2)     ;SET STATUS BIT FOR CONNECTOR
1517  011252  005722        20$:    TST     (R2)+           ;POP POINTER
1518  011254  012761  021324  000006        MOV     #021324,6(R1)   ;PUT INSTRUCTION IN PORT6
1519  011262  012711  001400                MOV     #BIT9!BIT8,(R1) ;PORT4←LU 15
1520  011266  156122  000004                BISB    4(R1),(R2)+     ;STORE DDCMP LINE # IN TABLE
1521  011272  012761  021344  000006        MOV     #021344,6(R1)   ;PORT6←INSTRUCTION
1522  011300  012711  001400                MOV     #BIT8!BIT9,(R1) ;CLOCK INSTR.
1523  011304  156122  000004                BISB    4(R1),(R2)+     ;STORE BM873 ADD IN TABLE
1524  011310  005722                        TST     (R2)+           ;POP OVER STAT3
1525  011312  005011                        CLR     (R1)            ;CLEAR ROMI
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1526  011314  005237  001310                    INC     DMNUM           ;UPDATE DEVICE COUNTER
1527  011320  022737  000020  001310            CMP     #20,DMNUM       ;ARE MAX. NO. OF DEV FOUND?
1528  011326  001410                            BEQ     13$             ;YES DON'T LOOK FOR ANY MORE.
1529  011330  005011                    3$:     CLR     (R1)            ;CLEAR BIT 10
1530  011332  005061  000006                    CLR     6(R1)           ;CLEAR SEL 6
1531  011336  062701  000010            14$:    ADD     #10,R1          ;UPDATE CSR POINTER ADDRESS
1532  011342  022701  164000                    CMP     #164000,R1
1533  011346  001203                            BNE     2$              ;BR IF MORE ADDRESS TO CHECK.
1534  011350  005037  001306            13$:    CLR     DMACTV
1535  011354  005737  001310                    TST     DMNUM           ;WERE ANY DMC11'S FOUND AT ALL?
1536  011360  001423                            BEQ     5$              ;ERROR AUTO SIZER FOUND NO DMC11'S IN THIS SYS.
1537  011362  013701  001310                    MOV     DMNUM,R1
1538  011366  010137  001314                    MOV     R1,SAVNUM       ;SAVE NUMBER OF DEVICES
1539  011372  000241                    4$:     CLC
1540  011374  006137  001306                    ROL     DMACTV          ;GENERATE ACTIVE REGISTER OF DEVICES.
1541  011400  005237  001306                    INC     DMACTV          ;SET THE BIT
1542  011404  005301                            DEC     R1
1543  011406  001371                            BNE     4$              ;BR IF MORE TO GENERATE
1544  011410  012737  000006  000004            MOV     #6,@#4          ;RESTORE TRAP VECTOR
1545  011416  013737  001306  001312            MOV     DMACTV,SAVACT   ;SAVE ACTIVE REGISTER
1546  011424  000137  011456                    JMP     VECMAP          ;GO FIND THE VECTOR NOW.
1547  011430  104402  005662            5$:     TYPE    ,MERR2          ;NOTIFY OPR THAT NO DMC11'S FOUND.
1548  011434  005000                            CLR     R0              ;MAKE DATA LIGHTS ZERO
1549  011436  000000                            HALT                    ;STOP THE SHOW
1550  011440  000776                            BR      .-2             ;DISABLE CONT. SW.
1551  011442  012716  011336            6$:     MOV     #14$,(SP)       ;ENTERED BY NON-EXISTANT TIME-OUT.
1552  011446  000002                            RTI                     ;RETURN TO MAINSTREAM
1553
1554  011450  000001                    WHICH:  1
1555  011452     002     002                    .BYTE   2,2
1556  011454  001256                            TEMP5
1557
1558  011456  032737  000001  001236    VECMAP: BIT     #SW00,STRTSW
1559  011464  001114                            BNE     5$
1560  011466  012737  000340  000022            MOV     #340,@#22       ;SET IOT TRAP PRIO TO 7
1561  011474  012737  011650  000020            MOV     #4$,@#20        ;SET IOT TRAP VECTOR
1562  011502  012702  001500                    MOV     #DM.MAP,R2      ;SET SOFTWARE POINTER
1563  011506  012700  000300                    MOV     #300,R0         ;FLOATING VECTORS START HERE.
1564  011512  012701  000302                    MOV     #302,R1         ;PC OF IOT INSTR.
1565  011516  010120                    1$:     MOV     R1,(R0)+        ;START FILLING VECTOR AREA
1566  011520  012721  000004                    MOV     #4,(R1)+        ;WITH .+2; IOT
1567  011524  022021                            CMP     (R0)+,(R1)+     ;ADD 2 TO R0 +R1
1568  011526  020127  001000                    CMP     R1,#1000
1569  011532  101771                            BLOS    1$              ;BR IF MORE TO FILL
1570  011534  013737  001306  001246            MOV     DMACTV,TEMP1    ;STORE TEMPORALLY
1571  011542  006037  001246            2$:     ROR     TEMP1           ;BRING OUT A BIT
1572  011546  103063                            BCC     5$              ;BR IF ALL DONE
1573  011550  012704  000012                    MOV     #12,R4          ;R4 IS INDEX REGISTER
1574  011554  016437  011720  177776            MOV     BRLVL(R4),PS    ;SET PS TO 7
1575  011562  011201                            MOV     (R2),R1
1576  011564  012761  000200  000004            MOV     #200,4(R1)
1577  011572  012711  001000                    MOV     #BIT9,(R1)      ;SET ROMI
1578  011576  012761  121111  000006            MOV     #121111,6(R1)   ;PUT INSTRUCTION IN PORT6
1579  011604  012711  001400                    MOV     #BIT9!BIT8,(R1) ;FORCE AN INTERRUPT
1580  011610  105200                    7$:     INCB    R0              ;STALL
1581  011612  001376                            BNE     .-2             ;FOR TIME TO INTERUPT
```

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1582  011614  162704  000002                        SUB     #2,R4           ;GET NEXT LOWEST PS LEVEL
1583  011620  001404                                BEQ     6$              ;BR IF R4 = 0
1584  011622  016437  011720  177776                MOV     BRLVL(R4),PS    ;MOVE NEXT LOWER LEVEL IN PS
1585  011630  000767                                BR      7$              ;BR TO DELAY
1586  011632  052762  005300  000002        6$:     BIS     #5300,2(R2)     ;NO INTERUPT ASSUME 300 AT LEVEL 5 AND FIX DMC11
1587  011640  005011                        3$:     CLR     (R1)            ;CLEAR ROMI
1588  011642  062702  000010                        ADD     #10,R2          ;POP SOFTWARE POINTER
1589  011646  000735                                BR      2$              ;KEEP GOING
1590  011650  051662  000002                4$:     BIS     (SP),2(R2)      ;GET VECTOR ADDRESS
1591  011654  042762  000007  000002                BIC     #7,2(R2)        ;CLEAR JUNK
1592  011662  016405  011722                        MOV     BRLVL+2(R4),R5  ;GET BR LEVEL OF DMC11
1593  011666  006305                                ASL     R5              ;SHIFT LEVEL 4 PLACES
1594  011670  006305                                ASL     R5              ;TO THE LEFT FOR THE
1595  011672  006305                                ASL     R5              ;STATUS TABLE
1596  011674  006305                                ASL     R5
1597  011676  042705  170777                        BIC     #170777,R5      ;CLEAR UNWANTED BITS
1598  011702  050562  000002                        BIS     R5,2(R2)        ;PUT BR LEVEL IN STATUS TABLE
1599  011706  022626                                CMP     (SP)+,(SP)+     ;POP IOT JUNK OFF STACK
1600  011710  012716  011640                        MOV     #3$,(SP)        ;SET FOR RETURN
1601  011714  000002                                RTI
1602  011716  000207                        5$:     RTS     PC              ;ALL DONE WITH "AUTO SIZING"
1603
1604  011720  000000                        BRLVL:  0       ;LEVEL 0
1605  011722  000000                                0       ;LEVEL 0
1606  011724  000200                                200     ;LEVEL 4
1607  011726  000240                                240     ;LEVEL 5
1608  011730  000300                                300     ;LEVEL 6
1609  011732  000340                                340     ;LEVEL 7
1610
1611
1612  011734  105777  167244                INTTY:  TSTB    @TKCSR          ;WAIT FOR DONE
1613  011740  100375                                BPL     .-4
1614  011742  017703  167240                        MOV     @TKDBR,R3       ;PUT CHAR IN R3
1615  011746  105777  167236                        TSTB    @TPCSR          ;WAIT UNTIL PRINTER IS READY
1616  011752  100375                                BPL     .-4
1617  011754  010377  167232                        MOV     R3,@TPDBR       ;ECHO CHAR
1618  011760  042703  000240                        BIC     #BIT7!BIT5,R3   ;MASK OFF LOWER CASE
1619  011764  000207                                RTS     PC              ;RETURN
1620
1621                                  15300
1622  011766                          15400 ROMMAP:
```

```
                        .TITLE  DMC-11 MICROPROCESSOR INSTRUCTIONS
                        .SBTTL  MACRO DEFINITIONS
                        ;
                        .SBTTL REVISION 00
                        .SBTTL FEBRUARY 25, 1975
                        .SBTTL
                        .SBTTL REVISION 01
                        .SBTTL MARCH 18,1975
                        .SBTTL NEW CSR BOARD CHANGES
                        .SBTTL
                        .SBTTL HARVEY M. SCHLESINGER
                        ;
                        .SBTTL COPYRIGHT 1975 DIGITAL EQUIPMENT CORPORATION
                        ;
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```
                        NEW=0
                        ;MICROPROCESSOR INSTRUCTION WORD DEFINITIONS
000000          MOVE=0                  ;OPCODE MOVE
100000          JUMP=100000             ;OPCODE JUMP
020000          IBUS=20000              ;SOURCE IBUS
000000          IMM=0                   ;SOURCVE IMMEDIATE
040000          MEMX=40000              ;SOURCE MEMORY
060000          BRX=60000               ;SOURCE BR
060000          BR=60000                ;SOURCE BR

060000          DP=60000                ;SOURCE BR
010000          LDMAR=10000             ;MA-LOAD MAR LO
014000          INCMAR=14000            ;MA-INCREMENT MAR
000400          WRTEBR=400              ;DEST-WRITE BR
001000          WROUTX=1000             ;DEST-EXTENDED IBUS
001400          SHFTBR=1400             ;DEST-SHIFT BR LEFT
002000          WROUT=2000              ;DEST-WRITE OUTPUT
002400          WRMEM=2400              ;DEST-WRITE MEMORY
003000          SPX=3000                ;DEST-WRITE SP
003400          SPBRX=3400              ;DEST-WRITE SP AND BR
                        ;FUNCTIONS
000200          SELA=200                ;FUNCTION-SELECT A
000220          SELB=220                ;FUNCTION-SELECT B
000240          AORNB=240               ;FUNCTION-A OR NOT B
000260          AANDB=260               ;FUNCTION A  AND B
000300          AORB=300                ;FUNCTION-A OR B
000320          AXORB=320               ;FUNCTION A XOR B
000340          SUB=340                 ;SUBTRACT
                   SUBTC=360            ;FUNCTION- TWOS COMPLEMENT SUBTRACT
000000          ADD=0                   ;ADD A+B
000020          ADDC=20                 ;A+B+CARRY
000040          SUBC=40                 ;A-B-C
000060          INCA=60                 ;INCREMENT A
000100          AC=100                  ;A PLUS CARRY
000120          AA=120                  ;A PLUS A
000140          AAC=140                 ;A PLUS A PLUS C
000160          DECA=160                ;DECREMENT A
                        ;END FUNCTIONS
004000                  PAGE1=4000
010000                  PAGE2=10000
014000                  PAGE3=14000
001000          CCOND=1000              ;CONDITION C
001400          ZCOND=1400              ;CONDITION Z
000400          ALCOND=400              ;ALWAYS
002000          BR0CON=2000             ;CONDITION BR0
002400          BR1CON=2400             ;CONDITION BR1
003000          BR4CON=3000             ;CONDITION BR4
003400          BR7CON=3400             ;CONDITION BR7
```

```
                        .SBTTL  MICRO INSTRUCTION DEFINITIONS
                        .SBTTL          BRANCH INSTRUCTIONS
                ;
100000          JUMP=100000             ;JUMP OP CODE
                ;
                        .MACRO  $ZERO
                        MICPC=MICPC+1
                        000000

                        .ENDM   $ZERO
                ;
                        .MACRO ALWAYS ADDRES    ;JUMP ALWAYS
                        MICPC=MICPC+1
                        <JUMP!ALCOND!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  BRO ADDRES      ;JUMP IF BRO SET
                        MICPC=MICPC+1
                        <JUMP!BROCON!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  BR1 ADDRES      ;JUMP IF BR1 SET
                        MICPC=MICPC+1
                        <JUMP!BR1CON!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  BR4 ADDRES      ;JUMP IF BR4 SET
                        MICPC=MICPC+1
                        <JUMP!BR4CON!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  BR7 ADDRES      ;JUMP IF BR7 SET
                        MICPC=MICPC+1
                        <JUMP!BR7CON!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  Z ADDRES        ;JUMP IF Z BIT SET
                        MICPC=MICPC+1
                        <JUMP!ZCOND!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  C ADDRES        ;JUMP IF C BIT SET
                        MICPC=MICPC+1
                        <JUMP!CCOND!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                        .SBTTL          INDEXED BRANCH INSTRUCTIONS
                ;
                        .MACRO  .ALWAY SRC,FUNC,SPLOC ;INDEXED JUMP ALWAYS
                        MICPC=MICPC+1
```

```
                                        INDEXED BRANCH INSTRUCTIONS

                                        <JUMP!ALCOND!SRC!FUNC!SPLOC>

                                        .ENDM
                                ;
                                        .MACRO  .BR0 SRC,FUNC,SPLOC ;INDEXED JUMP ON BR0 SET
                                        MICPC=MICPC+1
                                        <JUMP!BR0CON!SRC!FUNC!SPLOC>

                                        .ENDM
                                ;
                                        .MACRO  .BR1 SRC,FUNC,SPLOC ;INDEXED JUMP ON BR1 SET
                                        MICPC=MICPC+1
                                        <JUMP!BR1CON!SRC!FUNC!SPLOC>

                                        .ENDM
                                ;
                                        .MACRO  .BR4 SRC,FUNC,SPLOC ;INDEXED JUMP ON BR4 SET
                                        MICPC=MICPC+1
                                        <JUMP! BR4CON!SRC!FUNC!SPLOC>

                                        .ENDM
                                ;
                                        .MACRO  .BR7 SRC,FUNC,SPLOC ;INDEXED JUMP ON BR7 SET
                                        MICPC=MICPC+1
                                        <JUMP!BR7CON!SRC!FUNC!SPLOC>

                                        .ENDM
                                ;
                                        .MACRO  .Z SRC,FUNC,SPLOC ;INDEXED JUMP ON Z BIT SET
                                        MICPC=MICPC+1
                                        <JUMP!ZCOND!SRC!FUNC!SPLOC>

                                        .ENDM
                                ;
                                        .MACRO  .C SRC,FUNC,SPLOC ;INDEXED JUMP ON C BIT SET
                                        MICPC=MICPC+1
                                        <JUMP!CCOND!SRC!FUNC!SPLOC>

                                        .ENDM
                                        .SBTTL          MOVE INSTRUCTIONS
                                ;
000000                          MOVE=0          ;MOVE OPCODE
                                ;
                                        .MACRO  BRSHFT  ;BR SHIFT RIGHT
                                        MICPC=MICPC+1
                                        <MOVE!SHFTBR!WRTEBR!SELB>

                                        .ENDM
                                ;
                                        .MACRO  BSHFTB  ;BR ROTATE
                                        MICPC=MICPC+1
                                        <MOVE!SHFTBR!SELB!BR>

                                        .ENDM
                                ;
                                        .MACRO  SP SRC,FUNC,SPLOC ;LOAD SCRATCH-PAD
```

```
                        MOVE INSTRUCTIONS

                        MICPC=MICPC+1
                        <MOVE!SPX!SRC!FUNC!SPLOC>

                        .ENDM
                ;
                        .MACRO  SPBR SRC,FUNC,SPLOC ;LOAD SP AND BR
                        MICPC=MICPC+1
                        <MOVE!SPBRX!SRC!FUNC!SPLOC>

                        .ENDM
                ;
                        .MACRO  MEM SRC,DATA ;MOVE TO MEMORY
                        MICPC=MICPC+1
                        <MOVE!WRMEM!SRC!<DATA>>

                        .ENDM
                ;
                        .MACRO  MEMADR  ADDRES,FUNC     ;WRITE ADDRESS TO MEMORY
                        MICPC=MICPC+1
                        .IF B   FUNC
                        <MOVE!WRMEM!<ADDRES-INIT&777/2>>
                        .IFF
                        <MOVE!WRMEM!FUNC!<ADDRES-INIT&777/2>>
                        .ENDC
                        .ENDM
                ;
                        .MACRO MEMINC SRC,DATA ;MOVE TO MEM, INCR MAR
                        MICPC=MICPC+1
                        <MOVE!WRMEM!INCMAR!SRC!<DATA>>

                        .ENDM
                ;
                        .MACRO BRWRTE SRC,DATA ;MOVE TO BR
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!SRC!<DATA>>

                        .ENDM
                ;
                        .MACRO  BRADDR ADDRES   ;PUT RETURN ADDR (1 BYTE) IN BR
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO OUTPUT SRC,DATA  ;WRITE OUTPUT
                        MICPC=MICPC+1
                        <MOVE!WROUT!SRC!<DATA>>

                        .ENDM
                ;
                        .MACRO OUT SRC,DATA
                        MICPC=MICPC+1
                        <MOVE!WROUTX!SRC!<DATA>>

                        .ENDM
                ;
```

```
                        MOVE INSTRUCTIONS

                        .MACRO LDMA SRC,DATA    ;LOAD MEMORY ADDRESS REG
                        MICPC=MICPC+1
                        .IF IDN SRC,IMM
                        <MOVE!LDMAR!IMM!<DATA&377>>
                        .IFF
                        <MOVE!LDMAR!SRC!<DATA>>
                        .ENDC

                        .ENDM

                    ;
                        .MACRO LDMAP SRC,DATA   ;LOAD MEMORY PAGE NUMBER
                        MICPC=MICPC+1
                        .IF IDN SRC,IMM
                        <MOVE!LDMAPG!IMM!<DATA/400>>
                        .IFF
                        <MOVE!LDMAPG!SRC!<DATA>>
                        .ENDC

                        .ENDM

                    ;
                        .MACRO  LDADDR  DATA    ;LOAD A LINE TABLE ADDRESS
                        BRWRTE  IMM,DATA
                        LDMA    BR,<ADD!SP.RMO>
                        .ENDM

                    ;
                        .MACRO CMP SRC,SPADDR   ;COMPARE SOURCE AND SP
                        MICPC=MICPC+1
                        <SUBTC!SRC!SPADDR>

                        .ENDM

                    ;
                        .MACRO  NOP SRC,FUNC,SPADDR ;NOP-SOURCE, FUNC, NO DEST
                        MICPC=MICPC+1
                        <SRC!FUNC!SPADDR>

                        .ENDM

                        .MACRO  CALL    REG,ADDRES      ;SUBROUTINE CALL
                        DISP=<MICPC+1>&377
                        BRWRTE  IMM,DISP+3
                        SP      BR,SELB,REG
                        ALWAYS  ADDRES
                        .ENDM

                        .MACRO  RETURN  REG,PAGE        ;SUBROUTINE RETURN
                        .ALWAY  BR,SELA,<REG!PAGE>
                        .ENDM
```

```
                        .SBTTL  INPUT/OUTPUT ASSIGNMENTS
                        ;IBUS   ASSIGNMENTS
100000                  INCON=0+100000          ;IN CONTROL CSR
100020                  MAIN=20+100000          ;MAINTAINENCE REGISTER
100040                  OCON=40+100000          ;OUT CONTROL CSR
100060                  UBADDR=60+100000        ;UNUSED
100100                  PORT1=100+100000        ;CSR4
100120                  PORT2=120+100000        ;CSR5
100140                  PORT3=140+100000        ;CSR6
100160                  PORT4=160+100000        ;CSR7
100200                  NPR=200+100000          ;NPR CONTROL
100220                  UBBR=220+100000         ;BR(INTERRUPT)CONTROL
000000                  INDAT1=0                ;INPUT DATA LOW BYTE
000020                  INDAT2=20               ;INPUT DATA HIGH BYTE
000140                  IOBA1=140               ;OUTPUT BA LOW BYTE
000160                  IOBA2=160               ;OUTPUT BA HIGH BYTE
000100                  IIBA1=100               ;INPUT BA LOW BYTE
000120                  IIBA2=120               ;INPUT BA HIGH BYTE
000200                  RCVDAT=200              ;RECEIVE DATA
000220                  TMTCON=220              ;TMTR CONTROL
000240                  RCVCON=240              ;RCVR CONTROL
000260                  MODEM=260               ;MODEM CONTROL
000300                  SYNREG=300              ;SYN REGISTER
000320                  LNOSW=320               ;LINE NUMBER SWITCH
000340                  BM873=340               ;BM873 ADDRESS
000360                  LUMAIN=360              ;LINE UNIT MAINTAINENCE
                        ;OBUS   ASSIGNMENTS
                        ;EXTENDED OBUS
000000                  OINCON=0                ;IN CONTROL CSR
000001                  OMAIN=1                 ;MAINT
000002                  OOCON=2                 ;OUT CONTROL CSR
000003                  OUBADD=3                ;UNUSED
000004                  OPORT1=4                ;CSR4
000005                  OPORT2=5                ;CSR5
000006                  OPORT3=6                ;CSR6
000007                  OPORT4=7                ;CSR7
000010                  ONPR=10                 ;NPR CONTROL
000011                  OBR=11                  ;BR CONTROL
                        ;UNEXTENDED OBUS
000002                  OUTDA1=2                ;OUTPUT DATA LOW BYTE
000003                  OUTDA2=3                ;OUTPUT DATA HIGH BYTE
000006                  OBA1=6                  ;OUTPUT BA LOW BYTE
000007                  OBA2=7                  ;OUTPUT BA HIGH BYTE
000004                  IBA1=4                  ;INPUT BA LOW BYTE
000005                  IBA2=5                  ;INPUT BA HIGH BYTE
000010                  TMTDAT=10               ;TMTR DATA
000011                  OTMTCO=11               ;TMTR CONTROL
000012                  ORCVCO=12               ;RCVR CONTROL
000013                  OMODEM=13               ;MODEM CONTROL
000014                  SYNC=14                 ;SYN REGISTER
000017                  OLUMAN=17               ;LINE UNIT MAINT.
```

```
                                .SBTTL PROTOCOL DEPENDANT MACROS
                                .MACRO  RSTATE  STATE                   ;UPDATE RECEIVE STATE POINTER
                                MICPC=MICPC+1
                                <MOVE!WRTEBR!IMM!<STATE-INIT&777/2>>
                                MICPC=MICPC+1
                                <MOVE!SPX!BR!SELB!SP3>
                                .ENDM
                                ;
                                .MACRO  TSTATE  STATE
                                MICPC=MICPC+1
                                <MOVE!WRTEBR!IMM!<STATE-INIT&777/2>>
                                MICPC=MICPC+1
                                <MOVE!SPX!BR!SELB!SP2>
                                .ENDM
                                ;
                                .MACRO  STATE   ADDR
                                MICPC=MICPC+1
                                <MOVE!WRTEBR!IMM!<ADDR-INIT&777/2>>
                                .ENDM
                                ;
                                .MACRO  PSTATE  STATE
                                MEM     IMM,<<STATE-INIT&777/2>>
                                .ENDM
                                ;
                                .MACRO  PSTATI  STATE
                                MEMINC  IMM,<<STATE-INIT&777/2>>
                                .ENDM
                                ;
                                .MACRO  SYNMAC
                                SP      BR,SELB,SP2             ;UPDATE STATE POINTER FROM BR
                                SYNOUT
                                ALWAYS  IDLE
                                .ENDM
                                ;
                                .MACRO  SYNOUT
                                LDMA    IMM,UNMSG               ;LOAD PTR TO UNNUMB MESSAGE SKELETON
                                OUTPUT  <MEMX!INCMAR>,<SELB!OTMTCO>     ;SOM TO TMTR CONTROL
                                OUTPUT  <MEMX!INCMAR>,<SELB!TMTDAT>     ;SYNC TO TMTR SILO
                                .ENDM

177777                  MICPC=177777    ;INIT MICRO PC
```

```
                        .SBTTL  DMC11 DDCMP MICRO CODE ASSEMBLED FOR USE  WITH THE M8201 LINE UNIT
000000                  LOW=0
```

```
                        .TITLE DMC11 DDCMP PROTOCOL IMPLEMENTATION
                        .SBTTL VERSION 00A FEBRUARY 26,1975
                        .SBTTL
                        .SBTTL HARVEY M. SCHLESINGER
                        .SBTTL
                        .SBTTL COPYRIGHT 1975, DIGITAL EQUIPMENT CORPORATION
                        .SBTTL
                        .SBTTL  VERSION 00B     MARCH 17,1975
                        .SBTTL  CSR AND MICROPROCESSOR CHANGES
                        .SBTTL
                        .SBTTL  VERSION 00C     NOVEMBER 6, 1975
                        .SBTTL  RETRANSMISSION CHANGES
                        .SBTTL
                        .SBTTL  VERSION 00D     DECEMBER 3,1975
                        .SBTTL  TRANSMIT DONE CHANGES
                        .SBTTL
                        .SBTTL  THE LATEST MODIFICATIONS WERE ADDED ON:
                        .SBTTL          NOVEMBER 16, 1976
```

```
                                .SBTTL  MICROPROCESSOR MAIN MEMORY ASSIGNMENTS
                                ;ALLOCATION OF MICROPROCESSOR MAIN MEMORY
000000                          NAKSR=0         ;NAKS RECD--DYNAMIC
000001                          NAKST=NAKSR+1   ;NAKS TMTED--DYNAMIC
000002                          REPSR=NAKST+1   ;REPS RECD--DYNAMIC
000003                          REPST=REPSR+1   ;REPS TMTED--DYNAMIC
000006                          NP=REPST+3      ;CONSTANT 0
000007                          NTLR=NP+1       ;NAKS-MSG NO BUFFERS CUMUL.
000010                          NHDR=NTLR+1     ;NAKS-MSG HEADER BAD
000011                          NDATR=NHDR+1    ;NAKS-DATA BAD
000012                          NTLS=NDATR+1    ;NAK SENT --NO BUFFERS
000013                          NHDS=NTLS+1     ;NAK SENT BAD HEADER
000014                          NDATS=NHDS+1    ;NAK SENT BAD DATA
000015                          REPCS=NDATS+1   ;REPS SENT CUMUL
000016                          REPCR=REPCS+1   ;REPS RECD CUMUL
000017                          BASE=REPCR+1            ;CORE TABLE BASE ADDRESS
000022                          SRC=BASE+3              ;START OF INPUT CHAIN--NEXT RECV DONE
000023                          ERC=SRC+1               ;END OF INPUT CHAIN
000024                          RCL1=ERC+1              ;RECEIVE LINK #1
000031                          RCL2=RCL1+5             ;   "       "   #2
000036                          RCL3=RCL2+5             ;   "       "   #3
000043                          RCL4=RCL3+5
000050                          RCL5=RCL4+5
000055                          RCL6=RCL5+5
000062                          RCL7=RCL6+5
000067                          STC=RCL7+5              ;START OF OUTPUT CHAIN---NEXT TMT DONE
000070                          ETC=STC+1               ;END OF TRANSMIT CHAIN
000071                          TML1=ETC+1              ;TRANSMIT LINK #1
000077                          TML2=TML1+6             ;    "         "   #2
000105                          TML3=TML2+6             ;    "         "   #3
000113                          TML4=TML3+6
000121                          TML5=TML4+6
000127                          TML6=TML5+6
000135                          TML7=TML6+6
000143                          TML8=TML7+6
000151                          T=TML8+6                ;TYPE FIELD
000152                          ST=T+1          ;SUBTYPE FIELD
000153                          ISP17=ST+1      ;MSG ACKED IMAGE
000154                          IMG10=ISP17+1   ;IMAGE OF BIT 1 OF SP10
000155                          IMG11=IMG10+1   ;IMAGE OF SP11
000156                          IMG12=IMG11+1   ;IMAGE OF SP12
000157                          IMG14=IMG12+1   ;IMAGE OF SP14
000160                          IMG16=IMG14+1   ;IMAGE OF SP16
000161                          IMG17=IMG16+1   ;IMAGE OF SP17
000162                          TYPTAB=IMG17+1  ;TYPE TABLE---
                                                ;72 TYPE TABLE REP
                                                ;73  "      "   NAK
000164                          TYPSTT=TYPTAB+2 ;74  "      "   START
                                                ;75  "      "   STACK
                                                ;
000167                          BC=TYPSTT+3     ;RECEIVE BYTE COUNT
000171                          ISP11=BC+2      ;SP11 IMAGE
000172                          ISP12=ISP11+1   ;SP12 IMAGE
000173                          INCONS=ISP12+1  ;IN CONTROL CSR IMAGE
000174                          RTHRS=INCONS+1  ;RECV THRESHOLD LINK
```

```
                                ;ALL LOCATIONS FROM 200 ON ARE NOT WRITTEN OUT DURING A TABLE UPDATE

000210                          TABST=210       ;TABLE UPDATE STATE
000211                          PRTST=TABST+1   ;PORT STATE
000240                          NXTINT=240      ;NEXT INTERRUPT POSITION
000241                          NXTSP=NXTINT+1  ;END OF INTERUPT CHAIN
000242                          INTSTK=NXTSP+1  ;STACK OF INTERUPTS
000400                          MMEND=400       ;MAIN MEMORY END
```

```
                                .SBTTL  SCRATCH PAD ASSIGNMENTS
000000                          SP0=0   ;SP0---SCRATCH REGISTER
000001                          SP1=1   ;SP1---PORT STATUS WORD
                                        ;BIT ASSIGNMENTS
                                        ;BIT0--INIT MODE
                                        ;BIT1--SEC STATION SELECT(UNUSED)
                                        ;BIT2--NO BUFFER ASSIGNED IN BOOT MODE
                                        ;BIT3--DLE RECEIVED WHILE NOT IN MAINT MODE
                                        ;BIT4--INTERRUPT PENDING
                                        ;BIT6--DISCONNECT ERROR
                                        ;BIT7--BOOT MODE
000002                          SP2=2   ;SP2---TRANSMIT STATE POINTER
000003                          SP3=3   ;SP3---RECEIVE STATE POINTER
000004                          SP4=4   ;SP4---END RECV ADDRESS
000005                          SP5=5   ;SP5---END RECEIVE ADDRESS
000006                          SP6=6   ;SP6---END TRANSMIT ADDRESS
000007                          SP7=7   ;SP7---END TRANSMIT ADDRESS
000010                          SP10=10 ;SP10---LINE STATUS WORD
                                        ;BIT ASSIGNMENTS
                                        ;BIT0--UNNUMB PENDING
                                        ;BIT1--MESSAGE IN PROGRESS
                                        ;BIT2--LINE HAS GONE IDLE
                                        ;BIT3--START RECEIVED
                                        ;BIT4--CLEAR ACTIVE ON END
                                        ;BIT5--START MODE
                                        ;BIT6--HALF DUPLEX
                                        ;BIT7--OK TO SEND
000011                          SP11=11 ;SP11---R FIELD
000012                          SP12=12 ;SP12---N FIELD
000013                          SP13=13 ;SP13---TYPE
000014                          SP14=14 ;SP14---RECEIVE LINK IMAGE
000015                          SP15=15 ;SP15---TIMER ENTRY---NUMBER OF ONE SECOND TICKS
000016                          SP16=16 ;SP16---POINTER TO TMT LINK COPY IN MAIN MEM
000017                          SP17=17 ;SP17---LAST MESSAGE ACKNOWLEDGED
```

```
                                .SBTTL  INIT--INITIALIZATION ROUTINE
                                ;ZEROS MAIN MEMORY
                                ;LOOPS WAITING FOR RECEIVE DATA(BOOT?)
                                ;OR FOR RQI TO BE SET
                                ;WILL ACCEPT ONLY BASE FORMAT. ALL OTHERS WILL RETURN A PROCEDURE ERROR
                                ;
                                ;AT INITIALIZATION --- THE HARDWARE CLEARS THE BR AND MAR
                011766          .=11766
011766                  INIT:   SP      BR,SELB,SP0             ;CLEAR   SP0
(1)             000000          MICPC=MICPC+1
(1)     011766  063220          <MOVE!SPX!BR!SELB!SP0>
(1)
011770                          SP      BR,SELB,SP3             ;PAGE ONE TRANSFER ADDRESS
(1)             000001          MICPC=MICPC+1
(1)     011770  063223          <MOVE!SPX!BR!SELB!SP3>
(1)
011772                          SP      BR,SELB,SP17            ;CLEAR SP17
(1)             000002          MICPC=MICPC+1
(1)     011772  063237          <MOVE!SPX!BR!SELB!SP17>
(1)
011774                          OUT     BR,<SELA!OINCON>        ;ZERO THE IN CONTROL CSR
(1)             000003          MICPC=MICPC+1
(1)     011774  061200          <MOVE!WROUTX!BR!<SELA!OINCON>>
(1)
011776                          OUT     BR,<SELA!OOCON>         ;ZERO THE OUT CONTROL CSR
(1)             000004          MICPC=MICPC+1
(1)     011776  061202          <MOVE!WROUTX!BR!<SELA!OOCON>>
(1)
012000                          SP      IMM,370,SP10            ;WRITE 5 ONE BITS TO THE HIGH ORDER
(1)             000005          MICPC=MICPC+1
(1)     012000  003370          <MOVE!SPX!IMM!370!SP10>
(1)
                                                                ;BITS OF SP10
012002                  5$:     SP      BR,AA,SP10              ;SHIFT SP10 LEFT SETTING CARRY THE
(1)             000006          MICPC=MICPC+1
(1)     012002  063130          <MOVE!SPX!BR!AA!SP10>
(1)
                                                                ;FIRST 5 TIMES THRU THE LOOP
012004                          MEMINC  BR,ADDC!SP3             ;WRITE A ONE TO THE FIRST 5 MEMORY
(1)             000007          MICPC=MICPC+1
(1)     012004  076423          <MOVE!WRMEM!INCMAR!BR!<ADDC!SP3>>
(1)
                                                                ;LOCATIONS AND ZERO THE REST
012006                          SP      BR,INCA,SP0             ;INCREMENT COUNTER
(1)             000010          MICPC=MICPC+1
(1)     012006  063060          <MOVE!SPX!BR!INCA!SP0>
(1)
012010                          Z       10$                     ;ALL DONE
(1)             000011          MICPC=MICPC+1
(1)     012010  101413          <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
012012                          ALWAYS  5$                      ;KEEP GOING
(1)             000012          MICPC=MICPC+1
(1)     012012  100406          <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
012014                  10$:    SPBR    IMM,1,SP1               ;WRITE A 1 TO THE BR AND SP1
```

```
(1)             000013
(1)  012014     003401
(1)
525  012016
(1)             000014
(1)  012016     063231
(1)
526  012020
(1)             000015
(1)  012020     063232
(1)
527  012022
(1)             000016
(1)                001
(1)  012022     010162
(1)
(1)
(1)                000
(1)
528  012024
(1)             000017
(1)  012024     000626
(1)
529  012026
(1)             000020
(1)  012026     062234
(1)
530  012030
(1)             000021
(1)  012030     016403
(1)
531  012032
(1)             000022
(1)  012032     002402
(1)
532  012034
(1)             000023
(1)  012034     057235
(1)
533  012036
(1)             000024
(1)  012036     016406
(1)
534  012040
(1)             000025
(1)  012040     016407
(1)
535  012042
(1)             000026
(1)  012042     016401
(1)
536  012044
(1)             000027
(1)                001
(1)  012044     010210
(1)
```

```
        MICPC=MICPC+1
        <MOVE!SPBRX!IMM!1!SP1>

        SP      BR,SELB,SP11            ;WRITE A 1 TO SP11
        MICPC=MICPC+1
        <MOVE!SPX!BR!SELB!SP11>

        SP      BR,SELB,SP12            ;WRITE A 1 TO SP12
        MICPC=MICPC+1
        <MOVE!SPX!BR!SELB!SP12>

        LDMA    IMM,TYPTAB              ;POINT MAR TO TYPE TABLE
        MICPC=MICPC+1
        .IF IDN IMM,IMM
        <MOVE!LDMAR!IMM!<TYPTAB&377>>
        .IFF
        <MOVE!LDMAR!IMM!<TYPTAB>>
        .ENDC

        BRWRTE  IMM,226                 ;WRITE SYNC TO MEMORY
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<226>>

        OUTPUT  BR,SELB!SYNC    ;LOAD THE SYNC REGISTER
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELB!SYNC>>

        MEMINC  IMM,3                   ;REP
        MICPC=MICPC+1
        <MOVE!WRMEM!INCMAR!IMM!<3>>

        MEM     IMM,2                   ;NAK
        MICPC=MICPC+1
        <MOVE!WRMEM!IMM!<2>>

        SP      MEMX!INCMAR,SELB,SP15           ;SET STARTING COUNT
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!INCMAR!SELB!SP15>

        MEMINC  IMM,6                   ;START
        MICPC=MICPC+1
        <MOVE!WRMEM!INCMAR!IMM!<6>>

        MEMINC  IMM,7                   ;STACK
        MICPC=MICPC+1
        <MOVE!WRMEM!INCMAR!IMM!<7>>

        MEMINC  IMM,1                   ;ACK
        MICPC=MICPC+1
        <MOVE!WRMEM!INCMAR!IMM!<1>>

        LDMA    IMM,TABST               ;POINT TO TABLE UPDATE STATE
        MICPC=MICPC+1
        .IF IDN IMM,IMM
        <MOVE!LDMAR!IMM!<TABST&377>>
        .IFF
```

```
(1)                                     <MOVE!LDMAR!IMM!<TABST>>
(1)             000                     .ENDC
(1)
537  012046                             PSTATI  I3                      ;INITIALIZE IT
(1)  012046                             MEMINC  IMM,<<I3-INIT&777/2>>
(2)          000030                     MICPC=MICPC+1
(2)  012046  016460                     <MOVE!WRMEM!INCMAR!IMM!<<I3-INIT&777/2>>>
(2)
538  012050                             PSTATI  NIDLE2                  ;INITIALIZE PORT STATUS
(1)  012050                             MEMINC  IMM,<<NIDLE2-INIT&777/2>>
(2)          000031                     MICPC=MICPC+1
(2)  012050  016533                     <MOVE!WRMEM!INCMAR!IMM!<<NIDLE2-INIT&777/2>>>
(2)
539  012052                             LDMA    IMM,STC                 ;LOAD ADDRESS OF LAST TMT CHAIN
(1)          000032                     MICPC=MICPC+1
(1)             001                     .IF IDN IMM,IMM
(1)  012052  010067                     <MOVE!LDMAR!IMM!<STC&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<STC>>
(1)             000                     .ENDC
(1)
540  012054                             MEMINC  IMM,TML1                ;STORE ADDRESS OF FIRST TMT LINK
(1)          000033                     MICPC=MICPC+1
(1)  012054  016471                     <MOVE!WRMEM!INCMAR!IMM!<TML1>>
(1)
541  012056                             MEM     IMM,TML1
(1)          000034                     MICPC=MICPC+1
(1)  012056  002471                     <MOVE!WRMEM!IMM!<TML1>>
(1)
542  012060                             SP      MEMX,SELB,SP16          ;INITIALIZE LAST XMIT POINTER
(1)          000035                     MICPC=MICPC+1
(1)  012060  043236                     <MOVE!SPX!MEMX!SELB!SP16>
(1)
543  012062                             LDMA    IMM,SRC                 ;LOAD ADDRESS OF LAST RECV CHAIN
(1)          000036                     MICPC=MICPC+1
(1)             001                     .IF IDN IMM,IMM
(1)  012062  010022                     <MOVE!LDMAR!IMM!<SRC&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<SRC>>
(1)             000                     .ENDC
(1)
544  012064                             MEMINC  IMM,RCL1                ;SET UP ADDRESS OF FIRST RECV LINK
(1)          000037                     MICPC=MICPC+1
(1)  012064  016424                     <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
(1)
545  012066                             MEM     IMM,RCL1
(1)          000040                     MICPC=MICPC+1
(1)  012066  002424                     <MOVE!WRMEM!IMM!<RCL1>>
(1)
546  012070                             SP      MEMX,SELB,SP14
(1)          000041                     MICPC=MICPC+1
(1)  012070  043234                     <MOVE!SPX!MEMX!SELB!SP14>
(1)
547  012072                             LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER TO MAR
(1)          000042                     MICPC=MICPC+1
(1)             001                     .IF IDN IMM,IMM
```

```
(1)  012072  010240                    <MOVE!LDMAR!IMM!<NXTINT&377>>
(1)                                    .IFF
(1)                                    <MOVE!LDMAR!IMM!<NXTINT>>
(1)                 000                .ENDC
(1)
548  012074                            MEMINC  IMM,INTSTK                    ;INITIALIZE NEXT INTERRUPT POINTER
(1)                 000043             MICPC=MICPC+1
(1)  012074  016642                    <MOVE!WRMEM!INCMAR!IMM!<INTSTK>>
(1)
549  012076                            MEM     IMM,INTSTK                    ;INITIALIZE INSERTION POINTER
(1)                 000044             MICPC=MICPC+1
(1)  012076  002642                    <MOVE!WRMEM!IMM!<INTSTK>>
(1)
550  012100                            BRWRTE  IMM,200                ;WRITE THE RUN BIT TO THE BR
(1)                 000045             MICPC=MICPC+1
(1)  012100  000600                    <MOVE!WRTEBR!IMM!<200>>
(1)
551  012102                            OUT     BR,<SELB!OMAIN>        ;WRITE  THE RUN BIT TO MAINT CSR
(1)                 000046             MICPC=MICPC+1
(1)  012102  061221                    <MOVE!WROUTX!BR!<SELB!OMAIN>>
(1)
552                                                                   ;FALL INTO IDLE LOOP
553                 001                .IF NDF $LOW
554  012104                            ALWAYS  TEOM2
(1)                 000047             MICPC=MICPC+1
(1)  012104  110740                    <JUMP!ALCOND!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
(1)
555
556  012106                    REXIT:  SP      BR,SELB,SP3
(1)                 000050             MICPC=MICPC+1
(1)  012106  063223                    <MOVE!SPX!BR!SELB!SP3>
(1)
557                 000                .ENDC
```

```
                                        .SBTTL  IDLE--PROGRAM IDLE LOOP
                                        ;PROGRAM IDLE LOOP
                                        ;DISPATCHES TO APPROPRIATE SERVICE ROUTINES
                                        ;USES STATE POINTERS FOR TMT,RCV,CSR ACTIVITY
                                        .
012110                          IDLE:   BRWRTE  BR,<SELA!SP10>          ;READ TRANSMIT STATUS WORD FROM SP10 TO BR
(1)     000051                          MICPC=MICPC+1
(1)  012110  060610                     <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
012112                                  BR1     TMTDA                   ;IF DATA TO SEND-- BRANCH
(1)     000052                          MICPC=MICPC+1
(1)  012112  112400                     <JUMP!BR1CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
(1)
012114                                  BR0     TMTDA                   ;IF DATA TO SEND-- BRANCH
(1)     000053                          MICPC=MICPC+1
(1)  012114  112000                     <JUMP!BR0CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
(1)
                                        .IF DF  $LOW
                                        ALWAYS  I1
                                        .
                                XEXIT:  $P      BR,SELB,SP2
                                        .ENDC
012116                          I1:     BRWRTE  IBUS,RCVCON             ;READ LINE UNIT RECEIVE CONTROL WORD
(1)     000054                          MICPC=MICPC+1
(1)  012116  020640                     <MOVE!WRTEBR!IBUS!<RCVCON>>
(1)
012120                                  .BR4    BR,SELA,SP3!PAGE1       ;BRANCH BASED UPON RECV STATE
(1)     000055                          MICPC=MICPC+1
(1)  012120  167203                     <JUMP! BR4CON!BR!SELA!SP3!PAGE1>
(1)
012122                          I2:     LDMA    IMM,TABST               ;POINT TO TABLE UPDATE STATE
(1)     000056                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)  012122  010210                     <MOVE!LDMAR!IMM!<TABST&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<TABST>>
(1)        000                          .ENDC
(1)
012124                                  .ALWAY  MEMX,SELB,0
(1)     000057                          MICPC=MICPC+1
(1)  012124  140620                     <JUMP!ALCOND!MEMX!SELB!0>
(1)
012126                          I3:
                                        .IF NDF $LOW
                                        STATE   TMTA+2                  ;GET IDLE TRANSMIT STATE + 1
(1)     000060                          MICPC=MICPC+1
(1)  012126  000404                     <MOVE!WRTEBR!IMM!<TMTA+2-INIT&777/2>>
012130                                  NOP     BR,SUB,SP2              ;SUBTRACT FROM CURRENT STATE
(1)     000061                          MICPC=MICPC+1
(1)  012130  060342                     <BR!SUB!SP2>
(1)
012132                                  C       TMTDA                   ;NON-IDLE STATE
(1)     000062                          MICPC=MICPC+1
(1)  012132  111000                     <JUMP!CCOND!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
(1)
                                        .ENDC
```

```
   582  012134                    IDLE0:  SPBR    IBUS,UBBR,SPO           ;TIMER EXPIRES?
   (1)            000063                  MICPC=MICPC+1
   (1)  012134  123620                    <MOVE!SPBRX!IBUS!UBBR!SPO>
   (1)
   583  012136                            BR4     TIMSRV
   (1)            000064                  MICPC=MICPC+1
   (1)  012136  113255                    <JUMP!BR4CON!<TIMSRV-INIT&3000*4>!<TIMSRV-INIT&777/2>>
   (1)
   584  012140                            SP      IBUS,RCVCON,SPO         ;READ THE RECEIVE CONTROL REGISTER
   (1)            000065                  MICPC=MICPC+1
   (1)  012140  023240                    <MOVE!SPX!IBUS!RCVCON!SPO>
   (1)
   585  012142                            BRWRTE  BR,AA!SPO               ;SHIFT IT LEFT
   (1)            000066                  MICPC=MICPC+1
   (1)  012142  060520                    <MOVE!WRTEBR!BR!<AA!SPO>>
   (1)
   586  012144                            BR7     I1                      ;RECEIVE ACTIVE, DON'T DO PORT STATUS
   (1)            000067                  MICPC=MICPC+1
   (1)  012144  103454                    <JUMP!BR7CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
   (1)
   587  012146                            LDMA    IMM,PRTST               ;ADDRESS PORT STATE
   (1)            000070                  MICPC=MICPC+1
   (1)               001                  .IF IDN IMM,IMM
   (1)  012146  010211                    <MOVE!LDMAR!IMM!<PRTST&377>>
   (1)                                    .IFF
   (1)                                    <MOVE!LDMAR!IMM!<PRTST>>
   (1)                 000                .ENDC
   (1)
   588  012150                            .ALWAY  MEMX,SELB,0             ;INDEX
   (1)            000071                  MICPC=MICPC+1
   (1)  012150  140620                    <JUMP!ALCOND!MEMX!SELB!0>
   (1)
```

```
                                        .SBTTL  BASSRV---- BASE SERVICE ROUTINE
012152                          BASSRV: PSTATE  NIDLE2
012152                                  MEM     IMM,<<NIDLE2-INIT&777/2>>
                                        MICPC=MICPC+1
012152  002533                          <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>

012154                                  LDMA    IMM,BASE                        ;CLEAR TO MAR SO IT POINTS TO BASE POINT
000073                                  MICPC=MICPC+1
   001                                  .IF IDN IMM,IMM
012154  010017                          <MOVE!LDMAR!IMM!<BASE&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<BASE>>
   000                                  .ENDC

012156                                  MEMINC  IBUS,PORT1              ;READ CSR4
000074                                  MICPC=MICPC+1
012156  136500                          <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>

012160                                  MEMINC  IBUS,PORT2              ;READ CSR5
000075                                  MICPC=MICPC+1
012160  136520                          <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>

012162                                  MEM     IBUS,PORT4
000076                                  MICPC=MICPC+1
012162  122560                          <MOVE!WRMEM!IBUS!<PORT4>>

012164                                  SP      IBUS,INCON,SPO          ;READ INPUT CONTROL CSR
000077                                  MICPC=MICPC+1
012164  123000                          <MOVE!SPX!IBUS!INCON!SPO>

012166                                  BRWRTE  IMM,100                 ;CLEAR THE BR
000100                                  MICPC=MICPC+1
012166  000500                          <MOVE!WRTEBR!IMM!<100>>

012170                                  OUT     BR,<AANDB!OINCON>       ;CLEAR THE INCONTROL CSR
000101                                  MICPC=MICPC+1
012170  061260                          <MOVE!WROUTX!BR!<AANDB!OINCON>>

012172                                  OUTPUT  IMM,<120!OMODEM>        ;MASK FOR HDX AND DTR
000102                                  MICPC=MICPC+1
012172  002133                          <MOVE!WROUT!IMM!<120!OMODEM>>

012174                                  BRWRTE  MEMX,SELB               ;READ SEL6
000103                                  MICPC=MICPC+1
012174  040620                          <MOVE!WRTEBR!MEMX!<SELB>>

012176                                  BR4     RESUME                  ;IF SET RESUME
000104                                  MICPC=MICPC+1
012176  103113                          <JUMP!BR4CON!<RESUME-INIT&3000*4>!<RESUME-INIT&777/2>>

012200                                  LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
000105                                  MICPC=MICPC+1
   001                                  .IF IDN IMM,IMM
012200  010151                          <MOVE!LDMAR!IMM!<T&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<T>>
```

```
(1)                 000
(1)
603  012202
(1)                 000106
(1)  012202  016406
(1)
604  012204
(1)                 000107
(1)  012204  002700
(1)
605  012206
(1)                 000110
(1)  012206  063161
(1)
606  012210
(1)                 000111
(1)  012210  000641
(1)
607  012212
(1)                 000112
(1)  012212  110737
(1)
608  012214
(1)                 000113
(1)  012214  003004
(1)
609  012216
(1)                 000114
(1)  012216  063070
(1)
610
611  012220
(1)                 000115
(1)                   001
(1)  012220  010017
(1)
(1)
(1)                   000
(1)
612  012222
(1)                 000116
(1)  012222  000743
613  012224
(1)                 000117
(1)  012224  110455
(1)
614  012226
(1)                 000120
(1)                   001
(1)  012226  010154
(1)
(1)
(1)                   000
(1)
615  012230
(1)                 000121
```

```
                .ENDC

                MEMINC  IMM,6                   ;WRITE START TYPE TO MEMORY
                MICPC=MICPC+1
                <MOVE!WRMEM!INCMAR!IMM!<6>>

                MEM     IMM,300                 ;WRITE SELECT AND FINAL TO MEMORY
                MICPC=MICPC+1
                <MOVE!WRMEM!IMM!<300>>

                SP      BR,DECA,SP1     ;TURN OFF INIT MODE
                MICPC=MICPC+1
                <MOVE!SPX!BR!DECA!SP1>

BS1:            BRWRTE  IMM,241         ;SET OK TO SEND,STARTMODE AND UNNUM PENDING
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<241>>

                ALWAYS  SA3
                MICPC=MICPC+1
                <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>

RESUME:         SP      IMM,SP4,4               ;SET UP SP4 FOR COUNTING NPRS
                MICPC=MICPC+1
                <MOVE!SPX!IMM!SP4!4>

                SP      BR,INCA,SP10            ;SET UNNUMB MESSAGE PENDING TO
                MICPC=MICPC+1
                <MOVE!SPX!BR!INCA!SP10>

                                                ;TRICK TRANSMITTER CODE
                LDMA    IMM,BASE                ;ADDRESS BASE TABLE ADDRESS
                MICPC=MICPC+1
                .IF IDN IMM,IMM
                <MOVE!LDMAR!IMM!<BASE&377>>
                .IFF
                <MOVE!LDMAR!IMM!<BASE>>
                .ENDC

                STATE   FUDGE                   ;SET TMTR STATE TO ENTER TABLE UPDATE
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<FUDGE-INIT&777/2>>
                ALWAYS  TBO                     ;GO SET UP MXT BITS AND ADRESS OF BASE FOR NPRS
                MICPC=MICPC+1
                <JUMP!ALCOND!<TBO-INIT&3000*4>!<TBO-INIT&777/2>>

BS2:            LDMA    IMM,IMG10
                MICPC=MICPC+1
                .IF IDN IMM,IMM
                <MOVE!LDMAR!IMM!<IMG10&377>>
                .IFF
                <MOVE!LDMAR!IMM!<IMG10>>
                .ENDC

                SP      MEMX!INCMAR,AORB,SP10           ;RESTORE BIT 1 OF SP10
                MICPC=MICPC+1
```

```
(1)  012230  057310                <MOVE!SPX!MEMX!INCMAR!AORB!SP10>
(1)
616  012232                         SP      MEMX!INCMAR,SELB,SP11          ;RESTORE SP11
(1)            000122               MICPC=MICPC+1
(1)  012232  057231                 <MOVE!SPX!MEMX!INCMAR!SELB!SP11>
(1)
617  012234                         SP      MEMX!INCMAR,SELB,SP12          ;RESTORE SP12
(1)            000123               MICPC=MICPC+1
(1)  012234  057232                 <MOVE!SPX!MEMX!INCMAR!SELB!SP12>
(1)
618  012236                         SP      MEMX!INCMAR,SELB,SP14          ;RESTORE SP14
(1)            000124               MICPC=MICPC+1
(1)  012236  057234                 <MOVE!SPX!MEMX!INCMAR!SELB!SP14>
(1)
619  012240                         SP      MEMX!INCMAR,SELB,SP16          ;RESTORE SP16
(1)            000125               MICPC=MICPC+1
(1)  012240  057236                 <MOVE!SPX!MEMX!INCMAR!SELB!SP16>
(1)
620  012242                         SP      MEMX,SELB,SP17          ;RESTORE        SP17
(1)            000126               MICPC=MICPC+1
(1)  012242  043237                 <MOVE!SPX!MEMX!SELB!SP17>
(1)
621  012244                         SP      BR,DECA,SP10            ;TURN OFF UNNUM MESSAGE PENDING AND
(1)            000127               MICPC=MICPC+1
(1)  012244  063170                 <MOVE!SPX!BR!DECA!SP10>
(1)
622                                                                 ;ZERO THE BRG
623  012246                         SP      BR,DECA,SP1             ;CLEAR INIT MODE
(1)            000130               MICPC=MICPC+1
(1)  012246  063161                 <MOVE!SPX!BR!DECA!SP1>
(1)
624  012250                         BRWRTE  IMM,200                 ;SET OK TO SEND
(1)            000131               MICPC=MICPC+1
(1)  012250  000600                 <MOVE!WRTEBR!IMM!<200>>
(1)
625  012252                         ALWAYS  SA3
(1)            000132               MICPC=MICPC+1
(1)  012252  110737                 <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>
(1)
```

```
                                .SBTTL  NIDLE2---NO CSR ACTIVITY STATE
012254                  NIDLE2: BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
(1)     000133                  MICPC=MICPC+1
(1)     012254  060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
                                .IF NDF $LOW
012256                          BR4     NIDLE5                  ;INTERRUPT PENDING?---BRANCH
(1)     000134                  MICPC=MICPC+1
(1)     012256  103141          <JUMP!BR4CON!<NIDLE5-INIT&3000*4>!<NIDLE5-INIT&777/2>>
(1)
                                .ENDC
                                .IF DF  $LOW
                                BR4     OUTINT
                                .ENDC
012260                          SPBR    IBUS,INCON,SPO          ;READ INPUT CONTROL CSR
(1)     000135                  MICPC=MICPC+1
(1)     012260  123400          <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
012262                          BRSHFT                          ;SHIFT IT RIGHT
(1)     000136                  MICPC=MICPC+1
(1)     012262  001620          <MOVE!SHFTBR!WRTEBR!SELB>
(1)
012264                          BR4     INWAT1                  ;IF RQI SET -- BRANCH
(1)     000137                  MICPC=MICPC+1
(1)     012264  103146          <JUMP!BR4CON!<INWAT1-INIT&3000*4>!<INWAT1-INIT&777/2>>
(1)
                                                                ;TO RE-READ THE IN CNTRL REGISTER TO AVOID
                                                                ;A RACE IN MICRO-P READ/UNIBUS WRITE
                                .IF NDF $LOW
012266                          ALWAYS  IDLE
(1)     000140                  MICPC=MICPC+1
(1)     012266  100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
                                .ENDC
012270                  NIDLE6:
                                .IF DF  $LOW
                        10$:    SPBR    IBUS,MODEM,SPO          ;READ MODEM CONTROL CSR
                                BRWRTE  BR,AA!SPO               ;SHIFT IT LEFT
                                BR4     SETDSR                  ;IF DSR SET, CLEAR FLAG
                                BRWRTE  BR,SELA!SP10            ;READ LINE STATUS WORD
                                BRSHFT
                                BR4     IDLE                    ;START MODE
                                BRWRTE  BR,AA!SP1               ;READ PORT STATUS WORD
                                BR1     IDLE                    ;INIT MODE
                                BR7     IDLE                    ;DISCONNECT ERROR ALREADY SENT
                                SPBR    IBUS,MAIN,SPO   ;READ THE MAINT REGISTER
                                BRWRTE  BR,ADD!SPO              ;SHIFT LEFT
                                BR4     IDLE                    ;LU LOOP -- EXIT
                                BRWRTE  IMM,100                 ;WRITE DISCONNECT ERROR
                                SP      BR,AORB,SP1             ;FLAG ERROR RECORDED
                                ALWAYS  ERRXX                   ;MAKE A CONTROL OUT
                        SETDSR: BRWRTE  IMM,277                 ;CLEAR DISCONNECT ERROR FLAG
                                ALWAYS  CLRIDL
                                .ENDC
                                .IF NDF $LOW
012270                  NIDLE5: PSTATE  OUTINT                  ;SET STATE FOR INTERRUPT PROCESSING
```

```
(1)  012270                          MEM     IMM,<<OUTINT-INIT&777/2>>
(2)        000141                    MICPC=MICPC+1
(2)  012270  002614                  <MOVE!WRMEM!IMM!<<OUTINT-INIT&777/2>>>
(2)
565  012272                          ALWAYS  IDLE
(1)        000142                    MICPC=MICPC+1
(1)  012272  100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
666             000                  .ENDC
```

```
                        .SBTTL INWAIT---WAIT FOR RQI TO CLEAR
012274                  INWAIT: SPBR    IBUS,INCON,SPO          ;READ INPUT CONTROL CSR
(1)     000143                  MICPC=MICPC+1
(1)     012274  123400          <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
012276                          BRWRTE  BR,<AA!SPO>             ;SHIFT IT LEFT
(1)     000144                  MICPC=MICPC+1
(1)     012276  060520          <MOVE!WRTEBR!BR!<AA!SPO>>
(1)
012300                          BR7     NIDLE3                  ;INTERRUPT ENABLE HAS BEEN SET
(1)     000145                  MICPC=MICPC+1
(1)     012300  103550          <JUMP!BR7CON!<NIDLE3-INIT&3000*4>!<NIDLE3-INIT&777/2>>
(1)
012302                  INWAT1: SPBR    IBUS,INCON,SPO          ;READ THE INPUT CONTROL CSR
(1)     000146                  MICPC=MICPC+1
(1)     012302  123400          <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
012304                          BR7     INWAT2                  ;READY IN STILL SET
(1)     000147                  MICPC=MICPC+1
(1)     012304  103557          <JUMP!BR7CON!<INWAT2-INIT&3000*4>!<INWAT2-INIT&777/2>>
(1)
012306                  NIDLE3: PSTATE  INWAT1                  ;UPDATE STATE TO INPUT
012306                          MEM     IMM,<<INWAT1-INIT&777/2>>
(2)     000150                  MICPC=MICPC+1
(2)     012306  002546          <MOVE!WRMEM!IMM!<<INWAT1-INIT&777/2>>>
(2)
012310                          BRWRTE  BR,AA!SPO               ;SHIFT CSR LEFT
(1)     000151                  MICPC=MICPC+1
(1)     012310  060520          <MOVE!WRTEBR!BR!<AA!SPO>>
(1)
012312                          BR7     ININT
(1)     000152                  MICPC=MICPC+1
(1)     012312  117460          <JUMP!BR7CON!<ININT-INIT&3000*4>!<ININT-INIT&777/2>>
(1)
012314                          PSTATE  INWAIT                  ;UPDATE STATE POINTER TO NO INTERRUPT GENERATED
012314                          MEM     IMM,<<INWAIT-INIT&777/2>>
(2)     000153                  MICPC=MICPC+1
(2)     012314  002543          <MOVE!WRMEM!IMM!<<INWAIT-INIT&777/2>>>
(2)
012316                  NIDLE4: BRWRTE  IMM,200
(1)     000154                  MICPC=MICPC+1
(1)     012316  000600          <MOVE!WRTEBR!IMM!<200>>
(1)
012320                          OUT     BR,AORB!OINCON          ;SET THE RDYI
(1)     000155                  MICPC=MICPC+1
(1)     012320  061300          <MOVE!WROUTX!BR!<AORB!OINCON>>
(1)
012322                          ALWAYS  IDLE
(1)     000156                  MICPC=MICPC+1
(1)     012322  100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
                        ;
012324                  INWAT2: BRSHFT                          ;SHIFT THE BR RIGHT
(1)     000157                  MICPC=MICPC+1
(1)     012324  001620          <MOVE!SHFTBR!WRTEBR!SELB>
```

```
(1)
684                 001                     .IF DF  $LOW
685                                         BR4     NIDLE6                  ;RQI SET--- GO AWAY
686                 000                     .ENDC
687                 001                     .IF NDF $LOW
688   012326                                BR4     IDLE
(1)                 000160                  MICPC=MICPC+1
(1)   012326        103051                  <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
689   012330                                PSTATE  INSRV                   ;SET NEXT STATE TO INPUT SERVICE
(1)   012330                                MEM     IMM,<<INSRV-INIT&777/2>>
(2)                 000161                  MICPC=MICPC+1
(2)   012330        002563                  <MOVE!WRMEM!IMM!<<INSRV-INIT&777/2>>>
(2)
690   012332                                ALWAYS  IDLE
(1)                 000162                  MICPC=MICPC+1
(1)   012332        100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
691                 000                     .ENDC
692   012334                        INSRV:  SPBR    IBUS,INCON,SPO          ;READ THE INPUT CONTROL CSR
(1)                 000163                  MICPC=MICPC+1
(1)   012334        123400                  <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
693   012336                                BR1     30$                     ;--SENSE OR BASE
(1)                 000164                  MICPC=MICPC+1
(1)   012336        102600                  <JUMP!BR1CON!<30$-INIT&3000*4>!<30$-INIT&777/2>>
(1)
694   012340                                BR0     10$                     ;CNTL I
(1)                 000165                  MICPC=MICPC+1
(1)   012340        102172                  <JUMP!BR0CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
695   012342                                BRSHFT                          ;MUST BE BA/CC-SHIFT FOR IN OR OUT
(1)                 000166                  MICPC=MICPC+1
(1)   012342        001620                  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
696   012344                                BR1     15$
(1)                 000167                  MICPC=MICPC+1
(1)   012344        102574                  <JUMP!BR1CON!<15$-INIT&3000*4>!<15$-INIT&777/2>>
(1)
697   012346                                PSTATE  TBASRV                  ;TRANSMITTER
(1)   012346                                MEM     IMM,<<TBASRV-INIT&777/2>>
(2)                 000170                  MICPC=MICPC+1
(2)   012346        002700                  <MOVE!WRMEM!IMM!<<TBASRV-INIT&777/2>>>
(2)
698   012350                                ALWAYS  20$
(1)                 000171                  MICPC=MICPC+1
(1)   012350        100575                  <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
(1)
699   012352                          10$:  PSTATE  CTLSRV
(1)   012352                                MEM     IMM,<<CTLSRV-INIT&777/2>>
(2)                 000172                  MICPC=MICPC+1
(2)   012352        002657                  <MOVE!WRMEM!IMM!<<CTLSRV-INIT&777/2>>>
(2)
700   012354                                ALWAYS  20$
(1)                 000173                  MICPC=MICPC+1
(1)   012354        100575                  <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
```

```
(1)
701  012356                          15$:    PSTATE  RBASRV
(1)  012356                                  MEM     IMM,<<RBASRV-INIT&777/2>>
(2)             000174                       MICPC=MICPC+1
(2)  012356     002721                       <MOVE!WRMEM!IMM!<<RBASRV-INIT&777/2>>>
(2)
702  012360                          20$:    BRWRTE  BR,SELA!SP1             ;INIT MODE
(1)             000175                       MICPC=MICPC+1
(1)  012360     060601                       <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
703  012362                                  BRO     PROCER                  ;IF INIT MODE--ERROR
(1)             000176                       MICPC=MICPC+1
(1)  012362     102201                       <JUMP!BRCON!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
(1)
704  012364                                  ALWAYS  IDLE
(1)             000177                       MICPC=MICPC+1
(1)  012364     100451                       <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
705  012366                          30$:    BRO     INSRV1                          ;IF BASE---PROCESS
(1)             000200                       MICPC=MICPC+1
(1)  012366     102211                       <JUMP!BRCON!<INSRV1-INIT&3000*4>!<INSRV1-INIT&777/2>>
(1)
706  012370                          PROCER: PSTATE  NIDLE2                  ;RESET PORT STATUS
(1)  012370                                  MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)             000201                       MICPC=MICPC+1
(2)  012370     002533                       <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
(2)
707  012372                                  BRWRTE  IMM,100                 ;CLEAR INPUT CONTROL CSR
(1)             000202                       MICPC=MICPC+1
(1)  012372     000500                       <MOVE!WRTEBR!IMM!<100>>
(1)
708  012374                                  OUT     BR,AANDB!OINCON         ;;
(1)             000203                       MICPC=MICPC+1
(1)  012374     061260                       <MOVE!WROUTX!BR!<AANDB!OINCON>>
(1)
709  012376                                  LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
(1)             000204                       MICPC=MICPC+1
(1)                001                       .IF IDN IMM,IMM
(1)  012376     010177                       <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
(1)                                          .IFF
(1)                                          <MOVE!LDMAR!IMM!<<RTHRS+3>>>
(1)                000                       .ENDC
(1)
710  012400                                  MEMINC  IMM,2
(1)             000205                       MICPC=MICPC+1
(1)  012400     016402                       <MOVE!WRMEM!INCMAR!IMM!<2>>
(1)
711  012402                                  MEM     IMM,0
(1)             000206                       MICPC=MICPC+1
(1)  012402     002400                       <MOVE!WRMEM!IMM!<0>>
(1)
712  012404                                  OUTPUT  MEMX,SELB!OMODEM        ;CLEAR DATA TERMINAL READY
(1)             000207                       MICPC=MICPC+1
(1)  012404     042233                       <MOVE!WROUT!MEMX!<SELB!OMODEM>>
(1)
713  012406                                  ALWAYS  RCEXX                   ;POST THE ERROR - FATAL
```

```
(1)             000210
(1)  012406     114524          MICPC=MICPC+1
(1)                             <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
(1)
714  012410                     INSRV1: BRWRTE  BR,SELA!SP1                     ;INIT MODE?
(1)             000211          MICPC=MICPC+1
(1)  012410     060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
715  012412                             BRO     BASSRV
(1)             000212          MICPC=MICPC+1
(1)  012412     102072          <JUMP!BROCON!<BASSRV-INIT&3000*4>!<BASSRV-INIT&777/2>>
(1)
716  012414                             ALWAYS  PROCER                  ;NO - PROCEDURE ERROR
(1)             000213          MICPC=MICPC+1
(1)  012414     100601          <JUMP!ALCOND!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
(1)
```

```
                                        .SBTTL  OUTINT---SET UP OUTPUT INTERRUPT [RDYO]
                                OUTINT:
                                        .IF NDF $LOW
                                        PSTATE  PINT2
                                        MEM     IMM,<<PINT2-INIT&777/2>>
                                        MICPC=MICPC+1
                                        <MOVE!WRMEM!IMM!<<PINT2-INIT&777/2>>>
                                        .ENDC
                                        .IF DF  $LOW
                                        PSTATE  OUTWAIT         ;PORT STATUS TO WAITING FOR OUT
                                        .ENDC
                                                                ;COMPLETION
                                        LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER
                                        MICPC=MICPC+1
                                        .IF IDN IMM,IMM
                                        <MOVE!LDMAR!IMM!<NXTINT&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<NXTINT>>
                                        .ENDC

                                        LDMA    MEMX,SELB               ;NEXT INTERRUPT
                                        MICPC=MICPC+1
                                        .IF IDN MEMX,IMM
                                        <MOVE!LDMAR!IMM!<SELB&377>>
                                        .IFF
                                        <MOVE!LDMAR!MEMX!<SELB>>
                                        .ENDC

                                        SP      IBUS,OCON,SPO           ;READ THE OUTPUT CONTROL CSR
                                        MICPC=MICPC+1
                                        <MOVE!SPX!IBUS!OCON!SPO>

                                        OUT     <MEMX!INCMAR>,<AORB!OOCON>      ;WRITE THE OUT CONTROL CSR
                                        MICPC=MICPC+1
                                        <MOVE!WROUTX!MEMX!INCMAR!<AORB!OOCON>>

                                        LDMA    MEMX,SELB                       ;ADDRESS LINK
                                        MICPC=MICPC+1
                                        .IF IDN MEMX,IMM
                                        <MOVE!LDMAR!IMM!<SELB&377>>
                                        .IFF
                                        <MOVE!LDMAR!MEMX!<SELB>>
                                        .ENDC

                                        BRWRTE  <BR!INCMAR>,<AA!SPO>            ;KICK PAST LINK STATUS BYTE
                                        MICPC=MICPC+1
                                        <MOVE!WRTEBR!BR!INCMAR!<AA!SPO>>

                                                                ;SHIFT CSRO IMAGE LEFT
                                                        ;***DO NOT CHANGE BR UNTIL BR7***
                                        OUT     <MEMX!INCMAR>,<SELB!OPORT1>     ;WRITE LOW BYTE OF BA TO CSR
                                        MICPC=MICPC+1
                                        <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT1>>

                                        OUT     <MEMX!INCMAR>,<SELB!OPORT2>     ;WRITE HIGH BYTE OF BA TO CSR
```

```
(1)             000224          MICPC=MICPC+1
(1)  012436     055225          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT2>>
(1)
737  012440                     OUT     <MEMX!INCMAR>,<SELB!OPORT4>     ;WRITE HIGH BYTE OF COUNT TO CSR
(1)             000225          MICPC=MICPC+1
(1)  012440     055227          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT4>>
(1)
738  012442                     OUT     <MEMX!INCMAR>,<SELB!OPORT3>     ;WRITE THE LOW BYTE OF COUNT
(1)             000226          MICPC=MICPC+1
(1)  012442     055226          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT3>>
(1)
739                                                     ;***HERE IS BR7***
740  012444                     BR7     PE1             ;INTERRUPT ENABLE IS SET
(1)             000227          MICPC=MICPC+1
(1)  012444     103757          <JUMP!BR7CON!<PE1-INIT&3000*4>!<PE1-INIT&777/2>>
(1)
741                                                     ;GENERATE AN INTERRUPT
742                001          .IF NDF $LOW
743  012446                     ALWAYS  IDLE
(1)             000230          MICPC=MICPC+1
(1)  012446     100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
744  012450                PINT2: PSTATE  OUTWAIT
(1)  012450                     MEM     IMM,<<OUTWAIT-INIT&777/2>>
(2)             000231          MICPC=MICPC+1
(2)  012450     002652          <MOVE!WRMEM!IMM!<<OUTWAIT-INIT&777/2>>>
(2)
745                000          .ENDC
746                001          .IF DF  $LOW
747                        PINT2:
748                000          .ENDC
749  012452                     LDMA    IMM,NXTINT              ;ADDRESS NEXT INTERRUPT QUEUE
(1)             000232          MICPC=MICPC+1
(1)                001          .IF IDN IMM,IMM
(1)  012452     010240          <MOVE!LDMAR!IMM!<NXTINT&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<NXTINT>>
(1)                000          .ENDC
(1)
750  012454                     SP      MEMX,SELB,SPO           ;COPY ADDRESS FOR NEXT INT TO SPO
(1)             000233          MICPC=MICPC+1
(1)  012454     043220          <MOVE!SPX!MEMX!SELB!SPO>
(1)
751  012456                     MEM     IMM,INTSTK              ;ASSUME WRAP AROUND CASE
(1)             000234          MICPC=MICPC+1
(1)  012456     002642          <MOVE!WRMEM!IMM!<INTSTK>>
(1)
752  012460                     BRWRTE  IMM,<<MMEND-2>>         ;ADDRESS OF LAST INT IN STACK
(1)             000235          MICPC=MICPC+1
(1)  012460     000776          <MOVE!WRTEBR!IMM!<<MMEND-2>>>
(1)
753  012462                     CMP     BR,SPO                  ;SHOULD WE WRAP
(1)             000236          MICPC=MICPC+1
(1)  012462     060360          <SUBTC!BR!SPO>
(1)
754  012464                     Z       5$                      ;YES--BRANCH
```

```
(1)             000237
(1)  012464     101642                  MICPC=MICPC+1
(1)                                     <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
755  012466                             BRWRTE  IMM,2                   ;OFFSET FOR NEXT POINTER
(1)             000240                  MICPC=MICPC+1
(1)  012466     000402                  <MOVE!WRTEBR!IMM!<2>>
(1)
756  012470                             MEM     BR,ADD!SPO              ;UPDATE POINTER
(1)             000241                  MICPC=MICPC+1
(1)  012470     062400                  <MOVE!WRMEM!BR!<ADD!SPO>>
(1)
757  012472                     5$:     SP      MEMX,SELB,SPO           ;COPY POINTER TO SPO
(1)             000242                  MICPC=MICPC+1
(1)  012472     043220                  <MOVE!SPX!MEMX!SELB!SPO>
(1)
758  012474                             LDMA    IMM,NXTSP               ;PICK UP START OF IN QUEUE
(1)             000243                  MICPC=MICPC+1
(1)                 001                 .IF IDN IMM,IMM
(1)  012474     010241                  <MOVE!LDMAR!IMM!<NXTSP&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<NXTSP>>
(1)                 000                 .ENDC
(1)
759  012476                             CMP     MEMX,SPO                ;COMPARE TO END
(1)             000244                  MICPC=MICPC+1
(1)  012476     040360                  <SUBTC!MEMX!SPO>
(1)
760  012500                             Z       10$                     ;IF EQUAL--CLEAR INT PENDING
(1)             000245                  MICPC=MICPC+1
(1)  012500     101647                  <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
761  012502                             ALWAYS  IDLE
(1)             000246                  MICPC=MICPC+1
(1)  012502     100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
762  012504                     10$:    BRWRTE  IMM,357                 ;MASK TO CLEAR INT PENDING
(1)             000247                  MICPC=MICPC+1
(1)  012504     000757                  <MOVE!WRTEBR!IMM!<357>>
(1)
763  012506                     CLRIDL: SP      BR,AANDB,SP1
(1)             000250                  MICPC=MICPC+1
(1)  012506     063261                  <MOVE!SPX!BR!AANDB!SP1>
(1)
764  012510                             ALWAYS  IDLE
(1)             000251                  MICPC=MICPC+1
(1)  012510     100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
```

```
                                        .SBTTL  OUTWAI--WAIT FOR RDYO TO GO AWAY
OUTWAI: SPBR    IBUS,OCON,SPO           ;READ OUTPUT CONTROL CSR
        MICPC=MICPC+1
        <MOVE!SPBRX!IBUS!OCON!SPO>

        .IF DF  $LOW
        BR7     NIDLE6                  ;RDYO SET --GET OUT
        .ENDC
        .IF NDF $LOW
        BR7     IDLE
        MICPC=MICPC+1
        <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>

        .ENDC
        BRWRTE  IMM,100         ;CLEAR CONTROL BITS
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<100>>

        OUT     BR,OOCON!AANDB
        MICPC=MICPC+1
        <MOVE!WROUTX!BR!<OOCON!AANDB>>

        ALWAYS  INS13
        MICPC=MICPC+1
        <JUMP!ALCOND!<INS13-INIT&3000*4>!<INS13-INIT&777/2>>
```

```
766
767  012512
(1)          000252
(1)  012512  123440
(1)
768               001
769
770               000
771               001
772  012514
(1)          000253
(1)  012514  103451
(1)
773               000
774  012516
(1)          000254
(1)  012516  000500
(1)
775  012520
(1)          000255
(1)  012520  061262
(1)
776  012522
(1)          000256
(1)  012522  100671
(1)
```

```
                                        .SBTTL  CTLSRV--CNTL I SERVICE
012524                          CTLSRV: SPBR    IBUS,PORT4,SPO                  ;TO SPO
(1)     000257                          MICPC=MICPC+1
(1)  012524  123560                     <MOVE!SPBRX!IBUS!PORT4!SPO>
(1)
012526                                  BRSHFT
(1)     000260                          MICPC=MICPC+1
(1)  012526  001620                     <MOVE!SHFTBR!WRTEBR!SELB>
(1)
012530                                  BR1     HDSEL                           ;IF SET IS HALF DUPLEX
(1)     000261                          MICPC=MICPC+1
(1)  012530  102754                     <JUMP!BR1CON!<HDSEL-INIT&3000*4>!<HDSEL-INIT&777/2>>
(1)
012532                                  OUTPUT  IMM,<100!OMODEM>                ;MASK DTR, TURN OFF HDX
(1)     000262                          MICPC=MICPC+1
(1)  012532  002113                     <MOVE!WROUT!IMM!<100!OMODEM>>
(1)
012534                          INS11:  BRWRTE  DP,<SELA!SPO>                   ;RESTORE THE CNTL WORD
(1)     000263                          MICPC=MICPC+1
(1)  012534  060600                     <MOVE!WRTEBR!DP!<SELA!SPO>>
(1)
012536                                  BR0     CBOOT                           ;IF SET IS BOOT
(1)     000264                          MICPC=MICPC+1
(1)  012536  102273                     <JUMP!BR0CON!<CBOOT-INIT&3000*4>!<CBOOT-INIT&777/2>>
(1)
012540                          INS12:  SP      IBUS,INCON,SPO                  ;READ THE INPUT CONTROL CSR
(1)     000265                          MICPC=MICPC+1
(1)  012540  123000                     <MOVE!SPX!IBUS!INCON!SPO>
(1)
012542                                  BRWRTE  IMM,100                         ;ZERO THE BR REGISTER EXCEPT INT ENABLE
(1)     000266                          MICPC=MICPC+1
(1)  012542  000500                     <MOVE!WRTEBR!IMM!<100>>
(1)
012544                                  OUT     BR,<AANDB!0INCON>               ;CLEAR IN CONTROL CSR
(1)     000267                          MICPC=MICPC+1
(1)  012544  061260                     <MOVE!WROUTX!BR!<AANDB!0INCON>>
(1)
012546                                  LDMA    IMM,PRTST                       ;ADDRESS PORT STATE
(1)     000270                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)  012546  010211                     <MOVE!LDMAR!IMM!<PRTST&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<PRTST>>
(1)        000                          .ENDC
(1)
012550                          INS13:  PSTATE  NIDLE2
(1)  012550                             MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)     000271                          MICPC=MICPC+1
(2)  012550  002533                     <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
(2)
012552                                  ALWAYS  IDLE
(1)     000272                          MICPC=MICPC+1
(1)  012552  100451                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
791                                     ;
012554                          CBOOT:  BRWRTE  IMM,200                         ;MASK FOR BOOT MODE
```

```
(1)             000273          MICPC=MICPC+1
(1)  012554     000600          <MOVE!WRTEBR!IMM!<200>>
(1)
793  012556                     SP      BR,AORB,SP1             ;IN PORT STATUS WORD
(1)             000274          MICPC=MICPC+1
(1)  012556     063301          <MOVE!SPX!BR!AORB!SP1>
(1)
794  012560                     BRWRTE  IMM,204                 ;MASK FOR OK TO SEND AND LINE IDLE
(1)             000275          MICPC=MICPC+1
(1)  012560     000604          <MOVE!WRTEBR!IMM!<204>>
(1)
795  012562                     SP      BR,SELB,SP10            ;IN LINE STATUS
(1)             000276          MICPC=MICPC+1
(1)  012562     063230          <MOVE!SPX!BR!SELB!SP10>
(1)
796  012564                     ALWAYS  INS12
(1)             000277          MICPC=MICPC+1
(1)  012564     100665          <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
(1)
```

```
                        .SBTTL  TBASRV--TRANSMITTER BUFFER ADDRESS SERVICE
798
799  012566             TBASRV: LDMA    IMM,ETC                         ;GET POINTER TO END OF TMT CHAIN
(1)       000300                 MICPC=MICPC+1
(1)         001                  .IF IDN IMM,IMM
(1)  012566 010070               <MOVE!LDMAR!IMM!<ETC&377>>
(1)                              .IFF
(1)                              <MOVE!LDMAR!IMM!<ETC>>
(1)         000                  .ENDC
(1)
800  012570                      LDMA    MEMX,<SELB!SPX!SPO>             ;FIND THE LINK
(1)       000301                 MICPC=MICPC+1
(1)         001                  .IF IDN MEMX,IMM
(1)                              <MOVE!LDMAR!IMM!<SELB!SPX!SPO&377>>
(1)                              .IFF
(1)  012570 053220               <MOVE!LDMAR!MEMX!<SELB!SPX!SPO>>
(1)         000                  .ENDC
(1)
801  012572                      MEMINC  IMM,1                           ;BUFFER ASSIGNED IN IN LINK FLAGS
(1)       000302                 MICPC=MICPC+1
(1)  012572 016401               <MOVE!WRMEM!INCMAR!IMM!<1>>
(1)
802  012574                      BRWRTE  <IMM!INCMAR>,TML8                       ;POINT PAST NUMBER FIELD
(1)       000303                 MICPC=MICPC+1
(1)  012574 014543               <MOVE!WRTEBR!IMM!INCMAR!<TML8>>
(1)
803                                                                     ;SET BR FOR ADDITION TO SPO
804  012576                      MEMINC  IBUS,PORT1
(1)       000304                 MICPC=MICPC+1
(1)  012576 136500               <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
(1)
805  012600                      MEMINC  IBUS,PORT2
(1)       000305                 MICPC=MICPC+1
(1)  012600 136520               <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
(1)
806  012602                      MEMINC  IBUS,PORT4
(1)       000306                 MICPC=MICPC+1
(1)  012602 136560               <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
(1)
807  012604                      MEMINC  IBUS,PORT3
(1)       000307                 MICPC=MICPC+1
(1)  012604 136540               <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
(1)
808  012606                      LDMA    IMM,ETC
(1)       000310                 MICPC=MICPC+1
(1)         001                  .IF IDN IMM,IMM
(1)  012606 010070               <MOVE!LDMAR!IMM!<ETC&377>>
(1)                              .IFF
(1)                              <MOVE!LDMAR!IMM!<ETC>>
(1)         000                  .ENDC
(1)
809  012610                      MEM     IMM,TML1                        ;ASSUME QUEUE WRAP AROUND
(1)       000311                 MICPC=MICPC+1
(1)  012610 002471               <MOVE!WRMEM!IMM!<TML1>>
(1)
810  012612                      CMP     BR,SPO                          ;END OF CHAIN?
(1)       000312                 MICPC=MICPC+1
```

```
                        <SUBTC!BR!SPO>

                        Z       10$                             ;IF YES--BRANCH
                        MICPC=MICPC+1
(1) 012614  101716      <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>

                        BRWRTE  IMM,6                           ;QUEUE ENTRY LENGTH
                        MICPC=MICPC+1
(1) 012616  000406      <MOVE!WRTEBR!IMM!<6>>

                        MEM     BR,ADD!SPO                      ;UPDATE THE END POINTER IN MEMORY
                        MICPC=MICPC+1
(1) 012620  062400      <MOVE!WRMEM!BR!<ADD!SPO>>

10$:                    BRWRTE  IMM,2                   ;NUMBERED MSG PENDING MASK
                        MICPC=MICPC+1
(1) 012622  000402      <MOVE!WRTEBR!IMM!<2>>

                        SP      BR,AORB,SP10            ;UPDATE LINE STATUS
                        MICPC=MICPC+1
(1) 012624  063310      <MOVE!SPX!BR!AORB!SP10>

                        ALWAYS  INS12
                        MICPC=MICPC+1
(1) 012626  100665      <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
```

```
                                        .SBTTL  RBASRV--RECEIVE BUFFER ADDRESS SERVICE
818
819  012630                             RBASRV: LDMA    IMM,ERC                         ;ADDRES END OF RECEIVE CHAIN
(1)            000321                          MICPC=MICPC+1
(1)               001                          .IF IDN IMM,IMM
(1)  012630    010023                          <MOVE!LDMAR!IMM!<ERC&377>>
(1)                                            .IFF
(1)                                            <MOVE!LDMAR!IMM!<ERC>>
(1)               000                          .ENDC
(1)
820  012632                                    LDMA    MEMX,<SELB!SPX!SPO>             ;GET THE POINTER TO LINK
(1)            000322                          MICPC=MICPC+1
(1)               001                          .IF IDN MEMX,IMM
(1)                                            <MOVE!LDMAR!IMM!<SELB!SPX!SPO&377>>
(1)                                            .IFF
(1)  012632    053220                          <MOVE!LDMAR!MEMX!<SELB!SPX!SPO>>
(1)               000                          .ENDC
(1)
821  012634                                    MEMINC  IMM,1
(1)            000323                          MICPC=MICPC+1
(1)  012634    016401                          <MOVE!WRMEM!INCMAR!IMM!<1>>
(1)
822  012636                                    MEMINC  IBUS,PORT1
(1)            000324                          MICPC=MICPC+1
(1)  012636    136500                          <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
(1)
823  012640                                    MEMINC  IBUS,PORT2
(1)            000325                          MICPC=MICPC+1
(1)  012640    136520                          <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
(1)
824  012642                                    MEMINC  IBUS,PORT4
(1)            000326                          MICPC=MICPC+1
(1)  012642    136560                          <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
(1)
825  012644                                    MEMINC  IBUS,PORT3
(1)            000327                          MICPC=MICPC+1
(1)  012644    136540                          <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
(1)
826                                            ;;;;NOTE INVERTED ORDER OF PORT 3 AND PORT4
827  012646                                    LDMA    IMM,ERC
(1)            000330                          MICPC=MICPC+1
(1)               001                          .IF IDN IMM,IMM
(1)  012646    010023                          <MOVE!LDMAR!IMM!<ERC&377>>
(1)                                            .IFF
(1)                                            <MOVE!LDMAR!IMM!<ERC>>
(1)               000                          .ENDC
(1)
828  012650                                    MEM     IMM,RCL1                        ;ASSUME WRAP AROUND CASE
(1)            000331                          MICPC=MICPC+1
(1)  012650    002424                          <MOVE!WRMEM!IMM!<RCL1>>
(1)
829  012652                                    BRWRTE  IMM,RCL7                        ;GET ADDRESS OF END OF CAHIN AREA
(1)            000332                          MICPC=MICPC+1
(1)  012652    000462                          <MOVE!WRTEBR!IMM!<RCL7>>
(1)
830  012654                                    CMP     BR,SPO                                  ;CHECK FOR END
(1)            000333                          MICPC=MICPC+1
```

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                        012654  060360                  <SUBTC!BR!SPO>
                        (1)
831                     012656                          Z       INS12                           ;IF EQUAL BRANCH
                        (1)             000334          MICPC=MICPC+1
                        (1)     012656  101665          <JUMP!ZCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
                        (1)
832                     012660                          BRWRTE  IMM,5                   ;CALCULATE ADDRESS OF NEXT LINK
                        (1)             000335          MICPC=MICPC+1
                        (1)     012660  000405          <MOVE!WRTEBR!IMM!<5>>
                        (1)
833                     012662                          MEM     BR,ADD!SPO              ;..
                        (1)             000336          MICPC=MICPC+1
                        (1)     012662  062400          <MOVE!WRMEM!BR!<ADD!SPO>>
                        (1)
834                     012664                          ALWAYS  INS12                           ;EXIT
                        (1)             000337          MICPC=MICPC+1
                        (1)     012664  100665          <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
                        (1)
835                     012666  RA1:    BRWRTE  IMM,317                 ;MASK TO CLEAR START MODE AND CLR ACTIVE
                        (1)             000340          MICPC=MICPC+1
                        (1)     012666  000717          <MOVE!WRTEBR!IMM!<317>>
                        (1)
836                     012670                          SPBR    BR,AANDB,SP10           ;CLEAR BIT IN LINE STATUS WORD
                        (1)             000341          MICPC=MICPC+1
                        (1)     012670  063670          <MOVE!SPBRX!BR!AANDB!SP10>
                        (1)
837                     012672  RA3:    BRWRTE  IMM,0                   ;CLEAR BR
                        (1)             000342          MICPC=MICPC+1
                        (1)     012672  000400          <MOVE!WRTEBR!IMM!<0>>
                        (1)
838                     012674                          SP      BR,SELB,SP13            ;SET NUMB MESSAGE TYPE IN SP13
                        (1)             000343          MICPC=MICPC+1
                        (1)     012674  063233          <MOVE!SPX!BR!SELB!SP13>
                        (1)
839                     012676                          STATE   RCVB                    ;CHANGE RECEIVE STATE POINTER TO STATE B
                        (1)             000344          MICPC=MICPC+1
                        (1)     012676  000424          <MOVE!WRTEBR!IMM!<RCVB-INIT&777/2>>
840                     012700                          ALWAYS  REXIT
                        (1)             000345          MICPC=MICPC+1
                        (1)     012700  100450          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
                        (1)
841                                                     ;
842                                 001                 .IF NDF $LOW
843                     012702  ACK:    BRWRTE  BR,AA!SP10              ;READ LINE STATUS SHIFTING LEFT
                        (1)             000346          MICPC=MICPC+1
                        (1)     012702  060530          <MOVE!WRTEBR!BR!<AA!SP10>>
                        (1)
844                     012704                          BR4     5$                      ;IF START RECD--CLEAR START MODE
                        (1)             000347          MICPC=MICPC+1
                        (1)     012704  103351          <JUMP!BR4CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
                        (1)
845                     012706                          ALWAYS  IDLE
                        (1)             000350          MICPC=MICPC+1
                        (1)     012706  100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
                        (1)
846                     012710  5$:     BRWRTE  IMM,327                         ;CLEAR START MODE
```

```
(1)             000351          MICPC=MICPC+1
(1)  012710     000727          <MOVE!WRTEBR!IMM!<327>>
(1)
947  012712                     SP      BR,AANDB,SP10                   ;IN LINE STATUS
(1)             000352          MICPC=MICPC+1
(1)  012712     063270          <MOVE!SPX!BR!AANDB!SP10>
(1)
948  012714                     ALWAYS  RD5
(1)             000353          MICPC=MICPC+1
(1)  012714     104507          <JUMP!ALCOND!<RD5-INIT&3000*4>!<RD5-INIT&777/2>>
(1)
949                 000         .ENDC
```

```
  851  012716                  HDSEL:  BRWRTE  IMM,100                         ;HD MASK TO BR
  (1)          000354                  MICPC=MICPC+1
  (1)  012716  000500                  <MOVE!WRTEBR!IMM!<100>>
  (1)
  852  012720                          SP      BR,AORB,SP10                    ;UPDATE PORT STATUS WORD
  (1)          000355                  MICPC=MICPC+1
  (1)  012720  063310                  <MOVE!SPX!BR!AORB!SP10>
  (1)
  853  012722                          ALWAYS  INS11
  (1)          000356                  MICPC=MICPC+1
  (1)  012722  100663                  <JUMP!ALCOND!<INS11-INIT&3000*4>!<INS11-INIT&777/2>>
  (1)
  854                                  ;
  855  012724                  PE1:    BRWRTE  IMM,300                 ;MASK FOR INTERUPT AND VECTOR THROUGH X04
  (1)          000357                  MICPC=MICPC+1
  (1)  012724  000700                  <MOVE!WRTEBR!IMM!<300>>
  (1)
  856  012726                          SP      IBUS,UBBR,SP0           ;READ BR CONTROL REG
  (1)          000360                  MICPC=MICPC+1
  (1)  012726  123220                  <MOVE!SPX!IBUS!UBBR!SP0>
  (1)
  857  012730                          OUT     BR,<AORB!OBR>           ;INTERRUPT
  (1)          000361                  MICPC=MICPC+1
  (1)  012730  061311                  <MOVE!WROUTX!BR!<AORB!OBR>>
  (1)
  858             001                  .IF NDF $LOW
  859  012732                          ALWAYS  IDLE
  (1)          000362                  MICPC=MICPC+1
  (1)  012732  100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
  860             000                  .ENDC
  861             001                  .IF DF  $LOW
  862                                  ALWAYS  PINT2
  863             000                  .ENDC
  864                                  ;
  865  012734                  HALTED: MEMADR  EM6
  (1)          000363                  MICPC=MICPC+1
  (1)             001                  .IF B
  (1)  012734  002722                  <MOVE!WRMEM!<EM6-INIT&777/2>>
  (1)                                  .IFF
  (1)                                  <MOVE!WRMEM!!<EM6-INIT&777/2>>
  (1)             000                  .ENDC
  866                                                          ;FALL INTO ACLOW
  867  012736                  ACLOW:  BRWRTE  IMM,2                   ;CAUSE AN AC LOW
  (1)          000364                  MICPC=MICPC+1
  (1)  012736  000402                  <MOVE!WRTEBR!IMM!<2>>
  (1)
  868  012740                          OUT     BR,<SELB!OBR>
  (1)          000365                  MICPC=MICPC+1
  (1)  012740  061231                  <MOVE!WROUTX!BR!<SELB!OBR>>
  (1)
  869  012742                  5$:     BRWRTE  IBUS,UBBR               ;WAIT FOR IT TO COMPLETE
  (1)          000366                  MICPC=MICPC+1
  (1)  012742  120620                  <MOVE!WRTEBR!IBUS!<UBBR>>
  (1)
  870  012744                          BR1     5$
```

```
(1)             000367
(1)  012744     102766          MICPC=MICPC+1
(1)                             <JUMP!BR1CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
871  012746                     .ALWAY  MEMX,SELB,PAGE3
(1)             000370          MICPC=MICPC+1
(1)  012746     154620          <JUMP!ALCOND!MEMX!SELB!PAGE3>
(1)
872  012750                     CKTIME: BRWRTE  IBUS,UBBR               ;READ BR CONTROL REG
(1)             000371          MICPC=MICPC+1
(1)  012750     120620          <MOVE!WRTEBR!IBUS!<UBBR>>
(1)
873  012752                     BR4     HALTED
(1)             000372          MICPC=MICPC+1
(1)  012752     103363          <JUMP!BR4CON!<HALTED-INIT&3000*4>!<HALTED-INIT&777/2>>
(1)
874  012754                     ALWAYS  EM1
(1)             000373          MICPC=MICPC+1
(1)  012754     114725          <JUMP!ALCOND!<EM1-INIT&3000*4>!<EM1-INIT&777/2>>
(1)
875
876  012756                     ;
(1)             000374          IBU1:   BRWRTE  IBUS,NPR
(1)  012756     120600          MICPC=MICPC+1
(1)                             <MOVE!WRTEBR!IBUS!<NPR>>
(1)
877  012760                     BRO     IDLE
(1)             000375          MICPC=MICPC+1
(1)  012760     102051          <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
878  012762                     ALWAYS  EC2
(1)             000376          MICPC=MICPC+1
(1)  012762     114752          <JUMP!ALCOND!<EC2-INIT&3000*4>!<EC2-INIT&777/2>>
(1)
879  012764                     $ZERO
(1)             000377          MICPC=MICPC+1
(1)  012764     000000          000000
(1)
880
```

```
                        012766
                        000377
                        .=INIT+1000
                        MICPC=377
                        .SBTTL  RCVA--ROUTINE TO HANDLE FIRST DDCMP CHARACTER
                        ;ENTERED FROM IDLE LOOP
                        ;DETERMINES IF MESSAGE TYPE IS NUMBERED,UNNUMBERED OR BOOT
                        ;SETS UP APROPRIATE STATES FOR REST OF MESSAGE.
012766                  RCVA:   SP      IBUS,RCVDAT,SPO         ;READ RECEIVE CHARACTER TO SPO
(1)     000400                  MICPC=MICPC+1
(1)     012766  023200          <MOVE!SPX!IBUS!RCVDAT!SPO>
(1)
012770                          BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
(1)     000401                  MICPC=MICPC+1
(1)     012770  060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
012772                          BRO     5$                      ;IF INIT MODE---ONLY BOOT OK
(1)     000402                  MICPC=MICPC+1
(1)     012772  106012          <JUMP!BROCON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
012774                          BR7     5$                      ;IF BOOT MODE---ONLY BOOT OK
(1)     000403                  MICPC=MICPC+1
(1)     012774  107412          <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
012776                          BRWRTE  IMM,201                 ;SOH TO BR
(1)     000404                  MICPC=MICPC+1
(1)     012776  000601          <MOVE!WRTEBR!IMM!<201>>
(1)
013000                          CMP     BR,SPO                  ;COMPARE BR TO SPO
(1)     000405                  MICPC=MICPC+1
(1)     013000  060360          <SUBTC!BR!SPO>
(1)
013002                          Z       RA1                     ;IF EQUAL-IS NUMBERED MESSAGE
(1)     000406                  MICPC=MICPC+1
(1)     013002  101740          <JUMP!ZCOND!<RA1-INIT&3000*4>!<RA1-INIT&777/2>>
(1)
013004                          BRWRTE  IMM,5                   ;ENQ TO BR
(1)     000407                  MICPC=MICPC+1
(1)     013004  000405          <MOVE!WRTEBR!IMM!<5>>
(1)
013006                          CMP     BR,SPO                  ;COMPARE ENQ TO SPO
(1)     000410                  MICPC=MICPC+1
(1)     013006  060360          <SUBTC!BR!SPO>
(1)
013010                          Z       RA2                     ;IF EQUAL-IS UNNUMBERED MESSAGE
(1)     000411                  MICPC=MICPC+1
(1)     013010  105422          <JUMP!ZCOND!<RA2-INIT&3000*4>!<RA2-INIT&777/2>>
(1)
013012                  5$:     BRWRTE  IMM,220                 ;DLE TO BR
(1)     000412                  MICPC=MICPC+1
(1)     013012  000620          <MOVE!WRTEBR!IMM!<220>>
(1)
013014                          CMP     BR,SPO                  ;COMPARE DLE TO SPO
(1)     000413                  MICPC=MICPC+1
(1)     013014  060360          <SUBTC!BR!SPO>
(1)
013016                          Z       BOOT                    ;IF EQUAL IS BOOT
(1)     000414                  MICPC=MICPC+1
```

```
(1)  013016  105756                    <JUMP!ZCOND!<BOOT-INIT&3000*4>!<BOOT-INIT&777/2>>
(1)
901  013020                    FLUSH:  OUTPUT  IMM,<200!ORCVC0>          ;FLUSH INPUT SILO
(1)       000415                       MICPC=MICPC+1
(1)  013020  002212                    <MOVE!WROUT!IMM!<200!ORCVC0>>
(1)
902                                                                      ;(LOW ORDER BITS READ ONLY)
903  013022                            BRWRTE  IMM,357                   ;MASK TO CLEAR--CLEAR ACTIVE
(1)       000416                       MICPC=MICPC+1
(1)  013022  000757                    <MOVE!WRTEBR!IMM!<357>>
(1)
904  013024                            SP      BR,AANDB,SP10             ;IN LINE STATUS WORD
(1)       000417                       MICPC=MICPC+1
(1)  013024  063270                    <MOVE!SPX!BR!AANDB!SP10>
(1)
905             001                    .IF DF  $LOW
906                                    ALWAYS  RM1                       ;SET STATE TO RCVA AND RETURN TO IDLE
907             000                    .ENDC
908             001                    .IF NDF $LOW
909  013026                    RM1:    STATE   RCVA
(1)       000420                       MICPC=MICPC+1
(1)  013026  000400                    <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
910  013030                            ALWAYS  REXIT
(1)       000421                       MICPC=MICPC+1
(1)  013030  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
(1)
911             000                    .ENDC
912  013032                    RA2:    STATE   RCVI                      ;CHANGE RECEIVE STATE TO I
(1)       000422                       MICPC=MICPC+1
(1)  013032  000665                    <MOVE!WRTEBR!IMM!<RCVI-INIT&777/2>>
913             001                    .IF NDF $LOW
914  013034                            ALWAYS  REXIT
(1)       000423                       MICPC=MICPC+1
(1)  013034  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
(1)
915             000                    .ENDC
916             001                    .IF DF  $LOW
917                               REXIT: SP      BR,SELB,SP3
918                                    ALWAYS  IDLE
919             000                    .ENDC
```

```
                                        .SBTTL  RCVB--ROUTINE TO HANDLE FIRST CHARACTER OF COUNT FIELD
                                        ;ENTERED FROM IDLE LOOP
                                        ;STORES COUNT FIELD AND SETS UP RCVC AS NEXT STATE
                                        ;
013036                          RCVB:
013036                                  SP      IBUS,RCVDAT,SP4         ;READ CHARACTER TO SP4
(1)     000424                          MICPC=MICPC+1
(1)     013036  023204                  <MOVE!SPX!IBUS!RCVDAT!SP4>
(1)
013040                                  LDMA    BR,<SELA!SP14>                  ;LOAD MAR WITH ADDRESS OF CURRENT BA
(1)     000425                          MICPC=MICPC+1
(1)        001                          .IF IDN BR,IMM
(1)                                     <MOVE!LDMAR!IMM!<SELA!SP14&377>>
(1)                                     .IFF
(1)     013040  070214                  <MOVE!LDMAR!BR!<SELA!SP14>>
(1)        000                          .ENDC
(1)
013042                                  BRWRTE  MEMX,INCMAR!SELB                ;READ FLAGS BYTE
(1)     000426                          MICPC=MICPC+1
(1)     013042  054620                  <MOVE!WRTEBR!MEMX!<INCMAR!SELB>>
(1)
013044                                  BRO     RB1                             ;RECV BUFFER ASSIGNED---CONTINUE
(1)     000427                          MICPC=MICPC+1
(1)     013044  106041                  <JUMP!BROCON!<RB1-INIT&3000*4>!<RB1-INIT&777/2>>
(1)
013046                                  BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
(1)     000430                          MICPC=MICPC+1
(1)     013046  060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
013050                                  BR7     RB3                                     ;MAINT MODE
(1)     000431                          MICPC=MICPC+1
(1)     013050  107437                  <JUMP!BR7CON!<RB3-INIT&3000*4>!<RB3-INIT&777/2>>
(1)
013052                                  LDMA    IMM,T                   ;ERROR--LOAD TYPE FIELD ADDRESS IN MAR
(1)     000432                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)     013052  010151                  <MOVE!LDMAR!IMM!<T&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<T>>
(1)        000                          .ENDC
(1)
013054                                  MEMINC  IMM,2                   ;LOAD NAK TYPE
(1)     000433                          MICPC=MICPC+1
(1)     013054  016402                  <MOVE!WRMEM!INCMAR!IMM!<2>>
(1)
013056                                  MEM     IMM,310                 ;LOAD SUB-TYPE NO BUFFERS
(1)     000434                          MICPC=MICPC+1
(1)     013056  002710                  <MOVE!WRMEM!IMM!<310>>
(1)
013060                                  LDMA    IMM,NTLS
(1)     000435                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)     013060  010012                  <MOVE!LDMAR!IMM!<NTLS&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<NTLS>>
(1)        000                          .ENDC
```

```
(1)
936  013062                          ALWAYS  RH5                     ;BRANCH TO SEND NAK ROUTINE
(1)            000436                MICPC=MICPC+1
(1)  013062    104552                <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
(1)
937  013064                    RB3:  BRWRTE  IMM,4                    ;MASK FOR NO BUFFER AVAILABLE
(1)            000437                MICPC=MICPC+1
(1)  013064    000404                <MOVE!WRTEBR!IMM!<4>>
(1)
938  013066                          SP      BR,AORB,SP1             ;SET THE FLAG
(1)            000440                MICPC=MICPC+1
(1)  013066    063301                <MOVE!SPX!BR!AORB!SP1>
(1)
939  013070                    RB1:  STATE   RCVC
(1)            000441                MICPC=MICPC+1
(1)  013070    000461                <MOVE!WRTEBR!IMM!<RCVC-INIT&777/2>>
940  013072                    RB0:  SP      BR,SELB,SP3
(1)            000442                MICPC=MICPC+1
(1)  013072    063223                <MOVE!SPX!BR!SELB!SP3>
(1)
941  013074                          OUTPUT  <MEMX!INCMAR>,<SELB!OBA1>       ;OUTPUT LOW ORDER BYTE OF ADDRESS
(1)            000443                MICPC=MICPC+1
(1)  013074    056226                <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA1>>
(1)
942  013076                          OUTPUT  MEMX!INCMAR,<SELB!OBA2> ;OUTPUT HIGH BYTE OF ADDRESS
(1)            000444                MICPC=MICPC+1
(1)  013076    056227                <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA2>>
(1)
943  013100                          SP      IBUS,UBBR,SP0           ;READ THE BUS REQ REGISTER
(1)            000445                MICPC=MICPC+1
(1)  013100    123220                <MOVE!SPX!IBUS!UBBR!SP0>
(1)
944  013102                          BRWRTE  IMM,101                 ;MASK OFF ALL BUT NXM AND VEC4 BITS
(1)            000446                MICPC=MICPC+1
(1)  013102    000501                <MOVE!WRTEBR!IMM!<101>>
(1)
945  013104                          SP      BR,AANDB,SP0            ;AND SAVE IN SP0
(1)            000447                MICPC=MICPC+1
(1)  013104    063260                <MOVE!SPX!BR!AANDB!SP0>
(1)
946  013106                          SP      IMM,300,SP5             ;MASK TO ISOLATE EX. MEM BITS
(1)            000450                MICPC=MICPC+1
(1)  013106    003305                <MOVE!SPX!IMM!300!SP5>
(1)
947                                                                   ;NOTE THIS REALLY WRITES A 305 BUT THE
948                                                                   ;5 GETS SHIFTED OUT
949  013110                          BRWRTE  MEMX,AANDB!SP5          ;MASK ALL BUT EX. MEM BITS
(1)            000451                MICPC=MICPC+1
(1)  013110    040665                <MOVE!WRTEBR!MEMX!<AANDB!SP5>>
(1)
950  013112                          BRSHFT                          ;SHIFT THEM INTO THE CORRECT POSITION
(1)            000452                MICPC=MICPC+1
(1)  013112    001620                <MOVE!SHFTBR!WRTEBR!SELB>
(1)
951  013114                          BRSHFT
(1)            000453                MICPC=MICPC+1
```

```
(1)  013114  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
(1)
952  013116                            BRSHFT
(1)            000454                 MICPC=MICPC+1
(1)  013116  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
(1)
953  013120                            BRSHFT
(1)            000455                 MICPC=MICPC+1
(1)  013120  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
(1)
954  013122                            OUT     BR,AORB!OBR                    ;WRITE EX MEM BITS OUT
(1)            000456                 MICPC=MICPC+1
(1)  013122  061311                    <MOVE!WROUTX!BR!<AORB!OBR>>
(1)
955  013124                            ALWAYS  IDLE
(1)            000457                 MICPC=MICPC+1
(1)  013124  100451                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
956  013126                    RB2:    ALWAYS  I2
(1)            000460                 MICPC=MICPC+1
(1)  013126  100456                    <JUMP!ALCOND!<I2-INIT&3000*4>!<I2-INIT&777/2>>
(1)
```

```
                                        .SBTTL  RCVC--ROUTINE TO HANDLE SECOND CHARACTER OF COUNT FIELD, SELECT AND FINA
                                        ;ENTERED FROM IDLE LOOP
                                        ;INTERPRETS SELECT AND FINAL
                                        ;CHECKS FOR COUNT TOO LARGE
                                        ;
013130                          RCVC:
                                        .IF DF  $LOW
                                        ALWAYS  SELQSY                  ;"CALL" SELECT/QSYNC SUBROUTINE
                                        .ENDC
                                        .IF NDF $LOW
013130                                  SP      IBUS,RCVDAT,SP5         ;GET CHARACTER
000461                                  MICPC=MICPC+1
013130  023205                          <MOVE!SPX!IBUS!RCVDAT!SP5>

013132                                  BRWRTE  IMM,200                 ;SEPARATE SELECT BIT FROM COUNT
000462                                  MICPC=MICPC+1
013132  000600                          <MOVE!WRTEBR!IMM!<200>>

013134                                  BRWRTE  BR,AANDB!SP5
000463                                  MICPC=MICPC+1
013134  060665                          <MOVE!WRTEBR!BR!<AANDB!SP5>>

013136                                  SP      BR,AORB,SP10
000464                                  MICPC=MICPC+1
013136  063310                          <MOVE!SPX!BR!AORB!SP10>

013140                                  LDMA    IMM,BC                  ;LOAD MAR TO BYTE COUNT
000465                                  MICPC=MICPC+1
   002                                  .IF IDN IMM,IMM
013140  010167                          <MOVE!LDMAR!IMM!<BC&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<BC>>
   001                                  .ENDC

013142                                  MEMINC  BR,SELA!SP4             ;SAVE LOW BYTE
000466                                  MICPC=MICPC+1
013142  076604                          <MOVE!WRMEM!INCMAR!BR!<SELA!SP4>>

013144                                  MEMINC  BR,SELA!SP5             ;AND NOW HIGH BYTE
000467                                  MICPC=MICPC+1
013144  076605                          <MOVE!WRMEM!INCMAR!BR!<SELA!SP5>>

   000                                  .ENDC
013146                          RC5:    STATE   RCVD                    ;SET NEXT STATE TO D
000470                                  MICPC=MICPC+1
013146  000472                          <MOVE!WRTEBR!IMM!<RCVD-INIT&777/2>>
013150                                  ALWAYS  REXIT
000471                                  MICPC=MICPC+1
013150  100450                          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```

```
                                        .SBTTL  RCVD--ROUTINE TO HANDLE RESPONSE FIELD FOR NUMBERED MESSAGES
                                        ;
013152                          RCVD:   STATE   RCVE
(1)     000472                          MICPC=MICPC+1
(1)  013152  000513                     <MOVE!WRTEBR!IMM!<RCVE-INIT&777/2>>
013154                          RD2:    SP      BR,SELB,SP3             ;SAVE THE STATE
(1)     000473                          MICPC=MICPC+1
(1)  013154  063223                     <MOVE!SPX!BR!SELB!SP3>
(1)
013156                                  SPBR    IBUS,RCVDAT,SP0         ;INPUT THE CHARACTER
(1)     000474                          MICPC=MICPC+1
(1)  013156  023600                     <MOVE!SPBRX!IBUS!RCVDAT!SP0>
(1)
013160                                  BRWRTE  BR,SUB!SP17             ;COMPARE NEW R TO LAST R
(1)     000475                          MICPC=MICPC+1
(1)  013160  060757                     <MOVE!WRTEBR!BR!<SUB!SP17>>
(1)
013162                                  BR7     10$                     ;IF NEW IS GREATER---PROCESS
(1)     000476                          MICPC=MICPC+1
(1)  013162  107500                     <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
013164                                  ALWAYS  IDLE
(1)     000477                          MICPC=MICPC+1
(1)  013164  100451                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
013166                          10$:    BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
(1)     000500                          MICPC=MICPC+1
(1)  013166  060601                     <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
013170                                  BR7     IDLE                    ;MAINT. MODE - GET OUT
(1)     000501                          MICPC=MICPC+1
(1)  013170  103451                     <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
013172                                  BRWRTE  BR,SELA!SP10
(1)     000502                          MICPC=MICPC+1
(1)  013172  060610                     <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
013174                                  BRSHFT
(1)     000503                          MICPC=MICPC+1
(1)  013174  001620                     <MOVE!SHFTBR!WRTEBR!SELB>
(1)
013176                                  BR4     IDLE
(1)     000504                          MICPC=MICPC+1
(1)  013176  103051                     <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
013200                                  LDMA    IMM,ISP17               ;ADDRESS LAST ACKED IMAGE
(1)     000505                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)  013200  010153                     <MOVE!LDMAR!IMM!<ISP17&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<ISP17>>
(1)        000                          .ENDC
(1)
013202                                  MEM     BR,SELA!SP0             ;COPY THE CHAR
(1)     000506                          MICPC=MICPC+1
(1)  013202  062600                     <MOVE!WRMEM!BR!<SELA!SP0>>
```

```
(1)
994  013204                    RD5:    BRWRTE  IMM!LDMAR,REPST          ;SET UP COUNT FOR TIMER
(1)       000507                       MICPC=MICPC+1
(1)  013204  010403                    <MOVE!WRTEBR!IMM!LDMAR!<REPST>>
(1)
995                                                                     ;****DEPENDENT ON REPST = 2
996  013206                            MEM     IMM,1                   ;RESET REP THRESHOLD
(1)       000510                       MICPC=MICPC+1
(1)  013206  002401                    <MOVE!WRMEM!IMM!<1>>
(1)
997  013210                            SP      BR,SELB,SP15            ;RESET THE COUNT
(1)       000511                       MICPC=MICPC+1
(1)  013210  063235                    <MOVE!SPX!BR!SELB!SP15>
(1)
998  013212                            ALWAYS  IDLE
(1)       000512                       MICPC=MICPC+1
(1)  013212  100451                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
```

```
1000                                    .SBTTL  RCVE--ROUTINE TO HANDLE N FIELD OF NUMBERED MESSAGE
1001                                    ;
1002  013214                    RCVE:   BRWRTE  BR,SELA!SP1             ;READ THE STATUS BYTE
 (1)          000513                    MICPC=MICPC+1
 (1)  013214  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
 (1)
1003  013216                            BR7     RCVQ
 (1)          000514                    MICPC=MICPC+1
 (1)  013216  107703                    <JUMP!BR7CON!<RCVQ-INIT&3000*4>!<RCVQ-INIT&777/2>>
 (1)
1004  013220                            BRWRTE  IBUS,RCVDAT             ;INPUT THE CHARACTER
 (1)          000515                    MICPC=MICPC+1
 (1)  013220  020600                    <MOVE!WRTEBR!IBUS!<RCVDAT>>
 (1)
1005  013222                            CMP     BR,SP11
 (1)          000516                    MICPC=MICPC+1
 (1)  013222  060371                    <SUBTC!BR!SP11>
 (1)
1006  013224                            Z       5$
 (1)          000517                    MICPC=MICPC+1
 (1)  013224  105522                    <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
 (1)
1007  013226                            SP      BR,DECA,SP13            ;FORCE MSG TYPE TO -1
 (1)          000520                    MICPC=MICPC+1
 (1)  013226  063173                    <MOVE!SPX!BR!DECA!SP13>
 (1)
1008  013230                            ALWAYS  RE2
 (1)          000521                    MICPC=MICPC+1
 (1)  013230  104523                    <JUMP!ALCOND!<RE2-INIT&3000*4>!<RE2-INIT&777/2>>
 (1)
1009  013232                    5$:     SP      BR,INCA,SP11            ;UPDATE R FIELD
 (1)          000522                    MICPC=MICPC+1
 (1)  013232  063071                    <MOVE!SPX!BR!INCA!SP11>
 (1)
1010  013234                    RE2:    STATE   RCVF                    ;NEXT RECEIVE STATE IS F
 (1)          000523                    MICPC=MICPC+1
 (1)  013234  000525                    <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
1011  013236                            ALWAYS  REXIT
 (1)          000524                    MICPC=MICPC+1
 (1)  013236  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
 (1)
```

```
1013
1014  013240                        .SBTTL  RCVF--ROUTINE TO IGNORE ADDRESS
 (1)          000525
 (1)  013240  063164  RCVF:   SP      BR,DECA,SP4             ;DECREMENTLOW BYTE OF COUNT
 (1)                          MICPC=MICPC+1
 (1)                          <MOVE!SPX!BR!DECA!SP4>
1015  013242
 (1)          000526          C       RCVF0                   ;NO OVERFLOW
 (1)  013242  105130          MICPC=MICPC+1
 (1)                          <JUMP!CCOND!<RCVF0-INIT&3000*4>!<RCVF0-INIT&777/2>>
1016  013244
 (1)          000527          SP      BR,DECA,SP5             ;OVERFLOW - DECREMENT HIGH BYTE
 (1)  013244  063165          MICPC=MICPC+1
 (1)                          <MOVE!SPX!BR!DECA!SP5>
1017  013246
 (1)          000530  RCVF0:  STATE   RCVG
 (1)  013246  000533          MICPC=MICPC+1
1018  013250                  <MOVE!WRTEBR!IMM!<RCVG-INIT&777/2>>
 (1)          000531  RCVF1:  NOP     IBUS,RCVDAT,0           ;INPUT CHARACTER - AND DISCARD
 (1)  013250  020200          MICPC=MICPC+1
 (1)                          <IBUS!RCVDAT!0>
1019  013252
 (1)          000532          ALWAYS  REXIT
 (1)  013252  100450          MICPC=MICPC+1
 (1)                          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1020                          ;
1021                          .SBTTL  RCVG--ROUTINE TO IGNORE CRC1
1022                          ;
1023  013254          RCVG:   STATE   RCVH                    ;NEXT STATE IS RCVH
 (1)          000533          MICPC=MICPC+1
 (1)  013254  000535          <MOVE!WRTEBR!IMM!<RCVH-INIT&777/2>>
1024  013256                  ALWAYS  RCVF1
 (1)          000534          MICPC=MICPC+1
 (1)  013256  104531          <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
 (1)
```

```
1026
1027
1028  013260                          .SBTTL  RCVH--ROUTINE TO HANDLE CRC2 AND TO DISPATCH NUMBERED AND UNNUMBERED TYP
1029  013260                          ;
 (1)          000535
 (1)  013260  023200  RCVH:  SP      IBUS,RCVDAT,SPO                 ;GET CHAR IN SPO
 (1)                         MICPC=MICPC+1
 (1)                         <MOVE!SPX!IBUS!RCVDAT!SPO>
 (1)
1030  013262                        BRWRTE  IBUS,RCVCON               ;READ RECVR CONTROL REGISTER
 (1)          000536
 (1)  013262  020640                MICPC=MICPC+1
 (1)                                <MOVE!WRTEBR!IBUS!<RCVCON>>
 (1)
1031  013264                        BRO     TDON1                     ;IF BCC MATCH SET CRC IS GOOD
 (1)          000537
 (1)  013264  116165                MICPC=MICPC+1
 (1)                                <JUMP!BROCON!<TDON1-INIT&3000*4>!<TDON1-INIT&777/2>>
 (1)
1032  013266                        BRWRTE  BR,SELA!SP1               ;READ STATUS BYTE
 (1)          000540
 (1)  013266  060601                MICPC=MICPC+1
 (1)                                <MOVE!WRTEBR!BR!<SELA!SP1>>
 (1)
1033  013270                        BR7     RHX                       ;MAINT MODE
 (1)          000541
 (1)  013270  107740                MICPC=MICPC+1
 (1)                                <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
 (1)
1034  013272                        BRWRTE  DP,<SELA!SP10>            ;READ PORT STATUS WORD TO BR
 (1)          000542
 (1)  013272  060610                MICPC=MICPC+1
 (1)                                <MOVE!WRTEBR!DP!<SELA!SP10>>
 (1)
1035  013274                        BRSHFT
 (1)          000543
 (1)  013274  001620                MICPC=MICPC+1
 (1)                                <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1036  013276                        BR4     SNAK1                     ;IF START MODE--PROCEED TO RESEND START
 (1)          000544
 (1)  013276  117307                MICPC=MICPC+1
 (1)                                <JUMP!BR4CON!<SNAK1-INIT&3000*4>!<SNAK1-INIT&777/2>>
 (1)
1037  013300                        LDMA    IMM,T                     ;ELSE BCC ERROR--LOAD ADDRESS OF TYPE FI
 (1)          000545
 (1)             001                MICPC=MICPC+1
 (1)                                .IF IDN IMM,IMM
 (1)  013300  010151                <MOVE!LDMAR!IMM!<T&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<T>>
 (1)             000                .ENDC
 (1)
1038  013302                        MEMINC  IMM,2                     ;WRITE NAK TYPE
 (1)          000546
 (1)  013302  016402                MICPC=MICPC+1
 (1)                                <MOVE!WRMEM!INCMAR!IMM!<2>>
 (1)
1039  013304                        MEMINC  IMM,301                   ;WRITE HEADER BCC ERROR SUBTYPE
 (1)          000547
 (1)  013304  016701                MICPC=MICPC+1
 (1)                                <MOVE!WRMEM!INCMAR!IMM!<301>>
 (1)
1040  013306                        MEM     BR,SELA!SP17              ;RESTORE LAST ACKED  IMAGE
 (1)          000550
 (1)  013306  062617                MICPC=MICPC+1
 (1)                                <MOVE!WRMEM!BR!<SELA!SP17>>
 (1)
1041  013310                        LDMA    IMM,NHDS                  ;ADDRESS CUM ERROR COUNTER
```

```
                                        MICPC=MICPC+1
                                        .IF IDN IMM,IMM
                                        <MOVE!LDMAR!IMM!<NHDS&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<NHDS>>
                                        .ENDC

1042  013312                    RH5:    SP      MEMX,SELB,SPO           ;WRITE IT TO SPO
  (1)         000552                    MICPC=MICPC+1
  (1)  013312 043220                    <MOVE!SPX!MEMX!SELB!SPO>
  (1)
1043  013314                            MEM     BR,INCA!SPO             ;INCREMENT IT
  (1)         000553                    MICPC=MICPC+1
  (1)  013314 062460                    <MOVE!WRMEM!BR!<INCA!SPO>>
  (1)
1044  013316                            LDMA    IMM,NAKST               ;ADDRESS NAKS TMTED DYNAMIC
  (1)         000554                    MICPC=MICPC+1
  (1)         000001                    .IF IDN IMM,IMM
  (1)  013316 010001                    <MOVE!LDMAR!IMM!<NAKST&377>>
  (1)                                   .IFF
  (1)                                   <MOVE!LDMAR!IMM!<NAKST>>
  (1)                                   .ENDC
1045  013320                            BRWRTE  MEMX,SELB               ;WRITE IT TO BR
  (1)         000555                    MICPC=MICPC+1
  (1)  013320 040620                    <MOVE!WRTEBR!MEMX!<SELB>>
  (1)
1046  013322                            BSHFTB                          ;SHIFT IT RIGHT
  (1)         000556                    MICPC=MICPC+1
  (1)  013322 061620                    <MOVE!SHFTBR!SELB!BR>
  (1)
1047  013324                            MEM     BR,SELB                 ;UPDATE IT
  (1)         000557                    MICPC=MICPC+1
  (1)  013324 062620                    <MOVE!WRMEM!BR!<SELB>>
  (1)
1048  013326                            BRO     NTHRES                  ;BRANCH IF THRESHOLD EXCEEDED
  (1)         000560                    MICPC=MICPC+1
  (1)  013326 116256                    <JUMP!BROCON!<NTHRES-INIT&3000*4>!<NTHRES-INIT&777/2>>
  (1)
1049  013330                            ALWAYS  SNAK
  (1)         000561                    MICPC=MICPC+1
  (1)  013330 114704                    <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
  (1)
1050  013332                    RH3:    BRWRTE  DP,<DECA!SP13>                  ;LOAD TYPE RECEIVED--DECREMENTING
  (1)         000562                    MICPC=MICPC+1
  (1)  013332 060573                    <MOVE!WRTEBR!DP!<DECA!SP13>>
  (1)
1051  013334                            Z       RH1                             ;IF ALUOUT IS ALL ONES IS NUMBERED MSG
  (1)         000563                    MICPC=MICPC+1
  (1)  013334 115467                    <JUMP!ZCOND!<RH1-INIT&3000*4>!<RH1-INIT&777/2>>
  (1)
1052  013336                            RSTATE  RCVA
  (1)         000564                    MICPC=MICPC+1
  (1)  013336 000400                    <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
  (1)         000565                    MICPC=MICPC+1
  (1)  013340 063223                    <MOVE!SPX!BR!SELB!SP3>
```

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1053  013342                        BRWRTE  DP,<SELA!SP10>                  ;LOAD LINE STATUS WORD IN BR
 (1)            000566              MICPC=MICPC+1
 (1)  013342    060610              <MOVE!WRTEBR!DP!<SELA!SP10>>
 (1)
1054                 001             .IF DF  $LOW
1055                                 BR4     FLUSH1
1056                            CG1:
1057                 000             .ENDC
1058                 001             .IF NDF $LOW
1059  013344                         OUTPUT  IMM,<200!ORCVC0>
 (1)            000567              MICPC=MICPC+1
 (1)  013344    002212              <MOVE!WROUT!IMM!<200!ORCVC0>>
 (1)
1060                 000             .ENDC
1061  013346                         BRSHFT                                  ;SHIFT RIGHT
 (1)            000570              MICPC=MICPC+1
 (1)  013346    001620              <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1062  013350                         BR4     10$
 (1)            000571              MICPC=MICPC+1
 (1)  013350    107177              <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1063  013352                         LDMA    IMM,TYPTAB                      ;ADDRESS TYPE TABLE
 (1)            000572              MICPC=MICPC+1
 (1)               001              .IF IDN IMM,IMM
 (1)  013352    010162              <MOVE!LDMAR!IMM!<TYPTAB&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<TYPTAB>>
 (1)                 000            .ENDC
 (1)
1064  013354                         CMP     <MEMX!INCMAR>,SP13
 (1)            000573              MICPC=MICPC+1
 (1)  013354    054373              <SUBTC!MEMX!INCMAR!SP13>
 (1)
1065  013356                         Z       REP
 (1)            000574              MICPC=MICPC+1
 (1)  013356    115411              <JUMP!ZCOND!<REP-INIT&3000*4>!<REP-INIT&777/2>>
 (1)
1066  013360                         CMP     <MEMX!INCMAR>,SP13
 (1)            000575              MICPC=MICPC+1
 (1)  013360    054373              <SUBTC!MEMX!INCMAR!SP13>
 (1)
1067  013362                         Z       NAK
 (1)            000576              MICPC=MICPC+1
 (1)  013362    115445              <JUMP!ZCOND!<NAK-INIT&3000*4>!<NAK-INIT&777/2>>
 (1)
1068  013364                    10$: LDMA    IMM,TYPSTT                      ;SET POINTER TO START TYPE
 (1)            000577              MICPC=MICPC+1
 (1)               001              .IF IDN IMM,IMM
 (1)  013364    010164              <MOVE!LDMAR!IMM!<TYPSTT&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<TYPSTT>>
 (1)                 000            .ENDC
 (1)
1069  013366                         CMP     <MEMX!INCMAR>,SP13
 (1)            000600              MICPC=MICPC+1
```

```
   (1)  013366  054373                    <SUBTC!MEMX!INCMAR!SP13>
   (1)
  1070  013370                            Z       START
   (1)          000601                   MICPC=MICPC+1
   (1)  013370  115420                    <JUMP!ZCOND!<START-INIT&3000*4>!<START-INIT&777/2>>
   (1)
  1071                                                                    ;STACK TYPE
  1072  013372                            CMP     <MEMX!INCMAR>,SP13
   (1)          000602                   MICPC=MICPC+1
   (1)  013372  054373                    <SUBTC!MEMX!INCMAR!SP13>
   (1)
  1073  013374                            Z       STACK
   (1)          000603                   MICPC=MICPC+1
   (1)  013374  115432                    <JUMP!ZCOND!<STACK-INIT&3000*4>!<STACK-INIT&777/2>>
   (1)
  1074  013376                            CMP     <MEMX!INCMAR>,SP13      ;ACK TYPE
   (1)          000604                   MICPC=MICPC+1
   (1)  013376  054373                    <SUBTC!MEMX!INCMAR!SP13>
   (1)
  1075  013400                            Z       ACK
   (1)          000605                   MICPC=MICPC+1
   (1)  013400  101746                    <JUMP!ZCOND!<ACK-INIT&3000*4>!<ACK-INIT&777/2>>
   (1)
  1076  013402                            ALWAYS  IDLE                    ;OTHERWISE IGNORE--MUST BE OBS MSG
   (1)          000606                   MICPC=MICPC+1
   (1)  013402  100451                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
   (1)
  1077          001                      .IF DF  $LOW
  1078                           RCVCK:   SPBR    IBUS,RCVCON,SP0         ;READ RCVR CONTROL CSR
  1079                                    BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
  1080                                    BR7     I1
  1081                                    ALWAYS  TA1
  1082                           ACK:     BRWRTE  BR,AA!SP10              ;READ LINE STATUS-SHIFTING LEFT
  1083                                    BR4     5$                      ;IF START RECD -- CLEAR START MODE
  1084                                    ALWAYS  IDLE
  1085                           5$:      BRWRTE  IMM,327                 ;CLEAR START MODE
  1086                                    SP      BR,AANDB,SP10           ;IN LINE STATUS
  1087                                    ALWAYS  RDS
  1088          000                       .ENDC
```

```
1090
1091                                ;******************TIME CRITICAL CODE-- CHANGE WITH GREAT CARE*********************
1092  013404                                .SBTTL  RCVK01--ROUTINE TO HANDLE FIRST BYTE ODD RECEIVE
 (1)          000607          RCVK01: SPBR    IBUS,NPR,SP0                    ;READ NPR REGISTER
 (1)  013404  123600                  MICPC=MICPC+1
 (1)                                  <MOVE!SPBRX!IBUS!NPR!SP0>
 (1)
1093  013406                          BRO     IDLE
 (1)          000610                  MICPC=MICPC+1
 (1)  013406  102051                  <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1094  013410                          BRWRTE  IMM,200                         ;MASK FOR CO(BYTE TRANSFER)
 (1)          000611                  MICPC=MICPC+1
 (1)  013410  000600                  <MOVE!WRTEBR!IMM!<200>>
 (1)
1095                001               .IF NDF $LOW
1096  013412                          SP      BR,AORB,SP0
 (1)          000612                  MICPC=MICPC+1
 (1)  013412  063300                  <MOVE!SPX!BR!AORB!SP0>
 (1)
1097                000               .ENDC
1098                001               .IF DF  $LOW
1099                                  OUT     BR,<AORB!ONPR>                  ;TURN ON CO
1100                000               .ENDC
1101  013414                          STATE   RKE1
 (1)          000613                  MICPC=MICPC+1
 (1)  013414  000653                  <MOVE!WRTEBR!IMM!<RKE1-INIT&777/2>>
1102  013416                          ALWAYS  RCVK02
 (1)          000614                  MICPC=MICPC+1
 (1)  013416  104620                  <JUMP!ALCOND!<RCVK02-INIT&3000*4>!<RCVK02-INIT&777/2>>
 (1)
1103                                .SBTTL  RCVK0--PROCESS ODD CHARACTER
1104  013420                    RCVK0:  SPBR    IBUS,NPR,SP0                    ;IS AN NPR GOING
 (1)          000615                  MICPC=MICPC+1
 (1)  013420  123600                  <MOVE!SPBRX!IBUS!NPR!SP0>
 (1)
1105                001               .IF NDF $LOW
1106  013422                          BRO     RK66                            ;IF SO, REITERATE ODD AND EXIT
 (1)          000616                  MICPC=MICPC+1
 (1)  013422  106247                  <JUMP!BROCON!<RK66-INIT&3000*4>!<RK66-INIT&777/2>>
 (1)
1107                000               .ENDC
1108                001               .IF DF  $LOW
1109                                  BRO     IDLE                            ;IF SO, GO BACK TO IDLE LOOP
1110                000               .ENDC
1111  013424                          STATE   RCVKE
 (1)          000617                  MICPC=MICPC+1
 (1)  013424  000625                  <MOVE!WRTEBR!IMM!<RCVKE-INIT&777/2>>
1112  013426                    RCVK02: SP      BR,SELB,SP3                     ;SET STATE
 (1)          000620                  MICPC=MICPC+1
 (1)  013426  063223                  <MOVE!SPX!BR!SELB!SP3>
 (1)
1113  013430                          OUTPUT  IBUS,RCVDAT!OUTDA2              ;OUTPUT A CHAR
 (1)          000621                  MICPC=MICPC+1
 (1)  013430  022203                  <MOVE!WROUT!IBUS!<RCVDAT!OUTDA2>>
 (1)
1114  013432                    RK8:    BRWRTE  IMM,21                          ;SET OUT NPR (C1) AND NPR REQ
```

```
(1)             000622          MICPC=MICPC+1
(1)  013432     000421          <MOVE!WRTEBR!IMM!<21>>
(1)
1115                001          .IF DF  $LOW
1116                             SP      IBUS,NPR,SPO                    ;READ NPR REGISTER
1117                000          .ENDC
1118  013434                RK7:  OUT     BR,<AORB!ONPR>                  ;WRITE NPR REGISTER
(1)             000623          MICPC=MICPC+1
(1)  013434     061310          <MOVE!WROUTX!BR!<AORB!ONPR>>
(1)
1119  013436                    ALWAYS  IDLE
(1)             000624          MICPC=MICPC+1
(1)  013436     100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
```

```
1121
1122  013440                    RCVKE:  SBTTL  RCVKE--HANDLE EVEN BYTES
                                        BRWRTE  IBUS,NPR                        ;READ NPR CONTROL REGISTER
 (1)            000625                  MICPC=MICPC+1
 (1)  013440    120600                  <MOVE!WRTEBR!IBUS!<NPR>>
 (1)
1123                 001                .IF NDF $LOW
1124  013442                            BR4     RK4                             ;IF  RECV NPR--BRANCH
 (1)            000626                  MICPC=MICPC+1
 (1)  013442    107251                  <JUMP!BR4CON!<RK4-INIT&3000*4>!<RK4-INIT&777/2>>
 (1)
1125                 000                .ENDC
1126                 001                .IF DF  $LOW
1127                                    BR0     IDLE
1128                 000                .ENDC
1129  013444                    RK5:    SP      IBUS,IOBA1,SP0                  ;READ LOW BYTE OF BA TO SP
 (1)            000627                  MICPC=MICPC+1
 (1)  013444    023140                  <MOVE!SPX!IBUS!IOBA1!SP0>
 (1)
1130  013446                            OUTPUT  DP,<INCA!OBA1>                  ;WRITE INCREMENTED BA
 (1)            000630                  MICPC=MICPC+1
 (1)  013446    062066                  <MOVE!WROUT!DP!<INCA!OBA1>>
 (1)
1131  013450                    RK50:   SP      BR,DECA,SP4                     ;DECREMENT CHARACTER COUNT
 (1)            000631                  MICPC=MICPC+1
 (1)  013450    063164                  <MOVE!SPX!BR!DECA!SP4>
 (1)
1132  013452                            C       10$                             ;NO OVERFLOW
 (1)            000632                  MICPC=MICPC+1
 (1)  013452    105235                  <JUMP!CCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1133  013454                            SP      BR,DECA,SP5                     ;OVERFLOW - DECREMENT HIGH BYTE
 (1)            000633                  MICPC=MICPC+1
 (1)  013454    063165                  <MOVE!SPX!BR!DECA!SP5>
 (1)
1134  013456                            Z       RL3                             ;BYTE COUNT ZERO
 (1)            000634                  MICPC=MICPC+1
 (1)  013456    105711                  <JUMP!ZCOND!<RL3-INIT&3000*4>!<RL3-INIT&777/2>>
 (1)
1135  013460                    10$:    OUTPUT  IBUS,<RCVDAT!OUTDA1>            ;READ CHARACTER AND WRITE IT
 (1)            000635                  MICPC=MICPC+1
 (1)  013460    022202                  <MOVE!WROUT!IBUS!<RCVDAT!OUTDA1>>
 (1)
1136  013462                            SP      IBUS,IOBA1,SP0                  ;READ INCREMENTED BA
 (1)            000636                  MICPC=MICPC+1
 (1)  013462    023140                  <MOVE!SPX!IBUS!IOBA1!SP0>
 (1)
1137  013464                            OUTPUT  DP,<INCA!OBA1>                  ;WRITE INCREMENTED BA
 (1)            000637                  MICPC=MICPC+1
 (1)  013464    062066                  <MOVE!WROUT!DP!<INCA!OBA1>>
 (1)
1138  013466                            C       ICBA22                          ;IF CARRY INC BA HIGH
 (1)            000640                  MICPC=MICPC+1
 (1)  013466    115035                  <JUMP!CCOND!<ICBA22-INIT&3000*4>!<ICBA22-INIT&777/2>>
 (1)
1139  013470                    RK3:    SP      BR,DECA,SP4                     ;DECREMENT THE COUNT OF BYTES
 (1)            000641                  MICPC=MICPC+1
```

```
  (1)  013470  063164                    <MOVE!SPX!BR!DECA!SP4>
  (1)
1140   013472                            C       RK6                             ;NO OVERFLOW
  (1)          000642                    MICPC=MICPC+1
  (1)  013472  105245                    <JUMP!CCOND!<RK6-INIT&3000*4>!<RK6-INIT&777/2>>
  (1)
1141   013474                            SP      BR,DECA,SP5                     ;DECREMENT HIGH BYTE OF COUNT
  (1)          000643                    MICPC=MICPC+1
  (1)  013474  063165                    <MOVE!SPX!BR!DECA!SP5>
  (1)
1142   013476                            Z       RL4                             ;BYTE COUNT ZERO
  (1)          000644                    MICPC=MICPC+1
  (1)  013476  111772                    <JUMP!ZCOND!<RL4-INIT&3000*4>!<RL4-INIT&777/2>>
  (1)
1143                 001                .IF NDF $LOW
1144   013500                    RK6:    BRWRTE  IBUS,RCVCON                     ;READ RECEIVER CONTROL REGISTER
  (1)          000645                    MICPC=MICPC+1
  (1)  013500  020640                    <MOVE!WRTEBR!IBUS!<RCVCON>>
  (1)
1145   013502                            BR4     RCVKO                           ;IF ANOTHER CHARACTER--PROCESS
  (1)          000646                    MICPC=MICPC+1
  (1)  013502  107215                    <JUMP!BR4CON!<RCVKO-INIT&3000*4>!<RCVKO-INIT&777/2>>
  (1)
1146   013504                    RK66:   STATE   RCVKO
  (1)          000647                    MICPC=MICPC+1
  (1)  013504  000615                    <MOVE!WRTEBR!IMM!<RCVKO-INIT&777/2>>
1147   013506                            ALWAYS  REXIT
  (1)          000650                    MICPC=MICPC+1
  (1)  013506  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1148   013510                    RK4:    BRO     IDLE
  (1)          000651                    MICPC=MICPC+1
  (1)  013510  102051                    <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
1149   013512                            ALWAYS  RK5                             ;IF NO NPR --PROCESS
  (1)          000652                    MICPC=MICPC+1
  (1)  013512  104627                    <JUMP!ALCOND!<RK5-INIT&3000*4>!<RK5-INIT&777/2>>
  (1)
1150                 000                .ENDC
1151                 001                .IF DF  $LOW
1152                            RK6:    STATE   RCVKO
1153                                    ALWAYS  REXIT
1154                 000                .ENDC
1155                                    ;
1156   013514                    RKE1:   SP      IBUS,NPR,SP0                    ;READ NPR REGISTER
  (1)          000653                    MICPC=MICPC+1
  (1)  013514  123200                    <MOVE!SPX!IBUS!NPR!SP0>
  (1)
1157                 001                .IF NDF $LOW
1158   013516                            BRO     IDLE                            ;NPR STILL IN PROGRESS
  (1)          000654                    MICPC=MICPC+1
  (1)  013516  102051                    <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
1159                 000                .ENDC
1160   013520                            BRWRTE  IMM,177                         ;MASK FOR ALL BUT CO
  (1)          000655                    MICPC=MICPC+1
```

```
  (1)  013520  000577
  (1)
1161  013522
  (1)          000656
  (1)  013522  061270
  (1)
1162  013524
  (1)          000657
  (1)  013524  104631
  (1)
1163
1164
1165  013526
  (1)          000660
  (1)  013526  023200
  (1)
1166  013530
  (1)          000661
  (1)  013530  062202
  (1)
1167  013532
  (1)          000662
  (1)  013532  060601
  (1)
1168  013534
  (1)          000663
  (1)  013534  117576
  (1)
1169  013536
  (1)          000664
  (1)  013536  104641
  (1)
```

```
        <MOVE!WRTEBR!IMM!<177>>

        OUT     BR,<AANDB!ONPR>                 ;TURN OFF ALL BUT CO
        MICPC=MICPC+1
        <MOVE!WROUTX!BR!<AANDB!ONPR>>

        ALWAYS  RK50
        MICPC=MICPC+1
        <JUMP!ALCOND!<RK50-INIT&3000*4>!<RK50-INIT&777/2>>

;*****************END OF TIME CRITICAL PATH*************************************

RCVKE0: SP      IBUS,RCVDAT,SP0         ;READ CHARACTER AND SAVE IN SP0
        MICPC=MICPC+1
        <MOVE!SPX!IBUS!RCVDAT!SP0>

        OUTPUT  BR,<SELA!OUTDA1>        ;SEND NONSENSE CHARACTER
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELA!OUTDA1>>

        BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
        MICPC=MICPC+1
        <MOVE!WRTEBR!BR!<SELA!SP1>>

        BR7     PASWRD                  ;MAINT MODE - SEE IF RLD MESSAGE
        MICPC=MICPC+1
        <JUMP!BR7CON!<PASWRD-INIT&3000*4>!<PASWRD-INIT&777/2>>

        ALWAYS  RK3                     ;OTHERWISE PROCESS NORMALLY
        MICPC=MICPC+1
        <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
```

```
 1171
 1172  013540                         .SBTTL  RCVI--STORE UNNUMBERED MESSAGE TYPE
RCVI:    SP      IBUS,RCVDAT,SP13        ;STORE UNNUMBERED TYPE
  (1)           000665                  MICPC=MICPC+1
  (1)  013540   023213                  <MOVE!SPX!IBUS!RCVDAT!SP13>
  (1)
 1173  013542                          STATE   RCVJ                    ;NEXT STATE IS J
  (1)           000666                  MICPC=MICPC+1
  (1)  013542   000670                  <MOVE!WRTEBR!IMM!<RCVJ-INIT&777/2>>
 1174  013544                          ALWAYS  REXIT
  (1)           000667                  MICPC=MICPC+1
  (1)  013544   100450                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
 1175                                   ;
```

```
1177
1178  013546                        .SBTTL  RCVJ--ROUTINE TO HANDLE SUBTYPE FIELD,SELECT AND FINAL
1179                        001     RCVJ:
1180                                .IF DF  $LOW
1181                        000     ALWAYS  SELQSY          ;"CALL" SELECT AND QSYNC SUBROUTINE
1182                        001     .ENDC
1183  013546                        .IF NDF $LOW
      (1)           000670          SP      IBUS,RCVDAT,SP5         ;GET CHARACTER
      (1)  013546   023205          MICPC=MICPC+1
      (1)                           <MOVE!SPX!IBUS!RCVDAT!SP5>
1184  013550                        BRWRTE  IMM,200                 ;CONDITIONALLY SET BIT
      (1)           000671          MICPC=MICPC+1
      (1)  013550   000600          <MOVE!WRTEBR!IMM!<200>>
      (1)
1185  013552                        BRWRTE  BR,AANDB!SP5
      (1)           000672          MICPC=MICPC+1
      (1)  013552   060665          <MOVE!WRTEBR!BR!<AANDB!SP5>>
      (1)
1186  013554                        SP      BR,AORB,SP10
      (1)           000673          MICPC=MICPC+1
      (1)  013554   063310          <MOVE!SPX!BR!AORB!SP10>
      (1)
1187                        000     .ENDC
1188  013556                        STATE   RCVR                    ;NEXT STATE IS N
      (1)           000674          MICPC=MICPC+1
      (1)  013556   000676          <MOVE!WRTEBR!IMM!<RCVR-INIT&777/2>>
1189  013560                        ALWAYS  REXIT
      (1)           000675          MICPC=MICPC+1
      (1)  013560   100450          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
      (1)
```

```
1191                                    .SBTTL  RCVR--UNNUMBERED MESSAGE RESPONSE FIELD
1192                                    ;ENTERED FROM IDLE LOOP
1193                                    ;
1194  013562                    RCVR:   BRWRTE  IMM,3                   ;REP MESSAGE TYPE TO BR
 (1)            000676                  MICPC=MICPC+1
 (1)  013562    000403                  <MOVE!WRTEBR!IMM!<3>>
 (1)
1195  013564                            NOP     BR,SUB,SP13             ;IS TYPE ACK OR NAK
 (1)            000677                  MICPC=MICPC+1
 (1)  013564    060353                  <BR!SUB!SP13>
 (1)
1196  013566                            STATE   RCVQ                    ;NEXT STATE IS RCVQ
 (1)            000700                  MICPC=MICPC+1
 (1)  013566    000703                  <MOVE!WRTEBR!IMM!<RCVQ-INIT&777/2>>
1197                                                                    ;***NOTE THIS INSTR DOES NOT CLOCK "C"
1198  013570                            C       RCVF1                   ;IF NOT IGNORE
 (1)            000701                  MICPC=MICPC+1
 (1)  013570    105131                  <JUMP!CCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
 (1)
1199  013572                            ALWAYS  RD2                     ;DO RANGE CHECKS
 (1)            000702                  MICPC=MICPC+1
 (1)  013572    104473                  <JUMP!ALCOND!<RD2-INIT&3000*4>!<RD2-INIT&777/2>>
 (1)
```

```
 1201                                          .SBTTL  RCVQ--UNNUMBERED MESSAGE--NUMBER FIELD
 1202                                          ;ENTER  FROM IDLE
 1203                                          ;
 1204  013574                          RCVQ:   STATE   RCVF                    ;NEXT STATE IS ADDRESS
  (1)           000703                         MICPC=MICPC+1
  (1)  013574   000525                         <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
 1205  013576                                  ALWAYS  RCVF1
  (1)           000704                         MICPC=MICPC+1
  (1)  013576   104531                         <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
  (1)
```

```
1207                                    .SBTTL  RCVL--PROCESS CRC3
1208                                    ;ENTERED FROM  IDLE LOOP
1209  013600                    RCVL:   SPBR    IBUS,NPR,SPO                    ;READ NPR CONTROL
 (1)          000705                    MICPC=MICPC+1
 (1)  013600  123600                    <MOVE!SPBRX!IBUS!NPR!SPO>
 (1)
1210             001                    .IF NDF $LOW
1211  013602                            BR4     RL1                             ;RCV NPR BRANCH
 (1)          000706                    MICPC=MICPC+1
 (1)  013602  107314                    <JUMP!BR4CON!<RL1-INIT&3000*4>!<RL1-INIT&777/2>>
 (1)
1212             000                    .ENDC
1213             001                    .IF DF  $LOW
1214                                    BRO     IDLE
1215             000                    .ENDC
1216  013604                    RL2:    BRWRTE  IMM,176                         ;MASK TO TURN OFF CO
 (1)          000707                    MICPC=MICPC+1
 (1)  013604  000576                    <MOVE!WRTEBR!IMM!<176>>
 (1)
1217  013606                            OUT     BR,AANDB!ONPR
 (1)          000710                    MICPC=MICPC+1
 (1)  013606  061270                    <MOVE!WROUTX!BR!<AANDB!ONPR>>
 (1)
1218                                    ;
1219  013610                    RL3:    NOP     IBUS,RCVDAT,0           ;INPUT CHARACTER AND DISCARD
 (1)          000711                    MICPC=MICPC+1
 (1)  013610  020200                    <IBUS!RCVDAT!0>
 (1)
1220  013612                            STATE   RCVM
 (1)          000712                    MICPC=MICPC+1
 (1)  013612  000716                    <MOVE!WRTEBR!IMM!<RCVM-INIT&777/2>>
1221  013614                            ALWAYS  REXIT
 (1)          000713                    MICPC=MICPC+1
 (1)  013614  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
 (1)
1222                                    ;
1223             001                    .IF NDF $LOW
1224  013616                    RL1:    BRO     IDLE                            ;NPR GOING --GET OUT
 (1)          000714                    MICPC=MICPC+1
 (1)  013616  102051                    <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1225  013620                            ALWAYS  RL2
 (1)          000715                    MICPC=MICPC+1
 (1)  013620  104707                    <JUMP!ALCOND!<RL2-INIT&3000*4>!<RL2-INIT&777/2>>
 (1)
1226             000                    .ENDC
1227                                    ;
```

```
1229                                    .SBTTL  RCVM--PROCESS CRC4--END OF DATA MESSAGE
1230                                    ;ENTERED FROM IDLE LOOP
1231                                    ;IF CRC CORRECT -- QUEUE INTERUPT AND UPDATE RESPONSE
1232                                    ;
1233                                    ;IF CRC WRONG SEND NAK
1234  013622                    RCVM:   BRWRTE  IBUS,UBBR                       ;READ UNIBUS BR REGISTER
 (1)            000716                  MICPC=MICPC+1
 (1)  013622    120620                  <MOVE!WRTEBR!IBUS!<UBBR>>
 (1)
1235  013624                            BRO     NXMERR                          ;NON-EXISTANT MEMORY
 (1)            000717                  MICPC=MICPC+1
 (1)  013624    106351                  <JUMP!BROCON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
 (1)
1236  013626                            SP      IBUS,RCVDAT,SPO                 ;READ CRC CHARACTER
 (1)            000720                  MICPC=MICPC+1
 (1)  013626    023200                  <MOVE!SPX!IBUS!RCVDAT!SPO>
 (1)
1237  013630                            BRWRTE  IBUS,RCVCON                     ;READ RECEIVER CONTROL REGISTER
 (1)            000721                  MICPC=MICPC+1
 (1)  013630    020640                  <MOVE!WRTEBR!IBUS!<RCVCON>>
 (1)
1238  013632                            BRO     RCVM1                           ;IF CRC GOOD -- PROCESS
 (1)            000722                  MICPC=MICPC+1
 (1)  013632    116214                  <JUMP!BROCON!<RCVM1-INIT&3000*4>!<RCVM1-INIT&777/2>>
 (1)
1239  013634                            BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
 (1)            000723                  MICPC=MICPC+1
 (1)  013634    060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
 (1)
1240  013636                            BR7     RHX                             ;CRC ERROR IN BOOT MODE - FLUSH
 (1)            000724                  MICPC=MICPC+1
 (1)  013636    107740                  <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
 (1)
1241  013640                            LDMA    IMM,T                           ;ELSE SEND NAK --DATA ERROR
 (1)            000725                  MICPC=MICPC+1
 (1)               001                  .IF IDN IMM,IMM
 (1)  013640    010151                  <MOVE!LDMAR!IMM!<T&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<T>>
 (1)               000                  .ENDC
 (1)
1242  013642                            MEMINC  IMM,2                           ;NAK TYPE
 (1)            000726                  MICPC=MICPC+1
 (1)  013642    016402                  <MOVE!WRMEM!INCMAR!IMM!<2>>
 (1)
1243  013644                            MEMINC  IMM,302                         ;DATA ERROR SUBTYPE
 (1)            000727                  MICPC=MICPC+1
 (1)  013644    016702                  <MOVE!WRMEM!INCMAR!IMM!<302>>
 (1)
1244  013646                            LDMA    IMM,NDATS
 (1)            000730                  MICPC=MICPC+1
 (1)               001                  .IF IDN IMM,IMM
 (1)  013646    010014                  <MOVE!LDMAR!IMM!<NDATS&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<NDATS>>
 (1)               000                  .ENDC
```

```
(1)
1245  013650                        ALWAYS  RH5                             ;SEND NAK
(1)           000731                MICPC=MICPC+1
(1)   013650  104552                <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
(1)
1246
1247  013652                  RCVM0:  LDMA    IMM,<<RTHRS+3>>                 ;POINT TO ERROR WORD
(1)           000732                MICPC=MICPC+1
(1)              001                .IF IDN IMM,IMM
(1)   013652  010177                <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
(1)                                 .IFF
(1)                                 <MOVE!LDMAR!IMM!<<RTHRS+3>>>
(1)              000                .ENDC
(1)
1248  013654                        BRWRTE  IMM,10                          ;MAINT MESSAGE ERROR
(1)           000733                MICPC=MICPC+1
(1)   013654  000410                <MOVE!WRTEBR!IMM!<10>>
(1)
1249  013656                        ALWAYS RCEXY                            ;GIVE FATAL ERROR
(1)           000734                MICPC=MICPC+1
(1)   013656  114522                <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
(1)
```

```
                                        .SBTTL  EM2--PROCESS RLD MESSAGE
                                        ;ENTERED FROM IDLE LOOP
                                        ;IF RLD PASSWORD CHECKS TRIGGER THE BOOT ROM

013660                          EM2:    BRWRTE  IBUS,RCVDAT             ;READ THE CHAR
        000735                          MICPC=MICPC+1
013660  020600                          <MOVE!WRTEBR!IBUS!<RCVDAT>>

013662                                  CMP     BR,SP13                 ;IS IT A MATCH
        000736                          MICPC=MICPC+1
013662  060373                          <SUBTC!BR!SP13>

013664                                  Z       EM3
        000737                          MICPC=MICPC+1
013664  105746                          <JUMP!ZCOND!<EM3-INIT&3000*4>!<EM3-INIT&777/2>>

                                                                        ;FALL INTO RHX
013666                          RHX:    BRWRTE  BR,AA!SP1               ;READ STATUS BYTE SHIFTED LEFT
        000740                          MICPC=MICPC+1
013666  060521                          <MOVE!WRTEBR!BR!<AA!SP1>>

013670                                  BR4     10$                     ;DLE RECEIVED IN NORMAL MODE
        000741                          MICPC=MICPC+1
013670  107343                          <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>

013672                                  ALWAYS  FLUSH                   ;ALREADY IN MAINT MODE
        000742                          MICPC=MICPC+1
013672  104415                          <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>

013674                          10$:    BRWRTE  IMM,163                 ;MASK TO CLEAR ALL MAINT RELATED BITS
        000743                          MICPC=MICPC+1
013674  000563                          <MOVE!WRTEBR!IMM!<163>>

013676                                  SP      BR,AANDB,SP1            ;CLEAR THEM
        000744                          MICPC=MICPC+1
013676  063261                          <MOVE!SPX!BR!AANDB!SP1>

013700                                  ALWAYS  FLUSH
        000745                          MICPC=MICPC+1
013700  104415                          <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>

013702                          EM3:    SP      BR,DECA,SP4             ;DECREMENT CHARACTER COUNT BY ONE
        000746                          MICPC=MICPC+1
013702  063164                          <MOVE!SPX!BR!DECA!SP4>

013704                                  Z       EMTRIG                  ;TRIGGER AC LOW
        000747                          MICPC=MICPC+1
013704  115712                          <JUMP!ZCOND!<EMTRIG-INIT&3000*4>!<EMTRIG-INIT&777/2>>

013706                                  ALWAYS  IDLE
        000750                          MICPC=MICPC+1
013706  100451                          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

```
                    001
                                        .IF NDF $LOW
                                        .SBTTL NXMERR ---NON EXISTANT MEMORY HANDLER
013710                          NXMERR: LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
                    000751              MICPC=MICPC+1
                      002               .IF IDN IMM,IMM
013710  010177                          <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<<RTHRS+3>>>
                                        .ENDC
                    001
013712                                  MEMINC  IMM,1
                    000752              MICPC=MICPC+1
013712  016401                          <MOVE!WRMEM!INCMAR!IMM!<1>>

013714                                  MEM     IMM,0                   ;NXM ERROR BIT
                    000753              MICPC=MICPC+1
013714  002400                          <MOVE!WRMEM!IMM!<0>>

013716                                  SP      MEMX,SELB,SP10          ;CLEAR STATUS
                    000754              MICPC=MICPC+1
013716  043230                          <MOVE!SPX!MEMX!SELB!SP10>

013720                                  ALWAYS  RCEXX
                    000755              MICPC=MICPC+1
013720  114524                          <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
```

```
1278                    000
1279                    001
1280
1281
1282                                    .ENDC
1283                                    .IF DF  $LOW
1284                                    .SBTTL  SELQSY--ROUTINETOCHECK SELECT AND QSYNC AND DIDDLE LINE STATUS WORD
1285                                    ;USES SP5, ALWAYS CALLED BY FIRST INSTR IN A RSTATE
1286                            SELQSY: SPBR    IBUS,RCVDAT,SP5                 ;READCHARACTERINTO  SP5 AND THE BR
1287                                    BR7     15$                             ;SELECT SET?--BRANCH
1288                            5$:     BRWRTE  BR,AA!SP5                       ;SHIFTBR LEFT
1289                                    BR7     20$                             ;FINAL SET?
1290                            10$:    BRWRTE  IMM,77                          ;MASK   TO BR
1291                                    SP      BR,AANDB,SP5                    ;TURN OFF SELECTANDFINAL
1292                                    .ALWAY  BR,INCA,SP3!PAGE1
1293                                    ;
1294                            15$:    BRWRTE  IMM,200                         ;SET OK TO SEND
1295                                    SP      BR,AORB,SP10                    ;IN LINE STATUS WORD
1296                                    ALWAYS  5$
1297                            20$:    BRWRTE  IMM,20                          ;SETCLEARACTIVE
1298                                    SP      BR,AORB,SP10                    ;IN LINE STATUS WORD
1299                                    ALWAYS  10$
1300                                    .PAGE
1301                                    .ENDC
1302                                    ;
1303                            BOOT:   BRWRTE  BR,SELA!SP1             ;SEE IF IN MAINT. MODE
1304                                    MICPC=MICPC+1
1305                                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1306
1307                                    BR7     RA3                             ;BRANCH IF SO AND TREAT DLE LIKE NUM. MSG.
1308                                    MICPC=MICPC+1
1309                                    <JUMP!BR7CON!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
1310
1311                                    BRWRTE  IMM,210                 ;MASK TO SET MAINT MODE AND DLE RECV'D
1312                                    MICPC=MICPC+1
1313                                    <MOVE!WRTEBR!IMM!<210>>
1314
1315                                    SP      BR,AORB,SP1             ;SET THE BITS
1316                                    MICPC=MICPC+1
1317                                    <MOVE!SPX!BR!AORB!SP1>
1318
1319                                    ALWAYS  RA3                     ;TREAT LIKE NUMBERED MESSAGE
1320                                    MICPC=MICPC+1
1321                                    <JUMP!ALCOND!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
1322
1323                            RESEXT: BRWRTE  IMM,4                   ;ADD TO MXT BITS
1324                                    MICPC=MICPC+1
1325                                    <MOVE!WRTEBR!IMM!<4>>
1326
1327                                    SP      BR,ADD,SP0
1328                                    MICPC=MICPC+1
1329                                    <MOVE!SPX!BR!ADD!SP0>
1330
1331                                    ALWAYS  TH3X
1332                                    MICPC=MICPC+1
1333                                    <JUMP!ALCOND!<TH3X-INIT&3000*4>!<TH3X-INIT&777/2>>
1334
1335                            TABMXT: BRWRTE  IMM,4                   ;INCREMENT MXT
1336                                    MICPC=MICPC+1
1337                                    <MOVE!WRTEBR!IMM!<4>>
```

```
  (1)
1308  013744                        SP      IBUS,UBBR,SPO           ;READ BR CONTROL
  (1)         000767                MICPC=MICPC+1
  (1)  013744 123220                <MOVE!SPX!IBUS!UBBR!SPO>
  (1)
1309  013746                        OUT     BR,ADD!OBR
  (1)         000770                MICPC=MICPC+1
  (1)  013746 061011                <MOVE!WROUTX!BR!<ADD!OBR>>
  (1)
1310  013750                        ALWAYS  ECX
  (1)         000771                MICPC=MICPC+1
  (1)  013750 114761                <JUMP!ALCOND!<ECX-INIT&3000*4>!<ECX-INIT&777/2>>
  (1)
1311                                .
1312  013752                        RTHRES: BRWRTE  IMM,2
  (1)         000772                MICPC=MICPC+1
  (1)  013752 000402                <MOVE!WRTEBR!IMM!<2>>
  (1)
1313  013754                        ALWAYS  ERRXX
  (1)         000773                MICPC=MICPC+1
  (1)  013754 114663                <JUMP!ALCOND!<ERRXX-INIT&3000*4>!<ERRXX-INIT&777/2>>
  (1)
1314          000004                .REPT   4
1315                                $ZERO
1316                                .ENDR
  (1)  013756                       $ZERO
  (2)         000774                MICPC=MICPC+1
  (2)  013756 000000                000000
  (2)
  (1)  013760                       $ZERO
  (2)         000775                MICPC=MICPC+1
  (2)  013760 000000                000000
  (2)
  (1)  013762                       $ZERO
  (2)         000776                MICPC=MICPC+1
  (2)  013762 000000                000000
  (2)
  (1)  013764                       $ZERO
  (2)         000777                MICPC=MICPC+1
  (2)  013764 000000                000000
  (2)
```

```
1318                013766                  .=INIT+2000
1319                000777                  MICPC=777
1320                                        .SBTTL  TMTDA--TRANSMITTER DISPATCH ROUTINE
1321                                        .
1322  013766                        TMTDA:  BRWRTE  IBUS,TMTCON                     ;READ TRANMITTER CONTROL REGISTER
 (1)              001000                  MICPC=MICPC+1
 (1)  013766      020620                  <MOVE!WRTEBR!IBUS!<TMTCON>>
 (1)
1323  013770                                BR4     DP,SELA,<2!PAGE2>               ;IF READY PROCEED
 (1)              001001                  MICPC=MICPC+1
 (1)  013770      173202                  <JUMP! BR4CON!DP!SELA!2!PAGE2>
 (1)
1324  013772                                ALWAYS  I1                              ;ELSE IDLE
 (1)              001002                  MICPC=MICPC+1
 (1)  013772      100454                  <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
```

```
                                        .SBTTL  TMTA--FIRST CHARACTER OF HEADER
                                        ;
                                TMTA:
                                        .IF DF  $LOW
1329                        001         BRWRTE  BR,AA!SP10                      ;SHIFT LEFT
1330                                    BR7     RCVCK
1331
1332                                TA1:
1333                        000         .ENDC
1334    013774                          BRWRTE  BR,SELA!SP10                    ;REREAD STATUS
  (1)               001003              MICPC=MICPC+1
  (1)   013774      060610              <MOVE!WRTEBR!BR!<SELA!SP10>>
  (1)
1335    013776                          BR0     NUMSYN                          ;IF UNNUMBPENDING  -- SEND IT
  (1)               001004              MICPC=MICPC+1
  (1)   013776      112007              <JUMP!BR0CON!<NUMSYN-INIT&3000*4>!<NUMSYN-INIT&777/2>>
  (1)
1336    014000                          BRSHFT
  (1)               001005              MICPC=MICPC+1
  (1)   014000      001620              <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1337    014002                          BR4     IDLE0                           ;IF START MODE--EXIT
  (1)               001006              MICPC=MICPC+1
  (1)   014002      103063              <JUMP!BR4CON!<IDLE0-INIT&3000*4>!<IDLE0-INIT&777/2>>
  (1)
1338                        001         .IF DF  $LOW
1339                                    BR1     NUMSYN                          ;IF LINE HAS GONE IDLE SEND SYN
1340                                                                            ;ELSE--START TO SEND MESSAGE
1341                        000         .ENDC
1342                        001         .IF NDF $LOW
1343    014004                  NUMSYN: BRWRTE  BR,<SELA!SP10>                  ;READ LINE STATUS WORD
  (1)               001007              MICPC=MICPC+1
  (1)   014004      060610              <MOVE!WRTEBR!BR!<SELA!SP10>>
  (1)
1344    014006                          BR7     5$                              ;IF OK TO SEND--PROCEED
  (1)               001010              MICPC=MICPC+1
  (1)   014006      113412              <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
  (1)
1345    014010                          ALWAYS  I1                              ;ELSE--IDLE
  (1)               001011              MICPC=MICPC+1
  (1)   014010      100454              <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1346    014012                  5$:     BRWRTE  IBUS,MODEM                      ;ARE WE STILL SENDING?
  (1)               001012              MICPC=MICPC+1
  (1)   014012      020660              <MOVE!WRTEBR!IBUS!<MODEM>>
  (1)
1347    014014                          BRSHFT
  (1)               001013              MICPC=MICPC+1
  (1)   014014      001620              <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1348    014016                          BR4     I1                              ;RTS SET? IF SO WE ARE--STALL
  (1)               001014              MICPC=MICPC+1
  (1)   014016      103054              <JUMP!BR4CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1349    014020                          BRWRTE  IMM,373                         ;MASK TO TURN OFFLINE IDLE
  (1)               001015              MICPC=MICPC+1
  (1)   014020      000773              <MOVE!WRTEBR!IMM!<373>>
```

```
  (1)
1350  014022                    SP      BR,AANDB,SP10           ;IN LINE STATUS WORD
  (1)           001016          MICPC=MICPC+1
  (1)  014022   063270          <MOVE!SPX!BP!AANDB!SP10>
  (1)
1351  014024                    TSTATE  TMTA1
  (1)           001017          MICPC=MICPC+1
  (1)  014024   000424          <MOVE!WRTEBR!IMM!<TMTA1-INIT&777/2>>
  (1)           001020          MICPC=MICPC+1
  (1)  014026   063222          <MOVE!SPX!BR!SELB!SP2>
1352  014030                    BRWRTE  IMM,12
  (1)           001021          MICPC=MICPC+1
  (1)  014030   000412          <MOVE!WRTEBR!IMM!<12>>
  (1)
1353  014032                    SP      BR,SELB,SP6                     ;STORE IN SP6
  (1)           001022          MICPC=MICPC+1
  (1)  014032   063226          <MOVE!SPX!BR!SELB!SP6>
  (1)
1354  014034                    ALWAYS  I1                              ;BACK TO IDLE LOOP
  (1)           001023          MICPC=MICPC+1
  (1)  014034   100454          <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1355  014036              TMTA1:SP      BR,DECA,SP6                     ;DECREMENT SYN COUNT
  (1)           001024          MICPC=MICPC+1
  (1)  014036   063166          <MOVE!SPX!BR!DECA!SP6>
  (1)
1356  014040                    Z       TMTEXT
  (1)           001025          MICPC=MICPC+1
  (1)  014040   111432          <JUMP!ZCOND!<TMTEXT-INIT&3000*4>!<TMTEXT-INIT&777/2>>
  (1)
1357  014042                    OUTPUT  IMM,<1!OTMTCO>                  ;WRITE SOM TO TMTR CONTRL
  (1)           001026          MICPC=MICPC+1
  (1)  014042   002011          <MOVE!WROUT!IMM!<1!OTMTCO>>
  (1)
1358  014044                    BRWRTE  IMM,226                         ;SYNC CHAR
  (1)           001027          MICPC=MICPC+1
  (1)  014044   000626          <MOVE!WRTEBR!IMM!<226>>
  (1)
1359  014046                    OUTPUT  BR,<SELB!TMTDAT>                ;SEND THE CHARACTER
  (1)           001030          MICPC=MICPC+1
  (1)  014046   062230          <MOVE!WROUT!BR!<SELB!TMTDAT>>
  (1)
1360  014050                    ALWAYS  I1
  (1)           001031          MICPC=MICPC+1
  (1)  014050   100454          <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1361                 000        .ENDC
1362  014052              TMTEXT:BRWRTE  BR,<SELA!SP10>                  ;UNNUMB MESSGE?
  (1)           001032          MICPC=MICPC+1
  (1)  014052   060610          <MOVE!WRTEBR!BR!<SELA!SP10>>
  (1)
1363  014054                    BRO     TMTUN                           ;IF SO --BRANCH
  (1)           001033          MICPC=MICPC+1
  (1)  014054   112043          <JUMP!BROCON!<TMTUN-INIT&3000*4>!<TMTUN-INIT&777/2>>
  (1)
1364  014056                    TSTATE  TMTB
```

```
  (1)           001034          MICPC=MICPC+1
  (1)  014056   000451          <MOVE!WRTEBR!IMM!<TMTB-INIT&777/2>>
  (1)           001035          MICPC=MICPC+1
  (1)  014060   063222          <MOVE!SPX!BR!SELB!SP2>
1365   014062                   BRWRTE  BR,SELA!SP1                     ;ARE WE IN BOOT MODE
  (1)           001036          MICPC=MICPC+1
  (1)  014062   060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
  (1)
1366   014064                   BR7     TMTBT                   ;IF SO SEND DLE
  (1)           001037          MICPC=MICPC+1
  (1)  014064   113447          <JUMP!BR7CON!<TMTBT-INIT&3000*4>!<TMTBT-INIT&777/2>>
  (1)
1367   014066                   BRWRTE  IMM,201                         ;ELSE STORE SOH
  (1)           001040          MICPC=MICPC+1
  (1)  014066   000601          <MOVE!WRTEBR!IMM!<201>>
  (1)
1368   014070           TMTA5:  OUTPUT  BR,<SELB!TMTDAT>                ;IN TMT SILO
  (1)           001041          MICPC=MICPC+1
  (1)  014070   062230          <MOVE!WROUT!BR!<SELB!TMTDAT>>
  (1)
1369   014072                   ALWAYS  I1
  (1)           001042          MICPC=MICPC+1
  (1)  014072   100454          <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1370   014074           TMTUN:  TSTATE  TMTI
  (1)           001043          MICPC=MICPC+1
  (1)  014074   000610          <MOVE!WRTEBR!IMM!<TMTI-INIT&777/2>>
  (1)           001044          MICPC=MICPC+1
  (1)  014076   063222          <MOVE!SPX!BR!SELB!SP2>
1371   014100                   BRWRTE  IMM,5                           ;ENQ TO BR
  (1)           001045          MICPC=MICPC+1
  (1)  014100   000405          <MOVE!WRTEBR!IMM!<5>>
  (1)
1372   014102                   ALWAYS  TMTA5
  (1)           001046          MICPC=MICPC+1
  (1)  014102   110441          <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
  (1)
1373   014104           TMTBT:  BRWRTE  IMM,220                 ;WRITE A DLE TO BR
  (1)           001047          MICPC=MICPC+1
  (1)  014104   000620          <MOVE!WRTEBR!IMM!<220>>
  (1)
1374   014106                   ALWAYS  TMTA5                   ;SEND IT
  (1)           001050          MICPC=MICPC+1
  (1)  014106   110441          <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
  (1)
1375              001           .IF DF  $LOW
1376                            ;
1377                    NUMSYN: BRWRTE  BR,<SELA!SP10>                  ;READ LINE STATUS WORD
1378                            BR7     5$                              ;IF OK TO SEND--PROCEED
1379                            ALWAYS  I1                              ;ELSE--IDLE
1380                    5$:     BRWRTE  IBUS,MODEM              ;ARE WE STILL SENDING?
1381                            BRSHFT
```

```
1383                            BR4     I1              ;RTS SET? IF SO WE ARE--STALL
1384                            BRWRTE  IMM,373         ;MASK TO TURN OFFLINE IDLE
1385                            SP      BR,AANDB,SP10   ;IN LINE STATUS WORD
1386                            TSTATE  TMTA1
1387                            BRWRTE  IMM,10
```

```
1389                                    SP      BR,SELB,SP6             ;STORE IN SP6
1390                            TMTA1:  SP      BR,DECA,SP6             ;DECREMENT SYN COUNT
1391                                    Z       TMTEXT
1392                                    OUTPUT  IMM,<1!OTMTCO>          ;WRITE SOM TO TMTR CONTRL
1393                                    BRWRTE  IMM,226                 ;SYNC CHAR
1394                                    ALWAYS  TMTA5
1395            000                     .ENDC
```

```
1397
1398
1399  014110                                .SBTTL  TMTB--OUTPUT FIRST CHAR OF COUNT
                                            ;
1399  014110                    TMTB:   LDMA    BR,SELA!SP16                    ;GETPOINTER TO NEXT TMT LINK
(1)             001051                  MICPC=MICPC+1
(1)             001                     .IF IDN BR,IMM
(1)                                     <MOVE!LDMAR!IMM!<SELA!SP16&377>>
(1)                                     .IFF
(1)   014110  070216                    <MOVE!LDMAR!BR!<SELA!SP16>>
(1)             000                     .ENDC
(1)
1400  014112                            MEMINC  IMM,3                           ;WRITE MSG TMTED TO FLAGS
(1)             001052                  MICPC=MICPC+1
(1)   014112  016403                    <MOVE!WRMEM!INCMAR!IMM!<3>>
(1)
1401  014114                            MEMINC  BR,SELA!SP12                    ;PICK UP MSGNO
(1)             001053                  MICPC=MICPC+1
(1)   014114  076612                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP12>>
(1)
1402  014116                            STATE   TMTC                            ;ADDRESS TMTR STATE
(1)             001054                  MICPC=MICPC+1
(1)   014116  000476                    <MOVE!WRTEBR!IMM!<TMTC-INIT&777/2>>
1403  014120                    TBO:    SP      BR,SELB,SP2                     ;UPDATE IT
(1)             001055                  MICPC=MICPC+1
(1)   014120  063222                    <MOVE!SPX!BR!SELB!SP2>
(1)
1404  014122                            OUTPUT  <MEMX!INCMAR>,SELB!IBA1         ;WRITELOWBYTEOFADDRESS
(1)             001056                  MICPC=MICPC+1
(1)   014122  056224                    <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA1>>
(1)
1405  014124                            OUTPUT  <MEMX!INCMAR>,SELB!IBA2         ;WRITE HIGH BYTE OF ADDRESS
(1)             001057                  MICPC=MICPC+1
(1)   014124  056225                    <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA2>>
(1)
1406  014126                            SP      MEMX,SELB,SP7   ;HIGH BYTE OF COUNT TO SP7
(1)             001060                  MICPC=MICPC+1
(1)   014126  043227                    <MOVE!SPX!MEMX!SELB!SP7>
(1)
1407                                                            ;WAIT TO MASK OFF MEM EXT. BITS
1408  014130                            SP      IBUS,NPR,SP0
(1)             001061                  MICPC=MICPC+1
(1)   014130  123200                    <MOVE!SPX!IBUS!NPR!SP0>
(1)
1409  014132                            BRWRTE  IMM,220
(1)             001062                  MICPC=MICPC+1
(1)   014132  000620                    <MOVE!WRTEBR!IMM!<220>>
(1)
1410  014134                            SP      BR,AANDB,SP0
(1)             001063                  MICPC=MICPC+1
(1)   014134  063260                    <MOVE!SPX!BR!AANDB!SP0>
(1)
1411  014136                            SP      IMM,300,SP6                     ;MASK FOR MXT
(1)             001064                  MICPC=MICPC+1
(1)   014136  003306                    <MOVE!SPX!IMM!300!SP6>
(1)
1412  014140                            BRWRTE  MEMX!INCMAR,AANDB!SP6           ;TURN OFF CC2
(1)             001065                  MICPC=MICPC+1
```

```
  (1)  014140  054666                <MOVE!WRTEBR!MEMX!INCMAR!<AANDB!SP6>>
  (1)
1413   014142                        OUTPUT  MEMX,SELB!TMTDAT                ;ALSO WRITE COUNT TO TMTR SILO
  (1)          001066                MICPC=MICPC+1
  (1)  014142  042230                <MOVE!WROUT!MEMX!<SELB!TMTDAT>>
  (1)
1414   014144                        BRSHFT                                  ;SHIFT BITS INTO CORRECT POSITION
  (1)          001067                MICPC=MICPC+1
  (1)  014144  001620                <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1415   014146                        BRSHFT
  (1)          001070                MICPC=MICPC+1
  (1)  014146  001620                <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1416   014150                        BRSHFT
  (1)          001071                MICPC=MICPC+1
  (1)  014150  001620                <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1417   014152                        BRSHFT
  (1)          001072                MICPC=MICPC+1
  (1)  014152  001620                <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1418   014154                        OUT     BR,AORB!ONPR
  (1)          001073                MICPC=MICPC+1
  (1)  014154  061310                <MOVE!WROUTX!BR!<AORB!ONPR>>
  (1)
1419   014156                        SPBR    MEMX,SELB,SP6           ;LOWBYTE OF COUNT TO SP6
  (1)          001074                MICPC=MICPC+1
  (1)  014156  043626                <MOVE!SPBRX!MEMX!SELB!SP6>
  (1)
1420           001                   .IF DF  $LOW    ;*****10/21/76
1421                                 ALWAYS  IDLE
1422           000                   .ENDC
1423           001                   .IF NDF $LOW    ;*****10/21/76
1424   014160                        ALWAYS  I1
  (1)          001075                MICPC=MICPC+1
  (1)  014160  100454                <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1425           000                   .ENDC
1426                                 ;
```

```
                        .SBTTL  TMTC--OUTPUT SECOND CHAR OF COUNT
                        ;
014162 001076   TMTC:   BRWRTE  IMM,77                          ;MASK TO CLEAR MXT BITS
014162 000477           MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<77>>

014164 001077           SPBR    BR,AANDB,SP7                    ;CLEAR THEM
014164 063667           MICPC=MICPC+1
                        <MOVE!SPBRX!BR!AANDB!SP7>

014166 001100           OUTPUT  DP,<SELB!TMTDAT>                ;WRITE TO TMT SILO
014166 062230           MICPC=MICPC+1
                        <MOVE!WROUT!DP!<SELB!TMTDAT>>

014170 001101           BRWRTE  IMM,TML8                                ;GET WRAPAROUND ADDRESS
014170 000543           MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<TML8>>

014172 001102           CMP     BR,SP16                         ;WRAPAORUND
014172 060376           MICPC=MICPC+1
                        <SUBTC!BR!SP16>

014174 001103           Z       10$
014174 111511           MICPC=MICPC+1
                        <JUMP!ZCOND!<10$-INIT$3000*4>!<10$-INIT$777/2>>

014176 001104           BRWRTE  IMM,6                           ;OFFSET TO NEXT LINK
014176 000406           MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<6>>

014200 001105           SP      BR,ADD,SP16                     ;UPDATE THE POINTER
014200 063016           MICPC=MICPC+1
                        <MOVE!SPX!BR!ADD!SP16>

014202          5$:
                        .IF DF  $LOW
                        STATE   TMTD
                        ALWAYS  XEXIT
                        .ENDC
                        .IF NDF $LOW
014202 001106           TSTATE  TMTD
014202 000514           MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<TMTD-INIT$777/2>>
014204 001107           MICPC=MICPC+1
014204 063222           <MOVE!SPX!BR!SELB!SP2>
014206 001110           ALWAYS  I1                      ;****OCTOBER 29, 1976
014206 100454           MICPC=MICPC+1
                        <JUMP!ALCOND!<I1-INIT$3000*4>!<I1-INIT$777/2>>

                        .ENDC
014210 001111   10$:    BRWRTE  IMM,TML1                        ;GO BACK TO FIRST LINK
014210 000471           MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<TML1>>

014212 001112           SP      BR,SELB,SP16
                        MICPC=MICPC+1
```

```
   (1)  014212  063236                    <MOVE!SPX!BR!SELB!SP16>
   (1)
1449    014214                           ALWAYS  5$
   (1)          001113                   MICPC=MICPC+1
   (1)  014214  110506                   <JUMP!ALCOND!<5$-INIT%3000*4>!<5$-INIT%777/2>>
   (1)
1450                                     ;
```

```
1452
1453  014216                        .SBTTL  TMTD--RESPONSE FIELD-NUMBERED MESSAGE
TMTD:   STATE   TMTE
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<TMTE-INIT&777/2>>
        SP      BR,DECA,SP6                     ;ADJUSRT COUNT FOR  TWO'S  COMPLEMENT
        MICPC=MICPC+1
        <MOVE!SPX!BR!DECA!SP6>

        C       TD2                             ;NO OVERFLOW
        MICPC=MICPC+1
        <JUMP!CCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>

        SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
        MICPC=MICPC+1
        <MOVE!SPX!BR!DECA!SP7>

TD2:    LDMA    IMM,ISP11                       ;RESP FIELD ADDR TO MAR
        MICPC=MICPC+1
        .IF IDN IMM,IMM
        <MOVE!LDMAR!IMM!<ISP11&377>>
        .IFF
        <MOVE!LDMAR!IMM!<ISP11>>
        .ENDC

TD3:    OUTPUT  MEMX,SELB!TMTDAT                ;WRITE IT TO SILO
        MICPC=MICPC+1
        <MOVE!WROUT!MEMX!<SELB!TMTDAT>>

XEXIT2: SP      BR,SELB,SP2
        MICPC=MICPC+1
        <MOVE!SPX!BR!SELB!SP2>

        ALWAYS  I1
        MICPC=MICPC+1
        <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
```

```
                                        .SBTTL  TMTE--NUMBER FIELD--NUMBERED MESSAGE
                                TMTE:
                                        SPBR    IBUS,NPR,SPO            ;READ NPR CONTROL REGISTER
                                        MICPC=MICPC+1
                                        <MOVE!SPBRX!IBUS!NPR!SPO>

                                        BRO     I1                      ;BUSY - GET OUT
                                        MICPC=MICPC+1
                                        <JUMP!BROCON!<I1-INIT&3000*4>!<I1-INIT&777/2>>

                                        BRWRTE  BR,SELA!SP12
                                        MICPC=MICPC+1
                                        <MOVE!WRTEBR!BR!<SELA!SP12>>

                                        OUTPUT  BR,<SELB!TMTDAT>                ;WRITE IT TO THE SILO
                                        MICPC=MICPC+1
                                        <MOVE!WROUT!BR!<SELB!TMTDAT>>

                                        STATE   TMTF
                                        MICPC=MICPC+1
                                        <MOVE!WRTEBR!IMM!<TMTF-INIT&777/2>>
                                        ALWAYS  TH3
                                        MICPC=MICPC+1
                                        <JUMP!ALCOND!<TH3-INIT&3000*4>!<TH3-INIT&777/2>>
```

```
1471
1472
1473  014252                        .SBTTL  TMTF--NUMBERED MSG ADDRESS FIELD
 (1)                                .
 (1)  014252  000537    TMTF:       STATE   TF1
 (1)                                MICPC=MICPC+1
 (1)                                <MOVE!WRTEBR!IMM!<TF1-INIT&777/2>>
1474  014254            TF2:        SP      BR,SELB,SP2
 (1)                                MICPC=MICPC+1
 (1)  014254  063222                <MOVE!SPX!BR!SELB!SP2>
 (1)
1475  014256                        BRWRTE  IMM,1                   ;LOAD ADDRESS
 (1)                                MICPC=MICPC+1
 (1)  014256  000401                <MOVE!WRTEBR!IMM!<1>>
 (1)
1476                                .IF NDF $LOW
1477  014260            TF3:        OUTPUT  BR,<SELB!TMTDAT>
 (1)                                MICPC=MICPC+1
 (1)  014260  062230                <MOVE!WROUT!BR!<SELB!TMTDAT>>
 (1)
1478  014262                        ALWAYS  I1
 (1)                                MICPC=MICPC+1
 (1)  014262  100454                <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1479                                .ENDC
1480                                .IF DF  $LOW
1481                                ALWAYS  TMTA5
1482                                .ENDC
```

```
 1484
 1485  014264                          .SBTTL  TF1-NUMBERED MSG HEADER EOM
TF1:    BRWRTE  IMM,2                                   ;EOM  MASK TO BR
  (1)           001137                  MICPC=MICPC+1
  (1)   014264  000402                  <MOVE!WRTEBR!IMM!<2>>
  (1)
 1486  014266                          OUTPUT  BR,<SELB!OTMTCO>                ;UPDATE TMTR CONTROL REGISTER
  (1)           001140                  MICPC=MICPC+1
  (1)   014266  062231                  <MOVE!WROUT!BR!<SELB!OTMTCO>>
  (1)
 1487  014270                          OUTPUT  BR,<SELB!TMTDAT>                ;OUTPUT A GARBAGE CHAR
  (1)           001141                  MICPC=MICPC+1
  (1)   014270  062230                  <MOVE!WROUT!BR!<SELB!TMTDAT>>
  (1)
 1488  014272                          BRWRTE  IBUS,IIBA1                      ;READ LOW ORDER FROM INBA
  (1)           001142                  MICPC=MICPC+1
  (1)   014272  020500                  <MOVE!WRTEBR!IBUS!<IIBA1>>
  (1)
 1489  014274                          BRO     TMTF1                           ;IF ODD BYTE--BRANCH
  (1)           001143                  MICPC=MICPC+1
  (1)   014274  112162                  <JUMP!BROCON!<TMTF1-INIT&3000*4>!<TMTF1-INIT&777/2>>
  (1)
 1490  014276                          STATE   TMTH
  (1)           001144                  MICPC=MICPC+1
  (1)   014276  000546                  <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
 1491  014300                          ALWAYS  XEXIT
  (1)           001145                  MICPC=MICPC+1
  (1)   014300  110563                  <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
  (1)
```

```
1493
1494
1495
1496  014302                    ;**********TIME CRITICAL PATH--MODIFY WITH GREAT CARE
                                        .SBTTL  TMTH--ROUTINE TO OUTPUT DATA CHARACTERS
                                        ;
                          TMTH: SPBR    IBUS,NPR,SPO                    ;READ NPR CONTROL
(1)             001146          MICPC=MICPC+1
(1)   014302    123600          <MOVE!SPBRX!IBUS!NPR!SPO>
(1)
1497                001
1498  014304                            .IF NDF $LOW
                                        BR4     5$                      ;IF RECV NPR --PROCESS
(1)             001147          MICPC=MICPC+1
(1)   014304    113151          <JUMP!BR4CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
1499                000                 .ENDC
1500  014306                            BRO     I1                      ;IF NPR IN PROGRESS --BRANCH
(1)             001150          MICPC=MICPC+1
(1)   014306    102054          <JUMP!BROCON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
(1)
1501  014310                    5$:     OUTPUT  IBUS,<INDAT1!TMTDAT>    ;WRITE THE EVEN CHAR TO TMT SILO
(1)             001151          MICPC=MICPC+1
(1)   014310    022010          <MOVE!WROUT!IBUS!<INDAT1!TMTDAT>>
(1)
1502  014312                            SP      IBUS,IIBA1,SPO          ;READ LOW BYTE OF BA TO SP
(1)             001152          MICPC=MICPC+1
(1)   014312    023100          <MOVE!SPX!IBUS!IIBA1!SPO>
(1)
1503  014314                            OUTPUT  BR,<INCA!IBA1>          ;OUTPUT INCREMENTED BA
(1)             001153          MICPC=MICPC+1
(1)   014314    062064          <MOVE!WROUT!BR!<INCA!IBA1>>
(1)
1504  014316                            SP      BR,DECA,SP6             ;DECREMENT CHARACTER  COUNT
(1)             001154          MICPC=MICPC+1
(1)   014316    063166          <MOVE!SPX!BR!DECA!SP6>
(1)
1505  014320                            C       TH6                     ;NO OVERFLOW
(1)             001155          MICPC=MICPC+1
(1)   014320    111160          <JUMP!CCOND!<TH6-INIT&3000*4>!<TH6-INIT&777/2>>
(1)
1506  014322                            SP      BR,DECA,SP7             ;DECREMENT HIGH BYTE OF COUNT
(1)             001156          MICPC=MICPC+1
(1)   014322    063167          <MOVE!SPX!BR!DECA!SP7>
(1)
1507  014324                            Z       HEH1                    ;BYTE  COUNT ZERO
(1)             001157          MICPC=MICPC+1
(1)   014324    115407          <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
(1)
1508  014326                    TH6:
1509                001                 .IF NDF $LOW
1510  014326                            BRWRTE  IBUS,TMTCON             ;READ TMTR CONTROL CSR
(1)             001160          MICPC=MICPC+1
(1)   014326    020620          <MOVE!WRTEBR!IBUS!<TMTCON>>
(1)
1511  014330                            BR4     TH9                     ;IF MORE ROOM IN SILO--BRANCH
(1)             001161          MICPC=MICPC+1
(1)   014330    113165          <JUMP!BR4CON!<TH9-INIT&3000*4>!<TH9-INIT&777/2>>
(1)
1512                000                 .ENDC
```

```
1513  014332
 (1)            001162
 (1)  014332    000565
1514                001
1515
1516                000
1517                001
1518  014334
 (1)            001163
 (1)  014334    063222
 (1)
1519  014336
 (1)            001164
 (1)  014336    100454
 (1)
1520                000
1521  014340
1522                001
1523
1524
1525                000
1526  014340
 (1)            001165
 (1)  014340    022030
 (1)
1527  014342
 (1)            001166
 (1)  014342    023100
 (1)
1528  014344
 (1)            001167
 (1)  014344    062064
 (1)
1529  014346
 (1)            001170
 (1)  014346    111377
 (1)
1530  014350
 (1)            001171
 (1)  014350    063166
 (1)
1531  014352
 (1)            001172
 (1)  014352    111175
 (1)
1532  014354
 (1)            001173
 (1)  014354    063167
 (1)
1533  014356
 (1)            001174
 (1)  014356    115407
 (1)
1534  014360
 (1)            001175
 (1)  014360    123600
```

```
TMTF1:  STATE   TMTHO
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<TMTHO-INIT&777/2>>
        .IF DF  $LOW
        ALWAYS  XEXIT
        .ENDC
        .IF NDF $LOW
XEXIT:  SP      BR,SELB,SP2                     ;STORE NEW TRANSMIT STATE
        MICPC=MICPC+1
        <MOVE!SPX!BR!SELB!SP2>

        ALWAYS  I1
        MICPC=MICPC+1
        <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>

        .ENDC
TMTHO:
        .IF DF  $LOW
        SPBR    IBUS,NPR,SPO            ;NPR BUSY
        BRO     I1
        .ENDC
TH9:    OUTPUT  IBUS,<INDAT2!TMTDAT>            ;ODD CHAR TO SILO
        MICPC=MICPC+1
        <MOVE!WROUT!IBUS!<INDAT2!TMTDAT>>

        SP      IBUS,IIBA1,SPO                  ;READ LOW BYTE TO BA
        MICPC=MICPC+1
        <MOVE!SPX!IBUS!IIBA1!SPO>

        OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT THE INCREMENTED BA
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<INCA!IBA1>>

        C       HOINCH
        MICPC=MICPC+1
        <JUMP!CCOND!<HOINCH-INIT&3000*4>!<HOINCH-INIT&777/2>>

TH8:    SP      BR,DECA,SP6                     ;DECREMENT CHARACTERCOUNT
        MICPC=MICPC+1
        <MOVE!SPX!BR!DECA!SP6>

        C       TH7                             ;NO OVERFLOW
        MICPC=MICPC+1
        <JUMP!CCOND!<TH7-INIT&3000*4>!<TH7-INIT&777/2>>

        SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF  COUNT
        MICPC=MICPC+1
        <MOVE!SPX!BR!DECA!SP7>

        Z       HEH1                            ;BYTE COUNT ZERO
        MICPC=MICPC+1
        <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>

TH7:    SPBR    IBUS,NPR,SPO                    ;READ NPR REGISTER
        MICPC=MICPC+1
        <MOVE!SPBRX!IBUS!NPR!SPO>
```

```
  (1)
1535                    001             .IF NDF $LOW
1536  014362                            BRO     TH2                             ;IF NPR BUSY WAIT TO GO
  (1)                   001176          MICPC=MICPC+1
  (1)   014362  112205                  <JUMP!BROCON!<TH2-INIT&3000*4>!<TH2-INIT&777/2>>
  (1)
1537                    000             .ENDC
1538  014364                            STATE   TMTH
  (1)                   001177          MICPC=MICPC+1
  (1)   014364  000546                  <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
1539  014366            TH3:    SP      BR,SELB,SP2                             ;SAVE TSTATE
  (1)                   001200          MICPC=MICPC+1
  (1)   014366  063222                  <MOVE!SPX!BR!SELB!SP2>
  (1)
1540  014370            TH3X:   BRWRTE  IMM,156                                 ;CLEAR C0 AND C1
  (1)                   001201          MICPC=MICPC+1
  (1)   014370  000556                  <MOVE!WRTEBR!IMM!<156>>
  (1)
1541  014372                            SP      BR,AANDB,SP0                    ;CLEAR THE BITS
  (1)                   001202          MICPC=MICPC+1
  (1)   014372  063260                  <MOVE!SPX!BR!AANDB!SP0>
  (1)
1542  014374                            OUT     BR,<INCA!ONPR>
  (1)                   001203          MICPC=MICPC+1
  (1)   014374  061070                  <MOVE!WROUTX!BR!<INCA!ONPR>>
  (1)
1543  014376                            ALWAYS  I1
  (1)                   001204          MICPC=MICPC+1
  (1)   014376  100454                  <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1544                    001             .IF NDF $LOW
1545  014400            TH2:    TSTATE  TH7
  (1)                   001205          MICPC=MICPC+1
  (1)   014400  000575                  <MOVE!WRTEBR!IMM!<TH7-INIT&777/2>>
  (1)                   001206          MICPC=MICPC+1
  (1)   014402  063222                  <MOVE!SPX!BR!SELB!SP2>
1546  014404                            ALWAYS  I1
  (1)                   001207          MICPC=MICPC+1
  (1)   014404  100454                  <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
  (1)
1547                    000             .ENDC
1548                            ;***************END TIME CRITICAL PATH*******************************
1549                                    ;
```

```
                                        .SBTTL  TMTI--SEND UNNUMBERED TYPE FIELD
1552  014406                    TMTI:   LDMA    IMM,T                           ;ADDRESS OF TYPE FIELD TO MAR
 (1)            001210                  MICPC=MICPC+1
 (1)               001                  .IF IDN IMM,IMM
 (1)  014406    010151                  <MOVE!LDMAR!IMM!<T&377>>
 (1)                                     .IFF
 (1)                                     <MOVE!LDMAR!IMM!<T>>
 (1)                000                  .ENDC
 (1)
1553  014410                            SP      MEMX,SELB,SP6                   ;COPY IT TO SP6
 (1)            001211                  MICPC=MICPC+1
 (1)  014410    043226                  <MOVE!SPX!MEMX!SELB!SP6>
 (1)
1554  014412                            STATE   TMTJ
 (1)            001212                  MICPC=MICPC+1
 (1)  014412    000614                  <MOVE!WRTEBR!IMM!<TMTJ-INIT&777/2>>
1555  014414                            ALWAYS  TD3
 (1)            001213                  MICPC=MICPC+1
 (1)  014414    110521                  <JUMP!ALCOND!<TD3-INIT&3000*4>!<TD3-INIT&777/2>>
 (1)
1556                                    ;
1557                                    .SBTTL  TMTJ--SEND SUB-TYPE FIELD
1558  014416                    TMTJ:   LDMA    IMM,ST                          ;ADDRESS OF SUB-TYPE FIELD TO MAR
 (1)            001214                  MICPC=MICPC+1
 (1)               001                  .IF IDN IMM,IMM
 (1)  014416    010152                  <MOVE!LDMAR!IMM!<ST&377>>
 (1)                                     .IFF
 (1)                                     <MOVE!LDMAR!IMM!<ST>>
 (1)                000                  .ENDC
 (1)
1559  014420                            STATE   TMTK
 (1)            001215                  MICPC=MICPC+1
 (1)  014420    000617                  <MOVE!WRTEBR!IMM!<TMTK-INIT&777/2>>
1560  014422                            ALWAYS  TD3
 (1)            001216                  MICPC=MICPC+1
 (1)  014422    110521                  <JUMP!ALCOND!<TD3-INIT&3000*4>!<TD3-INIT&777/2>>
 (1)
```

```
                        .SBTTL  TMTK--OUTPUT RESPONSE FIELD (UNNUMB MSG)
                        ;
TMTK:   BRWRTE  IMM,3                                   ;WRITE A 3 TO BR
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<3>>

                        NOP     BR,SUB,SP6              ;IF TYPE LESS THAN 3
                        MICPC=MICPC+1
                        <BR!SUB!SP6>

                        TSTATE  TMTL
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<TMTL-INIT&777/2>>
                        MICPC=MICPC+1
                        <MOVE!SPX!BR!SELB!SP2>
                        C       TMTLO
                        MICPC=MICPC+1
                        <JUMP!CCOND!<TMTLO-INIT&3000*4>!<TMTLO-INIT&777/2>>

                        ALWAYS  TD2
                        MICPC=MICPC+1
                        <JUMP!ALCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>

                        ;
                        .SBTTL  TMTL--UNNUMB MSG NUMBER FIELD
TMTL:   TSTATE  TMTM
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<TMTM-INIT&777/2>>
                        MICPC=MICPC+1
                        <MOVE!SPX!BR!SELB!SP2>
                        BRWRTE  IMM,3
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<3>>

                        CMP     BR,SP6                  ;IS MESSAGE REP
                        MICPC=MICPC+1
                        <SUBTC!BR!SP6>

                        Z       TMTL1                   ;YES
                        MICPC=MICPC+1
                        <JUMP!ZCOND!<TMTL1-INIT&3000*4>!<TMTL1-INIT&777/2>>

TMTLO:  BRWRTE  IMM,0                                   ;ADDRESS CONTNAT OF ZERO
                        MICPC=MICPC+1
                        <MOVE!WRTEBR!IMM!<0>>

                        .IF DF  $LOW
                        ALWAYS  TMTA5
                        .ENDC
                        .IF NDF $LOW
                        OUTPUT  BR,<SELB!TMTDAT>        ;SEND IT OUT
                        MICPC=MICPC+1
                        <MOVE!WROUT!BR!<SELB!TMTDAT>>

                        ALWAYS  I1                      ;BACK TO IDLE LOOP
                        MICPC=MICPC+1
```

```
   (1)  014456  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
   (1)
  1582               000                  .ENDC
  1583
  1584  014460                        ;
   (1)              001235
   (1)  014460  060572              TMTL1:  BRWRTE  BR,DECA!SP12                    ;WRITE A RESPONSE
   (1)                                      MICPC=MICPC+1
   (1)                                      <MOVE!WRTEBR!BR!<DECA!SP12>>
  1585  014462
   (1)              001236                  ALWAYS  TMTA5
   (1)  014462  110441                      MICPC=MICPC+1
   (1)                                      <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
  1586                                      ;
```

```
 1588
 1589  014464
  (1)                001237
  (1)  014464  000641
 1590  014466
  (1)                001240
  (1)  014466  110533
  (1)
 1591  014470
  (1)                001241
  (1)  014470  000402
  (1)
 1592  014472
  (1)                001242
  (1)  014472  062231
  (1)
 1593  014474
  (1)                001243
  (1)  014474  062230
  (1)
 1594  014476
  (1)                001244
  (1)  014476  000404
  (1)
 1595  014500
  (1)                001245
  (1)  014500  063710
  (1)
 1596  014502
  (1)                001246
  (1)  014502  060530
  (1)
 1597  014504
  (1)                001247
  (1)  014504  113653
  (1)
 1598  014506
  (1)                001250
  (1)  014506  000776
  (1)
 1599  014510
  (1)                001251
  (1)  014510  063270
  (1)
 1600  014512
  (1)                001252
  (1)  014512  110740
  (1)
 1601  014514
  (1)                001253
  (1)  014514  000576
  (1)
 1602  014516
  (1)                001254
  (1)  014516  110651
  (1)
```

```
                .SBTTL  TMTM--UNNUMB MSG--STATION ADDRESS
TMTM:   STATE   TNEOM
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<TNEOM-INIT&777/2>>
        ALWAYS  TF2
        MICPC=MICPC+1
        <JUMP!ALCOND!<TF2-INIT&3000*4>!<TF2-INIT&777/2>>

TNEOM:  BRWRTE  IMM,2                           ;END OF MESSAGE TO BR
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<2>>

        OUTPUT  BR,<SELB!OTMTCO>
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELB!OTMTCO>>

        OUTPUT  BR,<SELB!TMTDAT>                ;OUTPUT A GARBAGE CHARACTER
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELB!TMTDAT>>

        BRWRTE  IMM,4                           ;SET UP LINE HAS GONE IDLE MASK
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<4>>

        SPBR    BR,AORB,SP10                    ;UPDATE LINE STATUS WORD
        MICPC=MICPC+1
        <MOVE!SPBRX!BR!AORB!SP10>

        BRWRTE  BR,AA!SP10                      ;SHIFT STATUS LEFT
        MICPC=MICPC+1
        <MOVE!WRTEBR!BR!<AA!SP10>>

        BR7     10$                             ;IF HDX SET---BRANCH TO CLEAR OK TO SEND
        MICPC=MICPC+1
        <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>

        BRWRTE  IMM,376                         ;MASK TO TURN OFF UNNUMB PENDDING
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<376>>

5$:     SP      BR,AANDB,SP10                   ;MASK TO LINE STATUS WORD
        MICPC=MICPC+1
        <MOVE!SPX!BR!AANDB!SP10>

        ALWAYS  TEOM2
        MICPC=MICPC+1
        <JUMP!ALCOND!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>

10$:    BRWRTE  IMM,176                         ;CLEAR OK TO SEND AND UNNUMB PENPENDING
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<176>>

        ALWAYS  5$
        MICPC=MICPC+1
        <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
```

```
                        .SBTTL  TIMSRV--TIMEOUT ROUTINE--SENDS  REP
                        ;
                        .ENABLE LSB
014520          TIMSRV: BRWRTE  IMM,177                         ;MASK OFF  BR REQ
                        MICPC=MICPC+1
(1)     001255
(1) 014520  000577      <MOVE!WRTEBR!IMM!<177>>
(1)
                                                                ;RESET TIMER---SLICK MOVE
                                                                ;SINCE TIMER IS RESET BY WRITING
                                                                ;A 1 AND THE EXPIRATION  LOOKS
                                                                ;LIKE 1--VOILA
014522                  OUT     BR,<AANDB!OBR>                  ;AND THE BIT ON
                        MICPC=MICPC+1
(1)     001256
(1) 014522  061271      <MOVE!WROUTX!BR!<AANDB!OBR>>
(1)
014524                  BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
                        MICPC=MICPC+1
(1)     001257
(1) 014524  060601      <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
014526                  BRO     IDLE
                        MICPC=MICPC+1
(1)     001260
(1) 014526  102051      <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
014530                  BR7     IDLE                            ;IF IN MAINT. MODE DISABLE TIMER
                        MICPC=MICPC+1
(1)     001261
(1) 014530  103451      <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
014532                  SP      BR,DECA,SP15                    ;DECREMENT THE COUNTER
                        MICPC=MICPC+1
(1)     001262
(1) 014532  063175      <MOVE!SPX!BR!DECA!SP15>
(1)
014534                  Z       20$                             ;IF ALL ONES HAS EXPIRED
                        MICPC=MICPC+1
(1)     001263
(1) 014534  111670      <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
(1)
014536          10$:    BRWRTE  BR,SELA!SP10            ;READ LINE STATUS
                        MICPC=MICPC+1
(1)     001264
(1) 014536  060610      <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
014540                  BR1     TABUPD                          ;NUMBERED MESSAGE IN PROGRESS
                        MICPC=MICPC+1
(1)     001265
(1) 014540  116731      <JUMP!BR1CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
(1)
014542                  BRO     TABUPD                          ;UNNUMBMSGIN PROGRESS
                        MICPC=MICPC+1
(1)     001266
(1) 014542  116331      <JUMP!BROCON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
(1)
014544                  ALWAYS  IDLE                            ;ELSE BACK TO IDLE LOOP
                        MICPC=MICPC+1
(1)     001267
(1) 014544  100451      <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
014546          TIME1:
014546          20$:    BRWRTE  IMM,2                           ;
                        MICPC=MICPC+1
(1)     001270
(1) 014546  000402      <MOVE!WRTEBR!IMM!<2>>
(1)
```

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1624  014550                    SP      BR,SELB,SP15                    ;RESET THE TIMER TICK COUNT
 (1)          001271            MICPC=MICPC+1
 (1)  014550  063235            <MOVE!SPX!BR!SELB!SP15>
 (1)
1625             001            .IF NDF $LOW
1626  014552                    BRWRTE  IMM,201                         ;SET OK TO SEND AND
 (1)          001272            MICPC=MICPC+1
 (1)  014552  000601            <MOVE!WRTEBR!IMM!<201>>
 (1)
1627  014554                    SPBR    BR,AORB,SP10                    ;UNNUM MSG PENDING
 (1)          001273            MICPC=MICPC+1
 (1)  014554  063710            <MOVE!SPBRX!BR!AORB!SP10>
 (1)
1628             000            .ENDC
1629             001            .IF DF  $LOW
1630                            BRWRTE  DP,<SELA!SP10>                  ;READ LINE STATUS WORD
1631             000            .ENDC
1632  014556                    BRSHFT
 (1)          001274            MICPC=MICPC+1
 (1)  014556  001620            <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1633  014560                    BR4     BS1                             ;IF IN START MODE--BRANC
 (1)          001275            MICPC=MICPC+1
 (1)  014560  103111            <JUMP!BR4CON!<BS1-INIT&3000*4>!<BS1-INIT&777/2>>
 (1)
1634  014562                    BRWRTE  BR,DECA!SP12                    ;GET LAST NUMBER SENT
 (1)          001276            MICPC=MICPC+1
 (1)  014562  060572            <MOVE!WRTEBR!BR!<DECA!SP12>>
 (1)
1635  014564                    CMP     BR,SP17                         ;COMPARE TO LAST ACKED
 (1)          001277            MICPC=MICPC+1
 (1)  014564  060377            <SUBTC!BR!SP17>
 (1)
1636  014566                    Z       SNDACK                  ;IF EQ --SEND ACK
 (1)          001300            MICPC=MICPC+1
 (1)  014566  111733            <JUMP!ZCOND!<SNDACK-INIT&3000*4>!<SNDACK-INIT&777/2>>
 (1)
1637  014570              TIME2:  LDMA    IMM,T                           ;LOAD ADDRESS OF TYPE FIELD IN UNNUMB SK
 (1)          001301            MICPC=MICPC+1
 (1)             001            .IF IDN IMM,IMM
 (1)  014570  010151            <MOVE!LDMAR!IMM!<T&377>>
 (1)                            .IFF
 (1)                            <MOVE!LDMAR!IMM!<T>>
 (1)             000            .ENDC
 (1)
1638  014572                    MEMINC  IMM,3                           ;LOAD REP TYPE
 (1)          001302            MICPC=MICPC+1
 (1)  014572  016403            <MOVE!WRMEM!INCMAR!IMM!<3>>
 (1)
1639  014574                    MEMINC  IMM,300                         ;ZERO THE SUB-TYPE
 (1)          001303            MICPC=MICPC+1
 (1)  014574  016700            <MOVE!WRMEM!INCMAR!IMM!<300>>
 (1)
1640  014576                    LDMA    IMM,REPCS                       ;CUMULATIVE REPS RECD
 (1)          001304            MICPC=MICPC+1
 (1)             001            .IF IDN IMM,IMM
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```
    (1)  014576  010015                 <MOVE!LDMAR!IMM!<REPCS&377>>
    (1)                                 .IFF
    (1)                                 <MOVE!LDMAR!IMM!<REPCS>>
    (1)                 000             .ENDC
    (1)
 1641  014600                           SP      MEMX,SELB,SPO                   ;COPY IT TO SPO
    (1)                 001305          MICPC=MICPC+1
    (1)  014600  043220                 <MOVE!SPX!MEMX!SELB!SPO>
    (1)
 1642  014602                           MEM     BR,INCA!SPO                     ;INCREMENT IT
    (1)                 001306          MICPC=MICPC+1
    (1)  014602  062460                 <MOVE!WRMEM!BR!<INCA!SPO>>
    (1)
 1643  014604                           LDMA    IMM,REPST                       ;ADDRESS DYNAMIC REP COUNTER
    (1)                 001307          MICPC=MICPC+1
    (1)                    001          .IF IDN IMM,IMM
    (1)  014604  010003                 <MOVE!LDMAR!IMM!<REPST&377>>
    (1)                                 .IFF
    (1)                                 <MOVE!LDMAR!IMM!<REPST>>
    (1)                 000             .ENDC
    (1)
 1644  014606                           BRWRTE  MEMX,SELB                       ;COPY IT TO THE BR
    (1)                 001310          MICPC=MICPC+1
    (1)  014606  040620                 <MOVE!WRTEBR!MEMX!<SELB>>
    (1)
 1645  014610                           BSHFTB
    (1)                 001311          MICPC=MICPC+1
    (1)  014610  061620                 <MOVE!SHFTBR!SELB!BR>
    (1)
 1646  014612                           MEM     BR,SELB
    (1)                 001312          MICPC=MICPC+1
    (1)  014612  062620                 <MOVE!WRMEM!BR!<SELB>>
    (1)
 1647  014614                           BRO     RTHRES
    (1)                 001313          MICPC=MICPC+1
    (1)  014614  106372                 <JUMP!BROCON!<RTHRES-INIT&3000*4>!<RTHRES-INIT&777/2>>
    (1)
 1648                       001         .IF DF  $LOW
 1649                                   BRWRTE  IMM,201                         ;MASK FOR OK TO SEND
 1650                                   SP      BR,AORB,SP10                    ;OR IT IN
 1651                       000         .ENDC
 1652  014616                           ALWAYS  IDLE
    (1)                 001314          MICPC=MICPC+1
    (1)  014616  100451                 <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
    (1)
 1653                                   .DSABLE LSB
 1654                                   ;
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1656  014620
 (1)            001315
 (1)  014620    120620
 (1)
1657  014622
 (1)            001316
 (1)  014622    106351
 (1)
1658  014624
 (1)            001317
 (1)  014624    000402
 (1)
1659  014626
 (1)            001320
 (1)  014626    062231
 (1)
1660  014630
 (1)            001321
 (1)  014630    062230
 (1)
1661  014632
 (1)            001322
 (1)  014632    060601
 (1)
1662  014634
 (1)            001323
 (1)  014634    113762
 (1)
1663  014636
 (1)            001324
 (1)  014636    063072
 (1)
1664  014640
 (1)            001325
 (1)               001
 (1)
 (1)
 (1)  014640    070216
 (1)               000
 (1)
1665  014642
 (1)            001326
 (1)  014642    040620
 (1)
1666  014644
 (1)            001327
 (1)  014644    112340
 (1)
1667  014646
 (1)            001330
 (1)  014646    000775
 (1)
1668  014650
 (1)            001331
 (1)  014650    063670
 (1)
```

```
TEOM:   BRWRTE  IBUS,UBBR
        MICPC=MICPC+1
        <MOVE!WRTEBR!IBUS!<UBBR>>

        BRO     NXMERR                          ;NON-EXISTANT MEMORY
        MICPC=MICPC+1
        <JUMP!BROCON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>

        BRWRTE  IMM,2                           ;EOM TO BR
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<2>>

        OUTPUT  BR,<SELB!OTMTCO>                ;WRITE TMTR CONTROL
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELB!OTMTCO>>

        OUTPUT  BR,<SELB!TMTDAT>                ;WRITE GARBAGE DATA
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELB!TMTDAT>>

        BRWRTE  BR,SELA!SP1                     ;CKECK FOR BOOT MODE
        MICPC=MICPC+1
        <MOVE!WRTEBR!BR!<SELA!SP1>>

        BR7     BTEOM                           ;---IF SET IS MAINT MSG
        MICPC=MICPC+1
        <JUMP!BR7CON!<BTEOM-INIT&3000*4>!<BTEOM-INIT&777/2>>

        SP      BR,INCA,SP12                    ;INCREMENT THE MESSAGE NUMBER
        MICPC=MICPC+1
        <MOVE!SPX!BR!INCA!SP12>

TEOM1:  LDMA    BR,SELA!SP16                    ;ADDRESS LAST TMT LINK
        MICPC=MICPC+1
        .IF IDN BR,IMM
        <MOVE!LDMAR!IMM!<SELA!SP15&377>>
        .IFF
        <MOVE!LDMAR!BR!<SELA!SP16>>
        .ENDC

        BRWRTE  MEMX,SELB
        MICPC=MICPC+1
        <MOVE!WRTEBR!MEMX!<SELB>>

        BRO     TEOM2
        MICPC=MICPC+1
        <JUMP!BROCON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>

TEOM3:  BRWRTE  IMM,375                         ;TURN OFF MESSAGE PENDING
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<375>>

        SPBR    BR,AANDB,SP10                   ;
        MICPC=MICPC+1
        <MOVE!SPBRX!BR!AANDB!SP10>
```

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1669  014652                        BRO     TEOM2                   ;IF UNNUMB PENDING--GO AWAY
 (1)            001332              MICPC=MICPC+1
 (1)  014652    112340              <JUMP!BRCON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
 (1)
1670                                .SBTTL  SNDACK--ROUTINE TO SEND AN ACK
1671  014654                    SNDACK: LDMA    IMM,T
 (1)            001333              MICPC=MICPC+1
 (1)               001              .IF IDN IMM,IMM
 (1)  014654    010151              <MOVE!LDMAR!IMM!<T&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<T>>
 (1)               000              .ENDC
 (1)
1672  014656                        MEMINC  IMM,1
 (1)            001334              MICPC=MICPC+1
 (1)  014656    016401              <MOVE!WRMEM!INCMAR!IMM!<1>>
 (1)
1673  014660                        BRWRTE  IMM,5
 (1)            001335              MICPC=MICPC+1
 (1)  014660    000405              <MOVE!WRTEBR!IMM!<5>>
 (1)
1674  014662                    SA2:    MEMINC  IMM,300
 (1)            001336              MICPC=MICPC+1
 (1)  014662    016700              <MOVE!WRMEM!INCMAR!IMM!<300>>
 (1)
1675  014664                    SA3:    SP      BR,AORB,SP10
 (1)            001337              MICPC=MICPC+1
 (1)  014664    063310              <MOVE!SPX!BR!AORB!SP10>
 (1)
1676                                ;
1677               001              .IF DF  $LOW
1678                            TEOM2:  STATE   TMTA
1679                                ALWAYS  XEXIT
1680               000              .ENDC
1681               001              .IF NDF $LOW
1682  014666                    TEOM2:  TSTATE  TMTA
 (1)            001340              MICPC=MICPC+1
 (1)  014666    000403              <MOVE!WRTEBR!IMM!<TMTA-INIT&777/2>>
 (1)            001341              MICPC=MICPC+1
 (1)  014670    063222              <MOVE!SPX!BR!SELB!SP2>
1683  014672                        ALWAYS  I1
 (1)            001342              MICPC=MICPC+1
 (1)  014672    100454              <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1684               000              .ENDC
1685  014674                    FUDGE:  BRWRTE  IBUS,NPR                ;READ NPR CONTROL
 (1)            001343              MICPC=MICPC+1
 (1)  014674    120600              <MOVE!WRTEBR!IBUS!<NPR>>
 (1)
1686  014676                        BRO     IDLE                    ;IF NPR GOING---LEAVE
 (1)            001344              MICPC=MICPC+1
 (1)  014676    102051              <JUMP!BRCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1687  014700                        BRWRTE  BR!LDMAR,SELA!SP4       ;LOAD THE MAR
 (1)            001345              MICPC=MICPC+1
 (1)  014700    070604              <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
```

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                (1)
1688  014702    (1)                   BR7     BS2                       ;IF SET - READ BACK ALL 200
                (1)  001346           MICPC=MICPC+1
                (1)  014702  103520   <JUMP!BR7CON!<BS2-INIT&3000*4>!<BS2-INIT&777/2>>
                (1)
1689  014704    (1)                   MEMINC  IBUS,INDAT1               ;OTHERWISE RESTORE TWO BYTES
                (1)  001347           MICPC=MICPC+1
                (1)  014704  036400   <MOVE!WRMEM!INCMAR!IBUS!<INDAT1>>
                (1)
1690  014706    (1)                   MEMINC  IBUS,INDAT2               ;..
                (1)  001350           MICPC=MICPC+1
                (1)  014706  036420   <MOVE!WRMEM!INCMAR!IBUS!<INDAT2>>
                (1)
1691  014710    (1)                   BRWRTE  IMM,2                     ;UPDATE---UNIBUS ADDRESS
                (1)  001351           MICPC=MICPC+1
                (1)  014710  000402   <MOVE!WRTEBR!IMM!<2>>
                (1)
1692  014712    (1)                   SP      BR,ADD,SP4                ;UPDATE NPR COUNTER
                (1)  001352           MICPC=MICPC+1
                (1)  014712  063004   <MOVE!SPX!BR!ADD!SP4>
                (1)
1693  014714    (1)                   SP      IBUS,IIBA1,SP0            ;UPDATE ADDRESS LOW
                (1)  001353           MICPC=MICPC+1
                (1)  014714  023100   <MOVE!SPX!IBUS!IIBA1!SP0>
                (1)
1694  014716    (1)                   OUTPUT  BR,ADD!IBA1
                (1)  001354           MICPC=MICPC+1
                (1)  014716  062004   <MOVE!WROUT!BR!<ADD!IBA1>>
                (1)
1695  014720    (1)                   SP      IBUS,IIBA2,SP0            ;READ HIGH ADDRESS
                (1)  001355           MICPC=MICPC+1
                (1)  014720  023120   <MOVE!SPX!IBUS!IIBA2!SP0>
                (1)
1696  014722    (1)                   OUTPUT  BR,AC!IBA2                ;UPDATE HIGH
                (1)  001356           MICPC=MICPC+1
                (1)  014722  062105   <MOVE!WROUT!BR!<AC!IBA2>>
                (1)
1697  014724    (1)                   SP      IBUS,NPR,SP0              ;READ NPR REGISTER
                (1)  001357           MICPC=MICPC+1
                (1)  014724  123200   <MOVE!SPX!IBUS!NPR!SP0>
                (1)
1698  014726    (1)                   C       RESEXT                    ;IF CARRY---UPDATE MXT
                (1)  001360           MICPC=MICPC+1
                (1)  014726  105363   <JUMP!CCOND!<RESEXT-INIT&3000*4>!<RESEXT-INIT&777/2>>
                (1)
1699  014730    (1)                   ALWAYS  TH3X                      ;GO DO ANOTHER NPR
                (1)  001361           MICPC=MICPC+1
                (1)  014730  110601   <JUMP!ALCOND!<TH3X-INIT&3000*4>!<TH3X-INIT&777/2>>
                (1)
1700  014732    (1)       BTEOM:      BRWRTE  IMM,374                   ;MASK FOR CLEAR MSG PENDING
                (1)  001362           MICPC=MICPC+1
                (1)  014732  000774   <MOVE!WRTEBR!IMM!<374>>
                (1)
1701  014734    (1)                   SP      BR,AANDB,SP10             ;TURN THEM OFF IN LINE STATUS WORD
                (1)  001363           MICPC=MICPC+1
                (1)  014734  063270   <MOVE!SPX!BR!AANDB!SP10>
```

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 (1)
1702  014736                    SP      BR,SELB,SP13            ;STORE UNRECOGNIZABLE VALUE INTO SP13
 (1)          001364            MICPC=MICPC+1
 (1)  014736  063233            <MOVE!SPX!BR!SELB!SP13>
 (1)
1703                                                            ;SO "RH3" WILL EXIT BACK TO IDLE LOOP
1704  014740                    LDMA    IMM,STC                 ;ADDRESS START OF TMT  CHAIN
 (1)          001365            MICPC=MICPC+1
 (1)             001            .IF IDN IMM,IMM
 (1)  014740  010067            <MOVE!LDMAR!IMM!<STC&377>>
 (1)                            .IFF
 (1)                            <MOVE!LDMAR!IMM!<STC>>
 (1)             000            .ENDC
 (1)
1705  014742                    SP      MEMX,SELB,SP0           ;COPY LINK ADDRESS
 (1)          001366            MICPC=MICPC+1
 (1)  014742  043220            <MOVE!SPX!MEMX!SELB!SP0>
 (1)
1706             001            .IF DF  $LOW
1707                            TSTATE  NUMSYN                  ;CHANGE XMIT STATE TO LINE IS IDLE
1708             000            .ENDC
1709             001            .IF NDF $LOW
1710  014744                    TSTATE  TMTA                    ;CHANGE XMIT STATE TO LINE IS IDLE
 (1)          001367            MICPC=MICPC+1
 (1)  014744  000403            <MOVE!WRTEBR!IMM!<TMTA-INIT&777/2>>
 (1)          001370            MICPC=MICPC+1
 (1)  014746  063222            <MOVE!SPX!BR!SELB!SP2>
1711             000            .ENDC
1712  014750                    ALWAYS  TDON2                   ;POST A DONE
 (1)          001371            MICPC=MICPC+1
 (1)  014750  114532            <JUMP!ALCOND!<TDON2-INIT&3000*4>!<TDON2-INIT&777/2>>
 (1)
1713  014752            RL4:    RSTATE  RCVL
 (1)          001372            MICPC=MICPC+1
 (1)  014752  000705            <MOVE!WRTEBR!IMM!<RCVL-INIT&777/2>>
 (1)          001373            MICPC=MICPC+1
 (1)  014754  063223            <MOVE!SPX!BR!SELB!SP3>
1714  014756                    SP      IBUS,NPR,SPO            ;READ NPR CONTROL REGISTER
 (1)          001374            MICPC=MICPC+1
 (1)  014756  123200            <MOVE!SPX!IBUS!NPR!SPO>
 (1)
1715  014760                    BRWRTE  IMM,221
 (1)          001375            MICPC=MICPC+1
 (1)  014760  000621            <MOVE!WRTEBR!IMM!<221>>
 (1)
1716  014762                    ALWAYS  RK7
 (1)          001376            MICPC=MICPC+1
 (1)  014762  104623            <JUMP!ALCOND!<RK7-INIT&3000*4>!<RK7-INIT&777/2>>
 (1)
1717  014764            HOINCH: SP      IBUS,IIBA2,SPO
 (1)          001377            MICPC=MICPC+1
 (1)  014764  023120            <MOVE!SPX!IBUS!IIBA2!SPO>
 (1)
1718  014766                    OUTPUT  BR,INCA!IBA2                    ;OUTPUT INCREMENTED BA
 (1)          001400            MICPC=MICPC+1
 (1)  014766  062065            <MOVE!WROUT!BR!<INCA!IBA2>>
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                (1)
1719  014770                        C       5$                              ;INCREMENT BYTEW COUNT
                (1)     OC1401      MICPC=MICPC+1
                (1)  014770  115003 <JUMP!CCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
                (1)
1720  014772                        ALWAYS  TH8
                (1)     001402      MICPC=MICPC+1
                (1)  014772  110571 <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
                (1)
1721                                ;INCREMENT MXT BITS
1722  014774                  5$:   SP      IBUS,NPR,SPO                    ;READ NPR REG IWTH CURRENT MXT BITS
                (1)     001403      MICPC=MICPC+1
                (1)  014774  123200 <MOVE!SPX!IBUS!NPR!SPO>
                (1)
1723  014776                        BRWRTE  IMM,4                           ;WRITE BIT TO ADD
                (1)     001404      MICPC=MICPC+1
                (1)  014776  000404 <MOVE!WRTEBR!IMM!<4>>
                (1)
1724  015000                        OUT     BR,<ADD!ONPR>                   ;TURN ON PROPER MXT BITS
                (1)     001405      MICPC=MICPC+1
                (1)  015000  061010 <MOVE!WROUTX!BR!<ADD!ONPR>>
                (1)
1725  015002                        ALWAYS  TH8
                (1)     001406      MICPC=MICPC+1
                (1)  015002  110571 <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
                (1)
1726                                ;
1727                001             .IF DF  LOW
1728  015004                  HEH1: STATE   TEOM
                (1)     001407      MICPC=MICPC+1
                (1)  015004  000715 <MOVE!WRTEBR!IMM!<TEOM-INIT&777/2>>
1729  015006                        ALWAYS  XEXIT
                (1)     001410      MICPC=MICPC+1
                (1)  015006  110563 <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
                (1)
1730                000             .ENDC
1731                                ;
1732                001             .IF NDF LOW
1733                            HEH1: TSTATE  TEOM
1734                                ALWAYS  I1
1735                000             .ENDC
```

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1737
1738  015010                                REP:    LDMA    IMM,REPCR               ;LOAD MAR ADDRESS WITH POINTER TO REPS RECC
 (1)            001411                             MICPC=MICPC+1
 (1)               001                             .IF IDN IMM,IMM
 (1)  015010  010016                               <MOVE!LDMAR!IMM!<REPCR&377>>
 (1)                                               .IFF
 (1)                                               <MOVE!LDMAR!IMM!<REPCR>>
 (1)               000                             .ENDC
 (1)
1739  015012                                      SP      MEMX,SELB,SPO           ;READ NUMBER OF REPS RECD
 (1)            001412                             MICPC=MICPC+1
 (1)  015012  043220                               <MOVE!SPX!MEMX!SELB!SPO>
 (1)
1740  015014                                      MEM     DP,<INCA!SPO>           ;INCREMNT REPS RECD
 (1)            001413                             MICPC=MICPC+1
 (1)  015014  062460                               <MOVE!WRMEM!DP!<INCA!SPO>>
 (1)
1741  015016                                      LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
 (1)            001414                             MICPC=MICPC+1
 (1)               001                             .IF IDN IMM,IMM
 (1)  015016  010151                               <MOVE!LDMAR!IMM!<T&377>>
 (1)                                               .IFF
 (1)                                               <MOVE!LDMAR!IMM!<T>>
 (1)               000                             .ENDC
 (1)
1742  015020                                      MEMINC  IMM,2                   ; LOAD NAK TYPE
 (1)            001415                             MICPC=MICPC+1
 (1)  015020  016402                               <MOVE!WRMEM!INCMAR!IMM!<2>>
 (1)
1743  015022                                      MEMINC  IMM,303                 ;LOAD REP RESPONSE SUB-TYPE
 (1)            001416                             MICPC=MICPC+1
 (1)  015022  016703                               <MOVE!WRMEM!INCMAR!IMM!<303>>
 (1)
1744  015024                                      ALWAYS  SNAK                    ;SEND AN UNNUMB MSG
 (1)            001417                             MICPC=MICPC+1
 (1)  015024  114704                               <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
 (1)
1745                                              ;
1746                                              .SBTTL  START HANDLER
1747  015026                                START:  BRWRTE  DP,<SELA!SP10>          ;READ LINE STATUS WORD
 (1)            001420                             MICPC=MICPC+1
 (1)  015026  060610                               <MOVE!WRTEBR!DP!<SELA!SP10>>
 (1)
1748  015030                                      BRSHFT                          ;GET START MODE BIT IN TESTABLE POSITION
 (1)            001421                             MICPC=MICPC+1
 (1)  015030  001620                               <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1749  015032                                      BR4     10$                     ;IF IN START MODE SET STACK
 (1)            001422                             MICPC=MICPC+1
 (1)  015032  117026                               <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1750                                                                            ;ELSE SET UP START ERROR
1751  015034                                      LDMA    IMM,<<RTHRS+3>>
 (1)            001423                             MICPC=MICPC+1
 (1)               001                             .IF IDN IMM,IMM
 (1)  015034  010177                               <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
```

```
 (1)                                                .IFF
 (1)                                                <MOVE!LDMAR!IMM!<<RTHRS+3>>>
 (1)              000                               .ENDC
 (1)
1752  015036                                        BRWRTE  IMM,200
 (1)              001424                           MICPC=MICPC+1
 (1)  015036      000600                           <MOVE!WRTEBR!IMM!<200>>
 (1)
1753  015040                                        ALWAYS  RCEXY
 (1)              001425                           MICPC=MICPC+1
 (1)  015040      114522                           <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
 (1)
1754  015042                                  10$:  LDMA    IMM,T                     ;SET UP ADDRESS OF TYPE FIELD
 (1)              001426                           MICPC=MICPC+1
 (1)                 001                           .IF IDN IMM,IMM
 (1)  015042      010151                           <MOVE!LDMAR!IMM!<T&377>>
 (1)                                               .IFF
 (1)                                               <MOVE!LDMAR!IMM!<T>>
 (1)              000                              .ENDC
 (1)
1755  015044                                        MEMINC  IMM,7                     ;WRITE STACK TYPE
 (1)              001427                           MICPC=MICPC+1
 (1)  015044      016407                           <MOVE!WRMEM!INCMAR!IMM!<7>>
 (1)
1756  015046                                        BRWRTE  IMM,11                    ;SET START RECD AND UNNUMB PENDING
 (1)              001430                           MICPC=MICPC+1
 (1)  015046      000411                           <MOVE!WRTEBR!IMM!<11>>
 (1)
1757  015050                                        ALWAYS  SA2                       ;SEND THE UNNUMBERED MESSAGE
 (1)              001431                           MICPC=MICPC+1
 (1)  015050      110736                           <JUMP!ALCOND!<SA2-INIT&3000*4>!<SA2-INIT&777/2>>
 (1)
1758                                               ;
1759                                               .SBTTL  STACK HANDLER
1760  015052                                  STACK:  BRWRTE  IMM,327                   ;MASK TO CLEAR START MODE
 (1)              001432                           MICPC=MICPC+1
 (1)  015052      000727                           <MOVE!WRTEBR!IMM!<327>>
 (1)
1761  015054                                        SP      BR,AANDB,SP10             ;CLEAR START MODE
 (1)              001433                           MICPC=MICPC+1
 (1)  015054      063270                           <MOVE!SPX!BR!AANDB!SP10>
 (1)
1762  015056                                        ALWAYS  TIME1                     ;RESET TIMER AND IDLE
 (1)              001434                           MICPC=MICPC+1
 (1)  015056      110670                           <JUMP!ALCOND!<TIME1-INIT&3000*4>!<TIME1-INIT&777/2>>
 (1)
```

```
1764  015060
 (1)          001435
 (1)  015060  023160
 (1)
1765  015062
 (1)          001436
 (1)  015062  062067
 (1)
1766  015064
 (1)          001437
 (1)  015064  115041
 (1)
1767  015066
 (1)          001440
 (1)  015066  104641
 (1)
1768
1769  015070
 (1)          001441
 (1)  015070  123220
 (1)
1770  015072
 (1)          001442
 (1)  015072  000404
 (1)
1771  015074
 (1)          001443
 (1)  015074  061011
 (1)
1772  015076
 (1)          001444
 (1)  015076  104641
 (1)
1773               001
1774
1775
1776               000
1777  015100
 (1)          001445
 (1)             001
 (1)  015100  010011
 (1)
 (1)
 (1)               000
 (1)
1778  015102
 (1)          001446
 (1)  015102  043220
 (1)
1779  015104
 (1)          001447
 (1)  015104  042460
 (1)
1780  015106
 (1)          001450
 (1)             001
```

```
ICBA22: SP      IBUS,IOBA2,SPO                  ;READTHEHIGH ORDERBITS OF BA TO SPO
        MICPC=MICPC+1
        <MOVE!SPX!IBUS!IOBA2!SPO>

        OUTPUT  DP,<INCA!OBA2>                  ;OUTPUT THE INCREMENTED COUNT
        MICPC=MICPC+1
        <MOVE!WROUT!DP!<INCA!OBA2>>

        C       5$                              ;IF CARRY SET INCREMENT THE MXTBITS
        MICPC=MICPC+1
        <JUMP!CCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>

        ALWAYS  RK3
        MICPC=MICPC+1
        <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>

        .
5$:     SP      IBUS,UBBR,SPO
        MICPC=MICPC+1
        <MOVE!SPX!IBUS!UBBR!SPO>

        BRWRTE  IMM,4
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<4>>

        OUT     BR,<ADD!OBR>
        MICPC=MICPC+1
        <MOVE!WROUTX!BR!<ADD!OBR>>

        ALWAYS  RK3
        MICPC=MICPC+1
        <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>

        .IF DF  $LOW
FLUSH1: OUTPUT  IMM,<200!ORCVCO>                ;FLUSH THE RECVR
        ALWAYS  CG1
        .ENDC
NAK:    LDMA    IMM,NDATR                       ;CUMMULATIVE NAK COUNTER
        MICPC=MICPC+1
        .IF IDN IMM,IMM
        <MOVE!LDMAR!IMM!<NDATR&377>>
        .IFF
        <MOVE!LDMAR!IMM!<NDATR>>
        .ENDC

        SP      MEMX,SELB,SPO                   ;READ IT
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!SELB!SPO>

        MEM     MEMX,INCA!SPO                   ;INCREMENT THE COUNTER
        MICPC=MICPC+1
        <MOVE!WRMEM!MEMX!<INCA!SPO>>

        LDMA    IMM,STC                         ;ADDRESS START OF TMT CHAIN
        MICPC=MICPC+1
        .IF IDN IMM,IMM
```

```
  (1)  015106  010067                  <MOVE!LDMAR!IMM!<STC&377>>
  (1)                                  .IFF
  (1)                                  <MOVE!LDMAR!IMM!<STC>>
  (1)                                  .ENDC
  (1)               000
  (1)
1781  015110                          SP      MEMX,SELB,SP16          ;COPY START OF CHAIN TO LAST XMIT POINTER
  (1)               001451           MICPC=MICPC+1
  (1)  015110  043236                <MOVE!SPX!MEMX!SELB!SP16>
  (1)
1782  015112                          BRWRTE  BR,INCA!SP17                    ;GETLASTMESSAGE ACKED
  (1)               001452           MICPC=MICPC+1
  (1)  015112  060477                <MOVE!WRTEBR!BR!<INCA!SP17>>
  (1)
1783  015114                          SP      BR,SELB,SP12                    ;COPY TO CURRENT NUMBER
  (1)               001453           MICPC=MICPC+1
  (1)  015114  063232                <MOVE!SPX!BR!SELB!SP12>
  (1)
1784  015116                          BRWRTE  IMM,6                   ;WRITE NUMBERED MSG PENDING
  (1)               001454           MICPC=MICPC+1
  (1)  015116  000406                <MOVE!WRTEBR!IMM!<6>>
  (1)
1785                                                                  ; AND LINE HAS GONE IDLE
1786  015120                          SP      BR,AORB,SP10            ;SET IT IN LINE STATUS WORD
  (1)               001455           MICPC=MICPC+1
  (1)  015120  063310                <MOVE!SPX!BR!AORB!SP10>
  (1)
1787  015122                          SP      BR,SELB,SP15            ;RESET TIMER COUNT
  (1)               001456           MICPC=MICPC+1
  (1)  015122  063235                <MOVE!SPX!BR!SELB!SP15>
  (1)
1788  015124                          ALWAYS  TEOM1
  (1)               001457           MICPC=MICPC+1
  (1)  015124  110725                <JUMP!ALCOND!<TEOM1-INIT$3000*4>!<TEOM1-INIT$777/2>>
  (1)
1789  015126                    ININT:BRWRTE  IMM,15                   ;MASK FOR TURN OFF ALL BUT EXT MEM BITS + NXM
  (1)               001460           MICPC=MICPC+1
  (1)  015126  000415                <MOVE!WRTEBR!IMM!<15>>
  (1)
1790  015130                          SP      IBUS,UBBR,SP0           ;READ BR  CONTROL REGISTER
  (1)               001461           MICPC=MICPC+1
  (1)  015130  123220                <MOVE!SPX!IBUS!UBBR!SP0>
  (1)
1791  015132                          SP      BR,AANDB,SP0            ;MASK OFF VECTOR TO X04
  (1)               001462           MICPC=MICPC+1
  (1)  015132  063260                <MOVE!SPX!BR!AANDB!SP0>
  (1)
1792  015134                          BRWRTE  IMM,200                 ;MASK FOR INTERRUPT
  (1)               001463           MICPC=MICPC+1
  (1)  015134  000600                <MOVE!WRTEBR!IMM!<200>>
  (1)
1793  015136                          OUT     BR,AORB!OBR             ;INTERRUPT
  (1)               001464           MICPC=MICPC+1
  (1)  015136  061311                <MOVE!WROUTX!BR!<AORB!OBR>>
  (1)
1794  015140                          SP      IBUS,INCON,SP0          ;RESTORE INPUT CONTROL CSR
  (1)               001465           MICPC=MICPC+1
```

```
   (1)  015140  123000                    <MOVE!SPX!IBUS!INCON!SPO>
   (1)
 1795   015142                           ALWAYS  NIDLE4
   (1)          001466                  MICPC=MICPC+1
   (1)  015142  100554                  <JUMP!ALCOND!<NIDLE4-INIT&3000*4>!<NIDLE4-INIT&777/2>>
   (1)
 1796                                   ;
```

```
1798                    001
1799
1800
1801
1802
1803
1804
1805
1806                    000
1807
1808  015144                        .IF DF  $LOW
                                    .SBTTL NXMERR ---NON EXISTANT MEMORY HANDLER
                      NXMERR: LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
                              MEMINC  IMM,1
                              MEM     IMM,0                   ;NXM ERROR BIT
                              SP      MEMX,SELB,SP10          ;CLEAR STATUS
                              ALWAYS  RCEXX
                              .PAGE
                              .ENDC
                              ;FUGITIVE RECEIVE ROUTINES---DON'T FIT IN PAGE
                      RH1:    BRWRTE  IMM,77
  (1)                         MICPC=MICPC+1
  (1)   015144  000477        <MOVE!WRTEBR!IMM!<77>>
  (1)
1809  015146                    SP      BR,AANDB,SP5
  (1)                         MICPC=MICPC+1
  (1)   015146  063265        <MOVE!SPX!BR!AANDB!SP5>
  (1)
1810  015150                    LDMA    BR,<INCA!SP14>          ;LOAD ADDRESS OF CURRENT COUNT
  (1)                         MICPC=MICPC+1
  (1)                         .IF IDN BR,IMM
  (1)                         <MOVE!LDMAR!IMM!<INCA!SP14&377>>
  (1)                         .IFF
  (1)   015150  070074        <MOVE!LDMAR!BR!<INCA!SP14>>
  (1)                         .ENDC
  (1)
1811  015152                    SP      BR!INCMAR,SELB,SP0      ;SAVE MASK
  (1)                         MICPC=MICPC+1
  (1)   015152  077220        <MOVE!SPX!BR!INCMAR!SELB!SP0>
  (1)
1812  015154                    BRWRTE  BR!INCMAR,SELA!SP1      ;READ STATUS BYTE
  (1)                         MICPC=MICPC+1
  (1)   015154  074601        <MOVE!WRTEBR!BR!INCMAR!<SELA!SP1>>
  (1)
1813  015156                    BRSHFT                          ;SHIFT IT RIGHT
  (1)                         MICPC=MICPC+1
  (1)   015156  001620        <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
1814  015160                    BR1     RH2                     ;NO BUFFER ASSIGNED IN MAINT MODE
  (1)                         MICPC=MICPC+1
  (1)   015160  116502        <JUMP!BR1CON!<RH2-INIT&3000*4>!<RH2-INIT&777/2>>
  (1)
1815  015162                    BRWRTE  MEMX!INCMAR,AANDB!SP0   ;GET HIGH BYTE COUNT BITS
  (1)                         MICPC=MICPC+1
  (1)   015162  054660        <MOVE!WRTEBR!MEMX!INCMAR!<AANDB!SP0>>
  (1)
1816  015164                    CMP     BR,SP5          ;COMPARE HIGH ORDER BITS OF COUNT
  (1)                         MICPC=MICPC+1
  (1)   015164  060365        <SUBTC!BR!SP5>
  (1)
1817  015166                    C       RCFATL                  ;IF CARRY--TOO BIG ERROR
  (1)                         MICPC=MICPC+1
  (1)   015166  115113        <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
  (1)
1818  015170                    Z       RCLOW                   ;IF EQUAL COMPARE LOW ORDER BITS OF COUNT
  (1)                         MICPC=MICPC+1
```

```
                                        <JUMP!ZCOND!<RCLOW-INIT&3000*4>!<RCLOW-INIT&777/2>>

1819  015172                    RH2:    BRWRTE  IBUS,IOBA1                     ;READ LOW BYTE OF IN BA
  (1)         001502                    MICPC=MICPC+1
  (1)  015172 020540                    <MOVE!WRTEBR!IBUS!<IOBA1>>
  (1)
1820  015174                            BRO     RCVODD                          ;IF SET IS ODD TRANSFER
  (1)         001503                    MICPC=MICPC+1
  (1)  015174 116106                    <JUMP!BROCON!<RCVODD-INIT&3000*4>!<RCVODD-INIT&777/2>>
  (1)
1821              001                   .IF NDF LOW
1822                                    BRWRTE  IBUS,RCVCON                     ;IS THE RECEIVER READY?
1823                                    BR4     RCVKE0                          ;YES--GO PROCESS
1824              000                   .ENDC
1825  015176                            STATE   RCVKE0
  (1)         001504                    MICPC=MICPC+1
  (1)  015176 000660                    <MOVE!WRTEBR!IMM!<RCVKE0-INIT&777/2>>
1826  015200                            ALWAYS  REXIT
  (1)         001505                    MICPC=MICPC+1
  (1)  015200 100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1827
1828  015202                    RCVODD: STATE   RCVKO1
  (1)         001506                    MICPC=MICPC+1
  (1)  015202 000607                    <MOVE!WRTEBR!IMM!<RCVKO1-INIT&777/2>>
1829  015204                            ALWAYS  REXIT
  (1)         001507                    MICPC=MICPC+1
  (1)  015204 100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1830
1831  015206                    RCLOW:  CMP     MEMX,SP4                        ;COMPARE LOW ORDER BITS OF COUNT
  (1)         001510                    MICPC=MICPC+1
  (1)  015206 040364                    <SUBTC!MEMX!SP4>
  (1)
1832  015210                            C       RCFATL                          ;CARRY--TOO BIG
  (1)         001511                    MICPC=MICPC+1
  (1)  015210 115113                    <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
  (1)
1833  015212                            ALWAYS  RH2                     ;ELSE CONTINUE
  (1)         001512                    MICPC=MICPC+1
  (1)  015212 114502                    <JUMP!ALCOND!<RH2-INIT&3000*4>!<RH2-INIT&777/2>>
  (1)
1834  015214                    RCFATL: LDMA    IMM,T
  (1)         001513                    MICPC=MICPC+1
  (1)            001                    .IF IDN IMM,IMM
  (1)  015214 010151                    <MOVE!LDMAR!IMM!<T&377>>
  (1)                                   .IFF
  (1)                                   <MOVE!LDMAR!IMM!<T>>
  (1)              000                  .ENDC
  (1)
1835  015216                            MEMINC  IMM,2
  (1)         001514                    MICPC=MICPC+1
  (1)  015216 016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
  (1)
1836  015220                            MEM     IMM,311
  (1)         001515                    MICPC=MICPC+1
```

```
                (1)  015220  002711                    <MOVE!WRMEM!IMM!<311>>
                (1)
             1837  015222                              LDMA    IMM,<<RTHRS+1>>          ;ADDRESS ERROR LINK
                (1)          001516                    MICPC=MICPC+1
                (1)             001                    .IF IDN IMM,IMM
                (1)  015222  010175                    <MOVE!LDMAR!IMM!<<RTHRS+1>&377>>
                (1)                                    .IFF
                (1)                                    <MOVE!LDMAR!IMM!<<RTHRS+1>>>
                (1)             000                    .ENDC
                (1)
             1838  015224                              MEMINC  IBUS,IOBA1
                (1)          001517                    MICPC=MICPC+1
                (1)  015224  036540                    <MOVE!WRMEM!INCMAR!IBUS!<IOBA1>>
                (1)
             1839  015226                              MEMINC  IBUS,IOBA2
                (1)          001520                    MICPC=MICPC+1
                (1)  015226  036560                    <MOVE!WRMEM!INCMAR!IBUS!<IOBA2>>
                (1)
             1840  015230                              BRWRTE  IMM,20
                (1)          001521                    MICPC=MICPC+1
                (1)  015230  000420                    <MOVE!WRTEBR!IMM!<20>>
                (1)
             1841  015232                    RCEXY:    MEMINC  IMM,0
                (1)          001522                    MICPC=MICPC+1
                (1)  015232  016400                    <MOVE!WRMEM!INCMAR!IMM!<0>>
                (1)
             1842  015234                              MEM     BR,SELB
                (1)          001523                    MICPC=MICPC+1
                (1)  015234  062620                    <MOVE!WRMEM!BR!<SELB>>
                (1)
             1843  015236                    RCEXX:    OUTPUT  IMM,<200!ORCVCO>         ;FLUSH INPUT SILO
                (1)          001524                    MICPC=MICPC+1
                (1)  015236  002212                    <MOVE!WROUT!IMM!<200!ORCVCO>>
                (1)
             1844  015240                              SP      IMM,SP2,2                ;INHIBIT FURTHER TRANSMISSIONS
                (1)          001525                    MICPC=MICPC+1
                (1)  015240  003002                    <MOVE!SPX!IMM!SP2!2>
                (1)
             1845  015242                              SP      IMM,1,SP1        ;SET INIT MODE IN PORT STATUS WORD
                (1)          001526                    MICPC=MICPC+1
                (1)  015242  003001                    <MOVE!SPX!IMM!1!SP1>
                (1)
             1846  015244                              ALWAYS  NTRS1
                (1)          001527                    MICPC=MICPC+1
                (1)  015244  114666                    <JUMP!ALCOND!<NTRS1-INIT&3000*4>!<NTRS1-INIT&777/2>>
                (1)
             1847  015246                    TDON3:    BRWRTE  MEMX,SUB!SP17                    ;COMPARE RESPONSE TO MSG NO
                (1)          001530                    MICPC=MICPC+1
                (1)  015246  040757                    <MOVE!WRTEBR!MEMX!<SUB!SP17>>
                (1)
             1848  015250                              BR7     RH3                              ;IF NEGATIVE EXIT
                (1)          001531                    MICPC=MICPC+1
                (1)  015250  107562                    <JUMP!BR7CON!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
                (1)
             1849  015252                    TDON2:    LDMA    BR,SELA!SP0                      ;ADDRESS THE TRANSMITLINK
                (1)          001532                    MICPC=MICPC+1
```

```
                        001                     .IF IDN BR,IMM
                                                <MOVE!LDMAR!IMM!<SELA!SPO&377>>
                                                .IFF
 015252  070200                                 <MOVE!LDMAR!BR!<SELA!SPO>>
                        000                     .ENDC

1850  015254                                    MEM     IMM,0                   ;TURN OF ASSIGNEDAND TMTED BITS IN FLAG
                001533                          MICPC=MICPC+1
 015254  002400                                 <MOVE!WRMEM!IMM!<0>>

1851  015256                                    LDMA    IMM,STC
                001534                          MICPC=MICPC+1
                   001                          .IF IDN IMM,IMM
 015256  010067                                 <MOVE!LDMAR!IMM!<STC&377>>
                                                .IFF
                                                <MOVE!LDMAR!IMM!<STC>>
                   000                          .ENDC

1852  015260                                    MEM     IMM,TML1                ;ASSUME WRAPAROUND
                001535                          MICPC=MICPC+1
 015260  002471                                 <MOVE!WRMEM!IMM!<TML1>>

1853  015262                                    BRWRTE  IMM,TML8                ;WRAPAROUND?
                001536                          MICPC=MICPC+1
 015262  000543                                 <MOVE!WRTEBR!IMM!<TML8>>

1854  015264                                    CMP     BR,SPO
                001537                          MICPC=MICPC+1
 015264  060360                                 <SUBTC!BR!SPO>

1855  015266                                    Z       TDON4                   ;YES
                001540                          MICPC=MICPC+1
 015266  115543                                 <JUMP!ZCOND!<TDON4-INIT&3000*4>!<TDON4-INIT&777/2>>

1856  015270                                    BRWRTE  IMM,6                   ;OFFSET FOR NEXT TMT LINK
                001541                          MICPC=MICPC+1
 015270  000406                                 <MOVE!WRTEBR!IMM!<6>>

1857  015272                                    MEM     BR,ADD!SPO              ;UPDATE THE POINTER
                001542                          MICPC=MICPC+1
 015272  062400                                 <MOVE!WRMEM!BR!<ADD!SPO>>

1858  015274                            TDON4:  LDMA    IMM,NXTSP               ;ADDRESS DONE LINK
                001543                          MICPC=MICPC+1
                   001                          .IF IDN IMM,IMM
 015274  010241                                 <MOVE!LDMAR!IMM!<NXTSP&377>>
                                                .IFF
                                                <MOVE!LDMAR!IMM!<NXTSP>>
                   000                          .ENDC

1859  015276                                    LDMA    MEMX,SELB!SPX!SP3       ;ADDRESS THE LINK,COPYING
                001544                          MICPC=MICPC+1
                   001                          .IF IDN MEMX,IMM
                                                <MOVE!LDMAR!IMM!<SELB!SPX!SP3&377>>
                                                .IFF
 015276  053223                                 <MOVE!LDMAR!MEMX!<SELB!SPX!SP3>>
```

```
(1)                 000                     .ENDC
(1)
1860
1861  015300                                MEMINC  IMM,200                 ;ITS ADDRESS TO SPO
(1)             001545                      MICPC=MICPC+1                   ;WRITE THE INTERRUPT TYPE
(1)   015300  016600                        <MOVE!WRMEM!INCMAR!IMM!<200>>
(1)
1862  015302                                MEM     BR,INCA!SPO             ;COPY ACTUAL LINK ADDRESS
(1)             001546                      MICPC=MICPC+1
(1)   015302  062460                        <MOVE!WRMEM!BR!<INCA!SPO>>
(1)
1863  015304                                LDMA    IMM,NXTSP               ;ADDRESS PTR INT STACK
(1)             001547                      MICPC=MICPC+1
(1)                 001                     .IF IDN IMM,IMM
(1)   015304  010241                        <MOVE!LDMAR!IMM!<NXTSP&377>>
(1)                                         .IFF
(1)                                         <MOVE!LDMAR!IMM!<NXTSP>>
(1)                 000                     .ENDC
(1)
1864  015306                                MEM     IMM,INTSTK              ;ASSUME WRAP AROUND
(1)             001550                      MICPC=MICPC+1
(1)   015306  002642                        <MOVE!WRMEM!IMM!<INTSTK>>
(1)
1865  015310                                BRWRTE  IMM,<<MMEND-2>>         ;ADDRESS ENDOFINT STACK
(1)             001551                      MICPC=MICPC+1
(1)   015310  000776                        <MOVE!WRTEBR!IMM!<<MMEND-2>>>
(1)
1866  015312                                CMP     BR,SP3                  ;WRAPAROUND?
(1)             001552                      MICPC=MICPC+1
(1)   015312  060363                        <SUBTC!BR!SP3>
(1)
1867  015314                                Z       TDON40                  ;YES---BRANCH
(1)             001553                      MICPC=MICPC+1
(1)   015314  115556                        <JUMP!ZCOND!<TDON40-INIT&3000*4>!<TDON40-INIT&777/2>>
(1)
1868  015316                                BRWRTE  IMM,2                   ;OFFSET TO NEXT PAIR
(1)             001554                      MICPC=MICPC+1
(1)   015316  000402                        <MOVE!WRTEBR!IMM!<2>>
(1)
1869  015320                                MEM     BR,ADD!SP3              ;UPDATE POINTER
(1)             001555                      MICPC=MICPC+1
(1)   015320  062403                        <MOVE!WRMEM!BR!<ADD!SP3>>
(1)
1870  015322                          TDON40: BRWRTE  IMM,20                  ;WRITE INTERUPT PENDING
(1)             001556                      MICPC=MICPC+1
(1)   015322  000420                        <MOVE!WRTEBR!IMM!<20>>
(1)
1871  015324                                SP      BR,AORB,SP1             ;IN PORT STATUS WORD
(1)             001557                      MICPC=MICPC+1
(1)   015324  063301                        <MOVE!SPX!BR!AORB!SP1>
(1)
1872  015326                                LDMA    IMM,ETC                 ;ADDRESS NEXT EMPTY PTR
(1)             001560                      MICPC=MICPC+1
(1)                 001                     .IF IDN IMM,IMM
(1)   015326  010070                        <MOVE!LDMAR!IMM!<ETC&377>>
(1)                                         .IFF
```

```
 (1)                                    <MOVE!LDMAR!IMM!<ETC>>
 (1)            000                     .ENDC
 (1)
1873  015330                           SP      MEMX,SELB,SPO                   ;COPY IT TO SPO
 (1)            001561                 MICPC=MICPC+1
 (1)  015330    043220                 <MOVE!SPX!MEMX!SELB!SPO>
 (1)
1874  015332                           LDMA    IMM,STC                         ;GET NEXT DONE PTR
 (1)            001562                 MICPC=MICPC+1
 (1)               001                 .IF IDN IMM,IMM
 (1)  015332    010067                 <MOVE!LDMAR!IMM!<STC&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<STC>>
 (1)            000                     .ENDC
 (1)
1875  015334                           CMP     MEMX,SPO                        ;IDENTICAL?
 (1)            001563                 MICPC=MICPC+1
 (1)  015334    040360                 <SUBTC!MEMX!SPO>
 (1)
1876  015336                           Z       RH3                             ;FINISH PROCESSING HEADER
 (1)            001564                 MICPC=MICPC+1
 (1)  015336    105562                 <JUMP!ZCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
 (1)
1877
1878  015340                     TDON1:LDMA    IMM,ISP17                       ;GET LAST ACKED
 (1)            001565                 MICPC=MICPC+1
 (1)               001                 .IF IDN IMM,IMM
 (1)  015340    010153                 <MOVE!LDMAR!IMM!<ISP17&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<ISP17>>
 (1)            000                     .ENDC
 (1)
1879  015342                           SP      MEMX,SELB,SP17                  ;STORE IT IN SP17
 (1)            001566                 MICPC=MICPC+1
 (1)  015342    043237                 <MOVE!SPX!MEMX!SELB!SP17>
 (1)
1880  015344                           LDMA    IMM,STC                         ;GET START OF TMT CHAIN
 (1)            001567                 MICPC=MICPC+1
 (1)               001                 .IF IDN IMM,IMM
 (1)  015344    010067                 <MOVE!LDMAR!IMM!<STC&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<STC>>
 (1)            000                     .ENDC
 (1)
1881  015346                           LDMA    MEMX,SELB!SPBRX!SPO             ;ADDRESS THE LINK
 (1)            001570                 MICPC=MICPC+1
 (1)               001                 .IF IDN MEMX,IMM
 (1)                                    <MOVE!LDMAR!IMM!<SELB!SPBRX!SPO&377>>
 (1)                                    .IFF
 (1)  015346    053620                 <MOVE!LDMAR!MEMX!<SELB!SPBRX!SPO>>
 (1)            000                     .ENDC
 (1)
1882  015350                           BRWRTE  MEMX!INCMAR,SELB                ;GET THE FLAGS
 (1)            001571                 MICPC=MICPC+1
 (1)  015350    054620                 <MOVE!WRTEBR!MEMX!INCMAR!<SELB>>
 (1)
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1883  015352
 (1)            001572
 (1)  015352    116530
 (1)
1884  015354
 (1)            001573
 (1)  015354    104562
 (1)
1885
1886  015356
 (1)            001574
 (1)  015356    000404
 (1)
1887  015360
 (1)            001575
 (1)  015360    114663
 (1)
1888
1889                                    ; INPUTS:
1890                                    ;       SPO = RECEIVE CHARACTER
1891
1892  015362                            PASWRD: SP      IBUS,LNOSW,SP13         ;READ PASSWD SWITCH
 (1)            001576                          MICPC=MICPC+1
 (1)  015362    023333                          <MOVE!SPX!IBUS!LNOSW!SP13>
 (1)
1893  015364                                    Z       10$                     ;IF ALL ONES NO RLD ENABLED
 (1)            001577                          MICPC=MICPC+1
 (1)  015364    115603                          <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1894  015366                                    BRWRTE  IMM,6                   ;CHECK FOR ENTER MOP MODE
 (1)            001600                          MICPC=MICPC+1
 (1)  015366    000406                          <MOVE!WRTEBR!IMM!<6>>
 (1)
1895  015370                                    CMP     BR,SPO
 (1)            001601                          MICPC=MICPC+1
 (1)  015370    060360                          <SUBTC!BR!SPO>
 (1)
1896  015372                                    Z       20$                     ;IF EQUAL   ENTER MOP
 (1)            001602                          MICPC=MICPC+1
 (1)  015372    115611                          <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
 (1)
1897  015374                            10$:    BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
 (1)            001603                          MICPC=MICPC+1
 (1)  015374    060601                          <MOVE!WRTEBR!BR!<SELA!SP1>>
 (1)
1898  015376                                    BRSHFT                          ;SHIFT IT RIGHT
 (1)            001604                          MICPC=MICPC+1
 (1)  015376    001620                          <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1899  015400                                    BR1     RHX                     ;MESSAGE WITH NO BUFFER ASSIGNED
 (1)            001605                          MICPC=MICPC+1
 (1)  015400    106740                          <JUMP!BR1CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
 (1)
1900  015402                                    BRSHFT                          ;SHIFT RIGHT AGAIN
 (1)            001606                          MICPC=MICPC+1
 (1)  015402    001620                          <MOVE!SHFTBR!WRTEBR!SELB>
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                                        BR1     TDON3                           ;IF BUFFER ASSIGNED PROCEED
                                        MICPC=MICPC+1
                                        <JUMP!BR1CON!<TDON3-INIT&3000*4>!<TDON3-INIT&777/2>>

                                        ALWAYS  RH3                             ;ELSE---EXIT
                                        MICPC=MICPC+1
                                        <JUMP!ALCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>


                                OVRRUN: BRWRTE  IMM,4
                                        MICPC=MICPC+1
                                        <MOVE!WRTEBR!IMM!<4>>

                                        ALWAYS  NTRSO
                                        MICPC=MICPC+1
                                        <JUMP!ALCOND!<NTRSO-INIT&3000*4>!<NTRSO-INIT&777/2>>
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  (1)
1901  015404                        BR1     RCVM0                   ;DLE RECEIVED IN NORMAL MODE
  (1)           001607              MICPC=MICPC+1
  (1)  015404   106732              <JUMP!BR1CON!<RCVM0-INIT&3000*4>!<RCVM0-INIT&777/2>>
  (1)
1902  015406                        ALWAYS  RK3                     ;HANDLE MAINT MODE MESSAGE
  (1)           001610              MICPC=MICPC+1
  (1)  015406   104641              <JUMP!ALCOND:<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
  (1)
1903  015410                  20$:  SP      BR,DECA,SP4               ;COUNT FOR NUMB OF COMPARES
  (1)           001611              MICPC=MICPC+1
  (1)  015410   063164              <MOVE!SPX!BR!DECA!SP4>
  (1)
1904  015412                        STATE   EM2
  (1)           001612              MICPC=MICPC+1
  (1)  015412   000735              <MOVE!WRTEBR!IMM!<EM2-INIT&777/2>>
1905  015414                        ALWAYS  REXIT
  (1)           001613              MICPC=MICPC+1
  (1)  015414   100450              <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1906                            ;
1907                                .ENABL  LSB
1908                            ;
1909  015416                  RCVM1:LDMA    IMM,NAKST                 ;RESET NAKS SENT
  (1)           001614              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015416   010001              <MOVE!LDMAR!IMM!<NAKST&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<NAKST>>
  (1)                  000          .ENDC
  (1)
1910  015420                        MEM     IMM,1                   ;..
  (1)           001615              MICPC=MICPC+1
  (1)  015420   002401              <MOVE!WRMEM!IMM!<1>>
  (1)
1911  015422                        LDMA    IMM,BC                  ;ADDRESS ORIGINAL RECV BYTE COUNT
  (1)           001616              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015422   010167              <MOVE!LDMAR!IMM!<BC&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<BC>>
  (1)                  000          .ENDC
  (1)
1912  015424                        SP      MEMX!INCMAR,SELB,SP4    ;MOVE BYTE COUNT TO SP4
  (1)           001617              MICPC=MICPC+1
  (1)  015424   057224              <MOVE!SPX!MEMX!INCMAR!SELB!SP4>
  (1)
1913  015426                        SP      MEMX!INCMAR,SELB,SP5    ;AND SP5
  (1)           001620              MICPC=MICPC+1
  (1)  015426   057225              <MOVE!SPX!MEMX!INCMAR!SELB!SP5>
  (1)
1914  015430                        MEM     BR,DECA!SP11                    ;COPY SP11 FROM MEMORY
  (1)           001621              MICPC=MICPC+1
  (1)  015430   062571              <MOVE!WRMEM!BR!<DECA!SP11>>
  (1)
1915  015432                        LDMA    IMM,NXTSP
```

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                (1)             001622          MICPC=MICPC+1
                (1)                 001         .IF IDN IMM,IMM
                (1)     015432  010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
                (1)                             .IFF
                (1)                             <MOVE!LDMAR!IMM!<NXTSP>>
                (1)                 000         .ENDC
                (1)
             1916       015434                  SP      MEMX!LDMAR,SELB,SP3                     ;COPY TO SP3
                (1)             001623          MICPC=MICPC+1
                (1)     015434  053223          <MOVE!SPX!MEMX!LDMAR!SELB!SP3>
                (1)
             1917       015436                  MEMINC  IMM,204                         ;RECEIVE DONE IMAGE
                (1)             001624          MICPC=MICPC+1
                (1)     015436  016604          <MOVE!WRMEM!INCMAR!IMM!<204>>
                (1)
             1918       015440                  MEM     BR!LDMAR,SELA!SP14                      ;COPY LINK ADDRESS TO NEXT INTER
                (1)             001625          MICPC=MICPC+1
                (1)     015440  072614          <MOVE!WRMEM!BR!LDMAR!<SELA!SP14>>
                (1)
             1919       015442                  MEMINC  IMM,0                           ;ZERO THE FLAGS
                (1)             001626          MICPC=MICPC+1
                (1)     015442  016400          <MOVE!WRMEM!INCMAR!IMM!<0>>
                (1)
             1920       015444                  SP      IMM!INCMAR,SP0,300              ;WRITE A 300 TO SP0
                (1)             001627          MICPC=MICPC+1
                (1)     015444  017300          <MOVE!SPX!IMM!INCMAR!SP0!300>
                (1)
             1921       015446                  BRWRTE  IMM!INCMAR,2                    ;PREPARE TO ADDRESS NEXT
                (1)             001630          MICPC=MICPC+1
                (1)     015446  014402          <MOVE!WRTEBR!IMM!INCMAR!<2>>
                (1)
             1922                                                                        ;INTERRUPT STACK AND INCREMENT
             1923                                                                        ;THE MAR
             1924       015450                  MEM     MEMX,AANDB!SP0                  ;MASK OFF ORIGINAL HIGH BYTE
                (1)             001631          MICPC=MICPC+1
                (1)     015450  042660          <MOVE!WRMEM!MEMX!<AANDB!SP0>>
                (1)
             1925                                                                        ;OF COUNT SAVING EXTENDED MEM BITS
             1926       015452                  MEMINC  MEMX,AORB!SP5                   ;COPY TO MEMORY LINK
                (1)             001632          MICPC=MICPC+1
                (1)     015452  056705          <MOVE!WRMEM!INCMAR!MEMX!<AORB!SP5>>
                (1)
             1927       015454                  MEMINC  BR,SELA!SP4
                (1)             001633          MICPC=MICPC+1
                (1)     015454  076604          <MOVE!WRMEM!INCMAR!BR!<SELA!SP4>>
                (1)
             1928       015456                  LDMA    IMM,NXTSP                       ;ADDRESS NEXT INT STACK
                (1)             001634          MICPC=MICPC+1
                (1)                 001         .IF IDN IMM,IMM
                (1)     015456  010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
                (1)                             .IFF
                (1)                             <MOVE!LDMAR!IMM!<NXTSP>>
                (1)                 000         .ENDC
                (1)
             1929       015460                  MEM     BR,ADD!SP3
                (1)             001635          MICPC=MICPC+1
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  (1)  015460  062403                  <MOVE!WRMEM!BR!<ADD!SP3>>
  (1)
1930   015462                          BRWRTE  IMM,<<MMEND-2>>                 ;ADDRESSEND OF INT STACK
  (1)          001636                 MICPC=MICPC+1
  (1)  015462  000776                 <MOVE!WRTEBR!IMM!<<MMEND-2>>>
  (1)
1931   015464                          CMP     BR,SP3                          ;WRAP AROUND
  (1)          001637                 MICPC=MICPC+1
  (1)  015464  060363                 <SUBTC!BR!SP3>
  (1)
1932   015466                          Z       40$                             ;IF YES-- BRANCH
  (1)          001640                 MICPC=MICPC+1
  (1)  015466  115651                 <JUMP!ZCOND!<40$-INIT&3000*4>!<40$-INIT&777/2>>
  (1)
1933   015470                   20$:
1934   015470                          BRWRTE  IMM,5                           ;INDEX TO NEXT BUFFER
  (1)          001641                 MICPC=MICPC+1
  (1)  015470  000405                 <MOVE!WRTEBR!IMM!<5>>
  (1)
1935   015472                          SP      BR,ADD,SP14                     ;UPDATE COPY OF POINTER
  (1)          001642                 MICPC=MICPC+1
  (1)  015472  063014                 <MOVE!SPX!BR!ADD!SP14>
  (1)
1936   015474                          BRWRTE  IMM,STC                         ;ADDRESS OF WRAP AROUND POINT
  (1)          001643                 MICPC=MICPC+1
  (1)  015474  000467                 <MOVE!WRTEBR!IMM!<STC>>
  (1)
1937   015476                          CMP     BR,SP14                         ;WRAPAROUND?
  (1)          001644                 MICPC=MICPC+1
  (1)  015476  060374                 <SUBTC!BR!SP14>
  (1)
1938   015500                          Z       50$                             ;IF YES---BRANCH
  (1)          001645                 MICPC=MICPC+1
  (1)  015500  115653                 <JUMP!ZCOND!<50$-INIT&3000*4>!<50$-INIT&777/2>>
  (1)
1939   015502                   30$:   BRWRTE  IMM,20                          ;MASK FOR INTERUPT PENDING
  (1)          001646                 MICPC=MICPC+1
  (1)  015502  000420                 <MOVE!WRTEBR!IMM!<20>>
  (1)
1940   015504                          SP      DP,AORB,SP1                     ;UPDATE PORT STATUS WORD
  (1)          001647                 MICPC=MICPC+1
  (1)  015504  063301                 <MOVE!SPX!DP!AORB!SP1>
  (1)
1941             001                   .IF DF  $LOW
1942                                   BRWRTE  DP,<SELA!SP10>                  ;READ LINE STATUS WORD
1943                                   BR4     FLUSH                           ;IF CLEAR ACTIVE SET---FLUSH
1944                             RM1:  STATE   RCVA
1945                                   ALWAYS  REXIT
1946             000                   .ENDC
1947             001                   .IF NDF $LOW
1948   015506                          ALWAYS  FLUSH
  (1)          001650                 MICPC=MICPC+1
  (1)  015506  104415                 <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
  (1)
1949             000                   .ENDC
1950   015510                   40$:   MEM     IMM,INTSTK              ;POINT TO START OF INTERRUPT STACK
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```
(1)             001651
(1)  015510     002642          MICPC=MICPC+1
(1)                             <MOVE!WRMEM!IMM!<INTSTK>>
(1)
1951 015512                     ALWAYS  20$
(1)             001652          MICPC=MICPC+1
(1)  015512     114641          <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
(1)
1952 015514             50$:    BRWRTE  IMM,RCL1                ;POINT TO START OF RECEIVE QUEUE
(1)             001653          MICPC=MICPC+1
(1)  015514     000424          <MOVE!WRTEBR!IMM!<RCL1>>
(1)
1953 015516                     SP      BR,SELB,SP14
(1)             001654          MICPC=MICPC+1
(1)  015516     063234          <MOVE!SPX!BR!SELB!SP14>
(1)
1954 015520                     ALWAYS  30$
(1)             001655          MICPC=MICPC+1
(1)  015520     114646          <JUMP!ALCOND!<30$-INIT&3000*4>!<30$-INIT&777/2>>
(1)
1955                            .DSABL  LSB
1956 015522             NTHRES: LDMA    IMM,ST
(1)             001656          MICPC=MICPC+1
(1)                001          .IF IDN IMM,IMM
(1)  015522     010152          <MOVE!LDMAR!IMM!<ST&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<ST>>
(1)                000          .ENDC
(1)
1957 015524                     SPBR    MEMX,SELB,SP0
(1)             001657          MICPC=MICPC+1
(1)  015524     043620          <MOVE!SPBRX!MEMX!SELB!SP0>
(1)
1958 015526                     BRWRTE  BR,ADD!SP0                      ;SHIFT LEFT
(1)             001660          MICPC=MICPC+1
(1)  015526     060400          <MOVE!WRTEBR!BR!<ADD!SP0>>
(1)
1959 015530                     BR4     OVRRUN
(1)             001661          MICPC=MICPC+1
(1)  015530     117174          <JUMP!BR4CON!<OVRRUN-INIT&3000*4>!<OVRRUN-INIT&777/2>>
(1)
1960 015532                     BRWRTE  IMM,1
(1)             001662          MICPC=MICPC+1
(1)  015532     000401          <MOVE!WRTEBR!IMM!<1>>
(1)
1961 015534             ERRXX:
1962 015534             NTRS0:  LDMA    IMM,<<RTHRS+3>>
(1)             001663          MICPC=MICPC+1
(1)                001          .IF IDN IMM,IMM
(1)  015534     010177          <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<<RTHRS+3>>>
(1)                000          .ENDC
(1)
1963 015536                     MEMINC  IMM,0
(1)             001664          MICPC=MICPC+1
(1)  015536     016400          <MOVE!WRMEM!INCMAR!IMM!<0>>
```

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  (1)
1964  015540                        MEM     BR,SELB
  (1)           001665              MICPC=MICPC+1
  (1)  015540   062620              <MOVE!WRMEM!BR!<SELB>>
  (1)
1965  015542                  NTRS1:  LDMA    IMM,NXTSP
  (1)           001666              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015542   010241              <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<NXTSP>>
  (1)              000              .ENDC
  (1)
1966  015544                        LDMA    MEMX,SELB!SPX!SP0
  (1)           001667              MICPC=MICPC+1
  (1)              001              .IF IDN MEMX,IMM
  (1)                               <MOVE!LDMAR!IMM!<SELB!SPX!SP0&377>>
  (1)                               .IFF
  (1)  015544   053220              <MOVE!LDMAR!MEMX!<SELB!SPX!SP0>>
  (1)              000              .ENDC
  (1)
1967  015546                        MEMINC  IMM,201
  (1)           001670              MICPC=MICPC+1
  (1)  015546   016601              <MOVE!WRMEM!INCMAR!IMM!<201>>
  (1)
1968  015550                        MEM     IMM,<<RTHRS>>
  (1)           001671              MICPC=MICPC+1
  (1)  015550   002574              <MOVE!WRMEM!IMM!<<RTHRS>>>
  (1)
1969  015552                        LDMA    IMM,NXTSP
  (1)           001672              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015552   010241              <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<NXTSP>>
  (1)              000              .ENDC
  (1)
1970  015554                        MEM     IMM,INTSTK              ;ASSUME QUEUE WRAP AROUND
  (1)           001673              MICPC=MICPC+1
  (1)  015554   002642              <MOVE!WRMEM!IMM!<INTSTK>>
  (1)
1971  015556                        BRWRTE  IMM,<<MMEND-2>>
  (1)           001674              MICPC=MICPC+1
  (1)  015556   000776              <MOVE!WRTEBR!IMM!<<MMEND-2>>>
  (1)
1972  015560                        CMP     BR,SP0
  (1)           001675              MICPC=MICPC+1
  (1)  015560   060360              <SUBTC!BR!SP0>
  (1)
1973  015562                        Z       NTRS2                   ;IT DID WRAP AROUND
  (1)           001676              MICPC=MICPC+1
  (1)  015562   115701              <JUMP!ZCOND!<NTRS2-INIT&3000*4>!<NTRS2-INIT&777/2>>
  (1)
1974  015564                        BRWRTE  IMM,2                   ;OFFSET TO NEXT PAIR
  (1)           001677              MICPC=MICPC+1
  (1)  015564   000402              <MOVE!WRTEBR!IMM!<2>>
```

```
  (1)
1975  015566                        MEM     BR,ADD!SPO                      ;UPDATE QUEUE POINTER
  (1)           001700              MICPC=MICPC+1
  (1)  015566   062400              <MOVE!WRMEM!BR!<ADD!SPO>>
  (1)
1976  015570                  NTRS2:  BRWRTE  IMM,20
  (1)           001701              MICPC=MICPC+1
  (1)  015570   000420              <MOVE!WRTEBR!IMM!<20>>
  (1)
1977  015572                        SPBR    BR,AORB,SP1
  (1)           001702              MICPC=MICPC+1
  (1)  015572   063701              <MOVE!SPBRX!BR!AORB!SP1>
  (1)
1978  015574                        BRO     TAB1                            ;FLAGGED BY ERROR TYPE
  (1)           001703              MICPC=MICPC+1
  (1)  015574   116334              <JUMP!BROCON!<TAB1-INIT&3000*4>!<TAB1-INIT&777/2>>
  (1)
1979  015576                  SNAK:   LDMA    IMM,ISP11
  (1)           001704              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015576   010171              <MOVE!LDMAR!IMM!<ISP11&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<ISP11>>
  (1)              000              .ENDC
  (1)
1980  015600                        SP      MEMX,SELB,SP11
  (1)           001705              MICPC=MICPC+1
  (1)  015600   043231              <MOVE!SPX!MEMX!SELB!SP11>
  (1)
1981  015602                        SP      BR,INCA,SP11                    ;INCREMENT MSG EXPECTED
  (1)           001706              MICPC=MICPC+1
  (1)  015602   063071              <MOVE!SPX!BR!INCA!SP11>
  (1)
1982  015604                  SNAK1:  BRWRTE  IMM,1                           ;UNNUMB PENING BIT TO BR
  (1)           001707              MICPC=MICPC+1
  (1)  015604   000401              <MOVE!WRTEBR!IMM!<1>>
  (1)
1983  015606                  SNAK2:  SP      BR,AORB,SP10                    ;UPDATE LINE STATUS WORD
  (1)           001710              MICPC=MICPC+1
  (1)  015606   063310              <MOVE!SPX!BR!AORB!SP10>
  (1)
1984  015610                        ALWAYS  FLUSH
  (1)           001711              MICPC=MICPC+1
  (1)  015610   104415              <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
  (1)
1985                            ;
1986  015612                  EMTRIG: BRWRTE  IMM,24
  (1)           001712              MICPC=MICPC+1
  (1)  015612   000424              <MOVE!WRTEBR!IMM!<24>>
  (1)
1987  015614                        OUTPUT  BR,<SELB!OBA1>
  (1)           001713              MICPC=MICPC+1
  (1)  015614   062226              <MOVE!WROUT!BR!<SELB!OBA1>>
  (1)
1988  015616                        BRWRTE  IMM,0
  (1)           001714              MICPC=MICPC+1
```

```
    (1)  015616  000400                    <MOVE!WRTEBR!IMM!<0>>
    (1)
 1989  015620                              OUTPUT  BR,<SELB!OBA2>
    (1)          001715                   MICPC=MICPC+1
    (1)  015620  062227                   <MOVE!WROUT!BR!<SELB!OBA2>>
    (1)
 1990  015622                              SPBR    IBUS,BM873,SPO          ;READ BM873 ADDRESS---
    (1)          001716                   MICPC=MICPC+1
    (1)  015622  023740                   <MOVE!SPBRX!IBUS!BM873!SPO>
    (1)
 1991  015624                              OUTPUT  BR,SELB!OUTDA1          ;SET UP LOW BYTE OF ADDRESS
    (1)          001717                   MICPC=MICPC+1
    (1)  015624  062222                   <MOVE!WROUT!BR!<SELB!OUTDA1>>
    (1)
 1992  015625                              BRWRTE  IMM,366                 ;HIGH BYTE BASE FOR ROM BOOT
    (1)          001720                   MICPC=MICPC+1
    (1)  015626  000766                   <MOVE!WRTEBR!IMM!<366>>
    (1)
 1993  015630                              OUTPUT  BR,SELB!OUTDA2          ;
    (1)          001721                   MICPC=MICPC+1
    (1)  015630  062223                   <MOVE!WROUT!BR!<SELB!OUTDA2>>
    (1)
 1994  015632                    EM6:      BRWRTE  IMM,21                  ;MASK FOR TIMER AND ALSO TO START NPR
    (1)          001722                   MICPC=MICPC+1
    (1)  015632  000421                   <MOVE!WRTEBR!IMM!<21>>
    (1)
 1995  015634                              OUT     BR,<SELB!OBR>
    (1)          001723                   MICPC=MICPC+1
    (1)  015634  061231                   <MOVE!WROUTX!BR!<SELB!OBR>>
    (1)
 1996  015636                              OUT     BR,<SELB!ONPR>
    (1)          001724                   MICPC=MICPC+1
    (1)  015636  061230                   <MOVE!WROUTX!BR!<SELB!ONPR>>
    (1)
 1997  015640                    EM1:      BRWRTE  IBUS,NPR                ;READ NPR CONTROL
    (1)          001725                   MICPC=MICPC+1
    (1)  015640  120600                   <MOVE!WRTEBR!IBUS!<NPR>>
    (1)
 1998  015642                              BRO     CKTIME
    (1)          001726                   MICPC=MICPC+1
    (1)  015642  102371                   <JUMP!BROCON!<CKTIME-INIT&3000*4>!<CKTIME-INIT&777/2>>
    (1)
 1999  015644                              MEMADR  RM1                     ;IF NPR DONE
    (1)          001727                   MICPC=MICPC+1
    (1)             001                   .IF B
    (1)  015644  002420                   <MOVE!WRMEM!<RM1-INIT&777/2>>
    (1)                                   .IFF
    (1)                                   <MOVE!WRMEM!!<RM1-INIT&777/2>>
    (1)             000                   .ENDC
 2000  015646                              ALWAYS  ACLOW
    (1)          001730                   MICPC=MICPC+1
    (1)  015646  100764                   <JUMP!ALCOND!<ACLOW-INIT&3000*4>!<ACLOW-INIT&777/2>>
    (1)
 2001  015650                    TABUPD:   SPBR    IBUS,RCVCON,SPO         ;READ RECEIVER CONTROL REG
    (1)          001731                   MICPC=MICPC+1
    (1)  015650  023640                   <MOVE!SPBRX!IBUS!RCVCON!SPO>
```

```
  (1)
2002  015652                        BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
  (1)           001732              MICPC=MICPC+1
  (1)  015652   060400              <MOVE!WRTEBR!BR!<ADD!SP0>>
  (1)
2003  015654                        BR7     IDLE                    ;RECEIVE ACTIVE--IDLE
  (1)           001733              MICPC=MICPC+1
  (1)  015654   103451              <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
2004  015656                  TAB1: LDMA    IMM,IMG10
  (1)           001734              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015656   010154              <MOVE!LDMAR!IMM!<IMG10&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<IMG10>>
  (1)              000              .ENDC
  (1)
2005  015660                        BRWRTE  IMM,2
  (1)           001735              MICPC=MICPC+1
  (1)  015660   000402              <MOVE!WRTEBR!IMM!<2>>
  (1)
2006  015662                        MEMINC  BR,AANDB!SP10           ;SAVE BIT 1 OF SP10
  (1)           001736              MICPC=MICPC+1
  (1)  015662   076670              <MOVE!WRMEM!INCMAR!BR!<AANDB!SP10>>
  (1)
2007  015664                        MEMINC  BR,SELA!SP11            ;SAVE SP11
  (1)           001737              MICPC=MICPC+1
  (1)  015664   076611              <MOVE!WRMEM!INCMAR!BR!<SELA!SP11>>
  (1)
2008  015666                        MEMINC  BR,SELA!SP12            ;SAVE SP12
  (1)           001740              MICPC=MICPC+1
  (1)  015666   076612              <MOVE!WRMEM!INCMAR!BR!<SELA!SP12>>
  (1)
2009  015670                        MEMINC  BR,SELA!SP14            ;SAVE SP14
  (1)           001741              MICPC=MICPC+1
  (1)  015670   076614              <MOVE!WRMEM!INCMAR!BR!<SELA!SP14>>
  (1)
2010  015672                        MEMINC  BR,SELA!SP16            ;SAVE SP16
  (1)           001742              MICPC=MICPC+1
  (1)  015672   076616              <MOVE!WRMEM!INCMAR!BR!<SELA!SP16>>
  (1)
2011  015674                        MEMINC  BR,SELA!SP17            ;SAVE SP17
  (1)           001743              MICPC=MICPC+1
  (1)  015674   076617              <MOVE!WRMEM!INCMAR!BR!<SELA!SP17>>
  (1)
2012                                                              ;MAR NOW POINTS TO BASE
2013  015676                        STATE   RB2             ;DO NOT CHANGE BR UNTIL RB0
  (1)           001744              MICPC=MICPC+1
  (1)  015676   000460              <MOVE!WRTEBR!IMM!<RB2-INIT&777/2>>
2014  015700                        LDMA    IMM,TABST       ;POINT TO TABLE UPDATE STATE
  (1)           001745              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015700   010210              <MOVE!LDMAR!IMM!<TABST&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<TABST>>
  (1)              000              .ENDC
```

```
  (1)
2015  015702                        PSTATE  TBU1                    ;NEW PORT STATE ADDRESS
  (1)  015702                       MEM     IMM,<<TBU1-INIT&777/2>>
  (2)            001746             MICPC=MICPC+1
  (2)  015702    002774             <MOVE!WRMEM!IMM!<<TBU1-INIT&777/2>>>
  (2)
2016  015704                        SP      IMM,4,SP4               ;INITIALIZE COUNT
  (1)            001747             MICPC=MICPC+1
  (1)  015704    003004             <MOVE!SPX!IMM!4!SP4>
  (1)
2017                                                                ;NOTE: FIRST 6 RAM LOCATIONS ARE NOT WRITTEN
2018                                                                ;TO CORE TABLE.
2019  015706                        LDMA    IMM,BASE
  (1)            001750             MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015706    010017             <MOVE!LDMAR!IMM!<BASE&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<BASE>>
  (1)                 000           .ENDC
  (1)
2020  015710                        ALWAYS  RBO
  (1)            001751             MICPC=MICPC+1
  (1)  015710    104442             <JUMP!ALCOND!<RBO-INIT&3000*4>!<RBO-INIT&777/2>>
  (1)
2021  015712                  EC2:  BRWRTE  IMM,2                           ;INCREMENT COUNT/TEST
  (1)            001752             MICPC=MICPC+1
  (1)  015712    000402             <MOVE!WRTEBR!IMM!<2>>
  (1)
2022  015714                        SP      BR,ADD,SP4
  (1)            001753             MICPC=MICPC+1
  (1)  015714    063004             <MOVE!SPX!BR!ADD!SP4>
  (1)
2023  015716                        SP      IBUS,IOBA1,SPO                ;POINT TO NEXT ADDRESS
  (1)            001754             MICPC=MICPC+1
  (1)  015716    023140             <MOVE!SPX!IBUS!IOBA1!SPO>
  (1)
2024  015720                        OUTPUT  BR,ADD!OBA1
  (1)            001755             MICPC=MICPC+1
  (1)  015720    062006             <MOVE!WROUT!BR!<ADD!OBA1>>
  (1)
2025  015722                        SP      IBUS,IOBA2,SPO
  (1)            001756             MICPC=MICPC+1
  (1)  015722    023160             <MOVE!SPX!IBUS!IOBA2!SPO>
  (1)
2026  015724                        OUTPUT  BR,AC!OBA2
  (1)            001757             MICPC=MICPC+1
  (1)  015724    062107             <MOVE!WROUT!BR!<AC!OBA2>>
  (1)
2027  015726                        C       TABMXT
  (1)            001760             MICPC=MICPC+1
  (1)  015726    105366             <JUMP!CCOND!<TABMXT-INIT&3000*4>!<TABMXT-INIT&777/2>>
  (1)
2028  015730                  ECX:  BRWRTE  BR,SELA!SP1                   ;READ PORT STATUS
  (1)            001761             MICPC=MICPC+1
  (1)  015730    060601             <MOVE!WRTEBR!BR!<SELA!SP1>>
  (1)
```

```
2029  015732                        BR0     30$                     ;INIT MODE, WRITE OUT 200 BYTES
 (1)          001762                MICPC=MICPC+1
 (1)  015732  116374                <JUMP!BROCON!<30$-INIT&3000*4>!<30$-INIT&777/2>>
 (1)
2030                                                                ;OTHERWISE ONLY WRITE OUT ERROR COUNTERS
2031  015734                        BRWRTE  BR!LDMAR,SELA!SP4       ;READ COUNTER
 (1)          001763                MICPC=MICPC+1
 (1)  015734  070604                <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
 (1)
2032  015736                        BR4     20$                     ;ALL DONE
 (1)          001764                MICPC=MICPC+1
 (1)  015736  117371                <JUMP!BR4CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
 (1)
2033  015740                  10$:  OUTPUT  MEMX!INCMAR,SELB!OUTDA1         ;STORE COUNTS OF ERRORS
 (1)          001765                MICPC=MICPC+1
 (1)  015740  056222                <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA1>>
 (1)
2034  015742                        OUTPUT  MEMX!INCMAR,SELB!OUTDA2
 (1)          001766                MICPC=MICPC+1
 (1)  015742  056223                <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA2>>
 (1)
2035                                .IF NDF $LOW
2036  015744                        SP      IBUS,NPR.SP0
 (1)          001767                MICPC=MICPC+1
 (1)  015744  123200                <MOVE!SPX!IBUS!NPR!SP0>
 (1)
2037                                .ENDC
2038  015746                        ALWAYS  RK8
 (1)          001770                MICPC=MICPC+1
 (1)  015746  104622                <JUMP!ALCOND!<RK8-INIT&3000*4>!<RK8-INIT&777/2>>
 (1)
2039  015750                  20$:  LDMA    IMM,TABST
 (1)          001771                MICPC=MICPC+1
 (1)            001                 .IF IDN IMM,IMM
 (1)  015750  010210                <MOVE!LDMAR!IMM!<TABST&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<TABST>>
 (1)              000               .ENDC
 (1)
2040  015752                        PSTATE  I3
 (1)  015752                        MEM     IMM,<<I3-INIT&777/2>>
 (2)          001772                MICPC=MICPC+1
 (2)  015752  002460                <MOVE!WRMEM!IMM!<<I3-INIT&777/2>>>
 (2)
2041  015754                        ALWAYS  RM1
 (1)          001773                MICPC=MICPC+1
 (1)  015754  104420                <JUMP!ALCOND!<RM1-INIT&3000*4>!<RM1-INIT&777/2>>
 (1)
2042  015756                  30$:  BRWRTE  BR!LDMAR,SELA!SP4       ;READ COUNTER
 (1)          001774                MICPC=MICPC+1
 (1)  015756  070604                <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
 (1)
2043  015760                        BR7     20$                     ;ALL DONE
 (1)          001775                MICPC=MICPC+1
 (1)  015760  117771                <JUMP!BR7CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
 (1)
```

```
  2044  015762
   (1)            001776
   (1)  015762    114765
   (1)
  2045  015764
   (1)            001777
   (1)  015764    000000
   (1)
  2046
  2047            000001

. ABS.  015766      000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 .DDCMP/CRF/DS:CRF←DMCHGH,HILOW,DDCHGH
 RUN-TIME: 16 31 .1 SECONDS
 RUN-TIME RATIO: 189/48=3.8
 CORE USED:  7K  (13 PAGES)
```

```
          ALWAYS  10$                       ;KEEP GOING
          MICPC=MICPC+1
          <JUMP!ALCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>

          $ZERO
          MICPC=MICPC+1
          000000

          ;
          .END
```

```
  1623                                00200
  1624
  1625
  1626                                ;*************************** TEST 1 ****************************
  1627                                ;*TEST OF BR RIGHT SHIFT
  1628                                ;*VERIFY THAT A DEST OF BR RSH (011) OF A MICRO-INSTRUCTION
  1629                                ;*SHIFTS THE RESULTING BR DATA RIGHT ONCE.
  1630                                ;:************************************************************
  1631
  1632                                ;  TEST 1
  1633                                ;--------------
  1634  015766  012737  000001  001226  TST1:  MOV     #1,TSTNO
  1635  015774  012737  016100  001216          MOV     #TST2,NEXT
  1636                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
  1637  016002  104412                         MSTCLR          ;MASTER CLEAR DMC11
```

```
1638  016004  013701  001404                    MOV     DMCSR,R1        ;R1 = DMC BASE ADDRESS
1639  016010  005011                            CLR     (R1)            ;CLEAR SEL0
1640  016012  012705  052525                    MOV     #52525,R5       ;START WITH 125
1641  016016  010561  000004                    MOV     R5,4(R1)        ;PORT4←125
1642  016022  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1643  016024  120500                            120500                  ;BR ← PORT4
1644  016026  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1645  016030  061620                            061620                  ;BR RSH←BR, SHIFT BR RIGHT
1646  016032  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1647  016034  061225                            061225                  ;PORT5←BR
1648  016036  006005                            ROR     R5              ;R5 = "EXPECTED"
1649  016040  116104  000005                    MOVB    5(R1),R4        ;R4 = "FOUND"
1650  016044  120504                            CMPB    R5,R4           ;DID BR SHIFT RIGHT ONCE?
1651  016046  001401                            BEQ     1$              ;BR IF YES
1652  016050  104012                            HLT     12              ;BR RIGHT SHIFT ERROR
1653  016052                            1$:
1654  016052  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1655  016054  061620                            061620                  ;BR RSH←BR, SHFT BR RIGHT AGAIN
1656  016056  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1657  016060  061225                            061225                  ;PORT5←BR
1658  016062  006005                            ROR     R5              ;R5 = "EXPECTED"
1659  016064  116104  000005                    MOVB    5(R1),R4        ;R4 = "FOUND"
1660  016070  120504                            CMPB    R5,R4           ;DID BR SHIFT RIGHT?
1661  016072  001401                            BEQ     2$              ;BR IF YES
1662  016074  104012                            HLT     12              ;BR RIGHT SHIFT ERROR
1663  016076  104400                    2$:     SCOPE                   ;SCOPE THIS TEST
1664
1665
1666                                            ;*************************** TEST 2 ****************************
1667                                            ;*IOP CRAM WRITE/READ TEST
1668                                            ;*FLOAT A 1 THROUGH EACH CRAM LOCATION
1669                                            ;:***********************************************************
1670
1671                                            ;  TEST 2
1672                                            ;--------------
1673  016100  012737  000002  001226    TST2:   MOV     #2,TSTNO
1674  016106  012737  016214  001216            MOV     #TST3,NEXT
1675  016114  012737  016140  001220            MOV     #3$,LOCK
1676                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
1677  016122  032737  100000  001366            BIT     #BIT15,STAT1    ;DOES DMC HAVE CRAM?
1678  016130  001430                            BEQ     5$              ;SKIP TEST IF NO CRAM
1679  016132  005000                            CLR     R0              ;R0 = CRAM ADDRESS
1680  016134  012702  000001            1$:     MOV     #1,R2           ;R2 = WRITE DATA
1681  016140                            2$:
1682  016140  012711  002000            3$:     MOV     #BIT10,(R1)     ;SET ROM0
1683  016144  010061  000004                    MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
1684  016150  010261  000006                    MOV     R2,6(R1)        ;LOAD SEL6 WITH WRITE DATA
1685  016154  052711  020000                    BIS     #BIT13,(R1)     ;WRITE SEL6 INTO CRAM
1686  016160  016104  000004                    MOV     4(R1),R4        ;READ CRAM INTO "FOUND"
1687  016164  020204                            CMP     R2,R4           ;IS DATA CORRECT?
1688  016166  001401                            BEQ     4$              ;BR IF OK
1689  016170  104001                            HLT     1               ;ERROR
1690  016172  104401                    4$:     SCOP1
1691  016174  000241                            CLC                     ;CLEAR CARRY
1692  016176  006102                            ROL     R2              ;SHIFT WRITE DATA
1693  016200  001357                            BNE     2$              ;BR IF NOT DONE THIS ADDRESS
```

```
1694  016202  005200                          INC     R0              ;BUMP TO NEXT CRAM ADDRESS
1695  016204  022700  002000                  CMP     #2000,R0        ;DONE YET?
1696  016210  001351                          BNE     1$              ;BR IF NO
1697  016212  104400                  5$:     SCOPE                   ;SCOPE THIS TEST
1698
1699
1700                                          ;*************************** TEST 3 ****************************
1701                                          ;*IOP CRAM WRITE/READ TEST
1702                                          ;*FLOAT A 0 THROUGH EACH CRAM LOCATION
1703                                          ;:***********************************************************
1704
1705                                          ;  TEST 3
1706                                          ;--------------
1707  016214  012737  000003  001226  TST3:   MOV     #3,TSTNO
1708  016222  012737  016336  001216          MOV     #TST4,NEXT
1709  016230  012737  016260  001220          MOV     #3$,LOCK
1710                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1711  016236  104412                          MSTCLR                  ;MASTER CLEAR DMC11
1712  016240  032737  100000  001366          BIT     #BIT15,STAT1    ;DOES DMC HAVE CRAM?
1713  016246  001432                          BEQ     5$              ;SKIP TEST IF NO CRAM
1714  016250  005000                          CLR     R0              ;R0 = CRAM ADDRESS
1715  016252  012702  000001          1$:     MOV     #1,R2           ;R2 = WRITE DATA
1716  016256                          2$:
1717  016256  005102                          COM     R2              ;MAKE IT A FLOATING ZERO
1718  016260  012711  002000          3$:     MOV     #BIT10,(R1)     ;SET ROMO
1719  016264  010061  000004                  MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
1720  016270  010261  000006                  MOV     R2,6(R1)        ;LOAD SEL6 WITH WRITE DATA
1721  016274  052711  020000                  BIS     #BIT13,(R1)     ;WRITE SEL6 INTO CRAM
1722  016300  016104  000004                  MOV     4(R1),R4        ;READ CRAM INTO "FOUND"
1723  016304  020204                          CMP     R2,R4           ;IS DATA CORRECT?
1724  016306  001401                          BEQ     4$              ;BR IF OK
1725  016310  104001                          HLT     1               ;ERROR
1726  016312  104401                  4$:     SCOP1
1727  016314  005102                          COM     R2              ;BACK TO FLOATING ONE
1728  016316  000241                          CLC                     ;CLEAR CARRY
1729  016320  006102                          ROL     R2              ;SHIFT WRITE DATA
1730  016322  001355                          BNE     2$              ;BR IF NOT DONE THIS ADDRESS
1731  016324  005200                          INC     R0              ;BUMP TO NEXT CRAM ADDRESS
1732  016326  022700  002000                  CMP     #2000,R0        ;DONE YET?
1733  016332  001347                          BNE     1$              ;BR IF NO
1734  016334  104400                  5$:     SCOPE                   ;SCOPE THIS TEST
1735
1736
1737                                          ;*************************** TEST 4 ****************************
1738                                          ;*IOP CRAM DUAL ADDRESSING TEST
1739                                          ;*WRITE EACH ADDRESS INTO ITSELF,READ EACH
1740                                          ;*ADDRESS TO VERIFY CORRECT ADDRESSING
1741                                          ;:***********************************************************
1742
1743                                          ;  TEST 4
1744                                          ;--------------
1745  016336  012737  000004  001226  TST4:   MOV     #4,TSTNO
1746  016344  012737  016516  001216          MOV     #TST5,NEXT
1747  016352  012737  016374  001220          MOV     #1$,LOCK
1748                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1749  016360  104412                          MSTCLR                  ;MASTER CLEAR DMC11
```

```
1750  016362  032737  100000  001366          BIT     #BIT15,STAT1    ;DOES DMC HAVE CRAM?
1751  016370  001451                          BEQ     5$              ;SKIP TEST IF NO CRAM
1752  016372  005000                          CLR     R0              ;R0 =CRAM ADDRESS
1753  016374  010002                  1$:     MOV     R0,R2           ;SAVE R2 FOR TYPEOUT
1754  016376  012711  002000                  MOV     #BIT10,(R1)     ;SET ROMO
1755  016402  010061  000004                  MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
1756  016406  010061  000006                  MOV     R0,6(R1)        ;LOAD SEL6 WITH WRITE DATA
1757  016412  052711  020000                  BIS     #BIT13,(R1)     ;WRITE CRAM
1758  016416  005061  000006                  CLR     6(R1)           ;CLEAR SEL 6
1759  016422  016104  000006                  MOV     6(R1),R4        ;SHOULD READ BACK OWN ADDRESS
1760  016426  020004                          CMP     R0,R4           ;IS DATA CORRECT?
1761  016430  001401                          BEQ     2$              ;BR IF YES
1762  016432  104001                          HLT     1               ;DATA ERROR
1763  016434  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
1764  016436  005200                          INC     R0              ;BUMP TO NEXT ADDRESS
1765  016440  022700  002000                  CMP     #2000,R0        ;DONE WRITING YET?
1766  016444  001353                          BNE     1$              ;BR IF NO
1767  016446  005000                          CLR     R0              ;RESTART AT ADDRESS 0
1768  016450  012737  016456  001220          MOV     #3$,LOCK        ;NEW SCOP1
1769  016456  010002                  3$:     MOV     R0,R2           ;SAVE R2 FOR TYPEOUT
1770  016460  012711  002000                  MOV     #BIT10,(R1)     ;SET ROMO
1771  016464  010061  000004                  MOV     R0,4(R1)        ;SEL4 = CRAM ADDRESS
1772  016470  016104  000006                  MOV     6(R1),R4        ;READ CRAM INTO "FOUND"
1773  016474  020004                          CMP     R0,R4           ;IS DATA CORRECT?
1774  016476  001401                          BEQ     4$              ;BR IF YES
1775  016500  104002                          HLT     2               ;DUAL ADDRESSING ERROR
1776  016502  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
1777  016504  005200                          INC     R0              ;BUMP TO NEXT ADDRESS
1778  016506  022700  002000                  CMP     #2000,R0        ;DONE WRITING YET?
1779  016512  001361                          BNE     3$              ;BR IF NO
1780  016514  104400                  5$:     SCOPE                   ;SCOPE THIS TEST
1781
1782
1783                                          ;*************************** TEST 5 ****************************
1784                                          ;*IOP CRAM READ TEST
1785                                          ;*THIS TEST WRITES THE CRAM WITH THE CROM MICRO-CODE MAP
1786                                          ;*THEN READS IT BACK AND COMPARES EACH ADDRESS WITH THE
1787                                          ;*DUPLICATE OF THE CROM MICRO-CODE.
1788                                          ;:***********************************************************
1789
1790                                          ;  TEST 5
1791                                          ;--------------
1792  016516  012737  000005  001226  TST5:   MOV     #5,TSTNO
1793  016524  012737  016636  001216          MOV     #TST6,NEXT
1794  016532  012737  016566  001220          MOV     #1$,LOCK
1795                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1796  016540  104412                          MSTCLR                  ;MASTER CLEAR DMC11
1797  016542  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT RAM OR ROM
1798  016550  001431                          BEQ     3$              ;SKIP TEST IF CROM
1799  016552  005011                          CLR     (R1)            ;CLEAR RUN
1800  016554  004737  035602                  JSR     PC,WROM         ;WRITE CRAM WITH MAP
1801  016560  012700  011766                  MOV     #ROMMAP,R0      ;SOFTWARE POINTER TO CROM DUPLICATE
1802  016564  005002                          CLR     R2              ;R2 = CROM ADDRESS
1803  016566  010261  000004          1$:     MOV     R2,4(R1)        ;WRITE CROM ADDRESS TO SEL4
1804  016572  012711  002000                  MOV     #BIT10,(R1)     ;SET CROMO
1805  016576  011005                          MOV     (R0),R5         ;PUT "EXPECTED" IN R5
```

```
1806  016600  016104  000006                    MOV     6(R1),R4        ;PUT "FOUND" IN R4
1807  016604  020504                            CMP     R5,R4           ;COMPARE HARD ROM TO SOFT DUPLICATE
1808  016606  001401                            BEQ     2$              ;BR IF OK
1809  016610  104003                            HLT     3               ;CRAM READ ERROR!
1810  016612  005011                    2$:     CLR     (R1)            ;CLR  BIT10
1811  016614  005061  000006                    CLR     6(R1)           ;CLEAR SEL6
1812  016620  104401                            SCOP1                   ;LOOP TO 1$ IF SW09=1
1813  016622  005202                            INC     R2              ;INC TO NEXT CROM ADDRESS
1814  016624  005720                            TST     (R0)+           ;POP R0 BY 2
1815  016626  022702  002000                    CMP     #2000,R2        ;DONE 1K YET?
1816  016632  001355                            BNE     1$              ;BR IF NO
1817  016634  104400                    3$:     SCOPE                   ;SCOPE THIS TEST
1818
1819
1820                                            ;*************************** TEST 6 ****************************
1821                                            ;*IOP MAIN MEMORY TEST
1822                                            ;*FLOAT A 1 THROUGH ALL MAIN MEMORY LOCATIONS
1823                                            ;:***********************************************************
1824
1825                                            ;  TEST 6
1826                                            ;--------------
1827  016636  012737  000006  001226    TST6:   MOV     #6,TSTNO
1828  016644  012737  017024  001216            MOV     #TST7,NEXT
1829  016652  012737  016702  001220            MOV     #65$,LOCK
1830                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
1831  016660  104412                            MSTCLR                  ;MASTER CLEAR DMC11
1832  016662  032737  100000  001366            BIT     #BIT15,STAT1    ;IS THIS AN IOP?
1833  016670  001454                            BEQ     2$              ;SKIP TEST IF NO
1834  016672  005037  034704                    CLR     FLAG            ;START WITH ADDRESS 0
1835  016676  012700  000001            1$:     MOV     #1,R0           ;START WITH BIT 0
1836  016702  042737  000377  016734    65$:    BIC     #377,66$                ;CLEAR ADDRESS FIELD OF INSTRUCTION
1837  016710  042737  000003  016740            BIC     #3,68$          ;CLEAR ADDRESS FIELD OF INSTRUCTION
1838  016716  153737  034704  016734            BISB    FLAG,66$                ;ADD ADDRESS TO INSTRUCTION
1839  016724  153737  034705  016740            BISB    FLAG+1,68$      ;ADD ADDRESS TO INSTRUCTION
1840  016732  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1841  016734  010000                    66$:    010000                  ;LOAD MAR LO WITH ADDRESS IN FLAG
1842  016736  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1843  016740  004000                    68$:    004000                  ;LOAD MAR HI
1844  016742  010061  000004                    MOV     R0,4(R1)        ;WRITE PATTERN IN PORT4
1845  016746  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1846  016750  122500                            122500                  ;MOVE PORT4 TO MEMORY
1847  016752  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1848  016754  040620                            040620                  ;MOVE MEMORY TO BR
1849  016756  104414                            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1850  016760  061225                            61225                   ;MOVE BR TO PORT5
1851  016762  010005                            MOV     R0,R5           ;PUT "EXPECTED" IN R5
1852  016764  116104  000005                    MOVB    5(R1),R4        ;PUT "FOUND" IN R4
1853  016770  120504                            CMPB    R5,R4           ;DATA CORRECT?
1854  016772  001401                            BEQ     67$             ;BR IF YES
1855  016774  104010                            HLT     10              ;DATA ERROR
1856  016776  104401                    67$:    SCOP1                   ;SW09=1?
1857  017000  000241                            CLC                     ;CLEAR CARRY
1858  017002  106100                            ROLB    R0              ;SHIFT BIT IN R0
1859  017004  001336                            BNE     65$             ;DONE IF R0=0
1860  017006  005237  034704                    INC     FLAG            ;NEXT ADDRESS
1861  017012  022737  002000  034704            CMP     #2000,FLAG      ;LAST ADDRESS?
```

```
1862  017020  001326                          BNE     1$              ;BR IF NO
1863  017022  104400                  2$:     SCOPE                   ;SCOPE THIS TEST
1864
1865
1866                                          ;*************************** TEST 7 ****************************
1867                                          ;*IOP MAIN MEMORY TEST
1868                                          ;*FLOAT A 0 THROUGH ALL MAIN MEMORY LOCATIONS
1869                                          ;:***********************************************************
1870
1871                                          ;  TEST 7
1872                                          ;--------------
1873  017024  012737  000007  001226  TST7:   MOV     #7,TSTNO
1874  017032  012737  017216  001216          MOV     #TST10,NEXT
1875  017040  012737  017072  001220          MOV     #65$,LOCK
1876                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1877  017046  104412                         MSTCLR                  ;MASTER CLEAR DMC11
1878  017050  032737  100000  001366          BIT     #BIT15,STAT1    ;IS THIS AN IOP?
1879  017056  001456                         BEQ     2$              ;SKIP TEST IF NO
1880  017060  005037  034704                 CLR     FLAG            ;START WITH ADDRESS 0
1881  017064  012700  000001          1$:     MOV     #1,R0           ;START WITH BIT 0
1882  017070  005100                  64$:    COM     R0              ;CHANGE TO FLOATING 0
1883  017072  042737  000377  017124  65$:    BIC     #377,66$                ;CLEAR ADDRESS FIELD OF INSTRUCTION
1884  017100  042737  000003  017130          BIC     #3,68$          ;CLEAR ADDRESS FIELD OF INSTRUCTION
1885  017106  153737  034704  017124          BISB    FLAG,66$                ;ADD ADDRESS TO INSTRUCTION
1886  017114  153737  034705  017130          BISB    FLAG+1,68$      ;ADD ADDRESS TO INSTRUCTION
1887  017122  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1888  017124  010000                  66$:    010000                  ;LOAD MAR LO WITH ADDRESS IN FLAG
1889  017126  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1890  017130  004000                  68$:    004000                  ;LOAD MAR HI
1891  017132  010061  000004                 MOV     R0,4(R1)        ;WRITE PATTERN IN PORT4
1892  017136  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1893  017140  122500                         122500                  ;MOVE PORT4 TO MEMORY
1894  017142  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1895  017144  040620                         040620                  ;MOVE MEMORY TO BR
1896  017146  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1897  017150  061225                         61225                   ;MOVE BR TO PORT5
1898  017152  010005                         MOV     R0,R5           ;PUT "EXPECTED" IN R5
1899  017154  116104  000005                 MOVB    5(R1),R4        ;PUT "FOUND" IN R4
1900  017160  120504                         CMPB    R5,R4           ;DATA CORRECT?
1901  017162  001401                         BEQ     67$             ;BR IF YES
1902  017164  104010                         HLT     10              ;DATA ERROR
1903  017166  104401                  67$:    SCOP1                   ;SW09=1?
1904  017170  005100                         COM     R0              ;CHANGE TO FLOATING 1
1905  017172  000241                         CLC                     ;CLEAR CARRY
1906  017174  106100                         ROLB    R0              ;SHIFT BIT IN R0
1907  017176  001334                         BNE     64$             ;DONE IF R0=0
1908  017200  005237  034704                 INC     FLAG            ;NEXT ADDRESS
1909  017204  022737  002000  034704         CMP     #2000,FLAG      ;LAST ADDRESS?
1910  017212  001324                         BNE     1$              ;BR IF NO
1911  017214  104400                  2$:     SCOPE                   ;SCOPE THIS TEST
1912
1913
1914                                          ;*************************** TEST 10 ***************************
1915                                          ;*IOP MAIN MEMORY DUAL ADDRESSING TEST
1916                                          ;*LOAD EACH MEMORY LOCATION WITH ITS OWN ADDRESS
1917                                          ;*READ BACK EACH LOCATION TO VERIFY CORRECT ADDRESSING
```

```
1918                                                ;;*****************************************************************
1919
1920                                                ;  TEST 10
1921                                                ;--------------
1922  017216  012737  000010  001226      TST10:    MOV     #10,TSTNO
1923  017224  012737  017516  001216                MOV     #TST11,NEXT
1924  017232  012737  017256  001220                MOV     #1$,LOCK
1925                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
1926  017240  104412                               MSTCLR                ;MASTER CLEAR DMC11
1927  017242  032737  100000  001366                BIT     #BIT15,STAT1  ;IS THIS AN IOP?
1928  017250  001521                               BEQ     9$            ;SKIP TEST IF NO
1929  017252  005037  034704                       CLR     FLAG          ;START AT ADDRESS 0
1930  017256  013702  034704            1$:        MOV     FLAG,R2       ;PUT DATA IN R2
1931  017262  042737  000377  017314               BIC     #377,2$       ;CLEAR ADDRESS FIELD OF INSTRUCTION
1932  017270  042737  000003  017320               BIC     #3,7$         ;CLEAR ADDRESS FIELD OF INSTRUCTION
1933  017276  153737  034704  017314               BISB    FLAG,2$       ;ADD ADDRESS TO INSTRUCTION
1934  017304  153737  034705  017320               BISB    FLAG+1,7$     ;ADD ADDRESS TO INSTRUCTION
1935  017312  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1936  017314  010000                      2$:      010000                ;LOAD MAR LO
1937  017316  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1938  017320  004000                      7$:      004000                ;LOAD MAR HI
1939  017322  010261  000004                       MOV     R2,4(R1)
1940  017326  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1941  017330  122500                               122500                ;MOVE PORT4 TO MEMORY
1942  017332  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1943  017334  040620                               040620                ;MOVE MEMORY TO THE BR
1944  017336  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1945  017340  061225                               61225                 ;MOV BR TO PORT5
1946  017342  010205                               MOV     R2,R5         ;PUT "EXPECTED" IN R5
1947  017344  116104  000005                       MOVB    5(R1),R4      ;PUT "FOUND" IN R4
1948  017350  120504                               CMPB    R5,R4         ;DATA CORRECT?
1949  017352  001401                               BEQ     3$            ;BR IF YES
1950  017354  104010                               HLT     10            ;DATA ERROR
1951  017356  104401                      3$:      SCOP1                 ;SW09=1?
1952  017360  005237  034704                       INC     FLAG          ;NEXT ADDRESS
1953  017364  022737  002000  034704               CMP     #2000,FLAG    ;LAST ADDRESS
1954  017372  001331                               BNE     1$            ;BR IF NO
1955  017374  012737  017406  001220               MOV     #4$,LOCK      ;NEW SCOPE 1
1956  017402  005037  034704                       CLR     FLAG          ;RESTART AT ADDRESS 0
1957  017406  013702  034704            4$:        MOV     FLAG,R2       ;PUT DATA IN R2
1958  017412  042737  000377  017444               BIC     #377,5$       ;CLEAR ADDRESS FIELD OF INSTRUCTION
1959  017420  042737  000003  017450               BIC     #3,8$         ;CLEAR ADDRESS FIELD OF INSTRUCTION
1960  017426  153737  034704  017444               BISB    FLAG,5$       ;ADD ADDRESS TO INSTRUCTION
1961  017434  153737  034705  017450               BISB    FLAG+1,8$     ;ADD ADDRESS TO INSTRUCTION
1962  017442  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1963  017444  010000                      5$:      010000                ;LOAD THE MAR LO
1964  017446  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1965  017450  004000                      8$:      004000                ;LOAD MAR HI
1966  017452  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1967  017454  040620                               040620                ;MOVE MEMORY TO THE BR
1968  017456  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1969  017460  061225                               61225                 ;MOV BR TO PORT5
1970  017462  010205                               MOV     R2,R5         ;PUT "EXPECTED" IN R5
1971  017464  116104  000005                       MOVB    5(R1),R4      ;PUT "FOUND" IN R4
1972  017470  120504                               CMPB    R5,R4         ;DATA CORRECT?
1973  017472  001401                               BEQ     6$            ;BR IF YES
```

```
1974  017474  104010                          HLT     10              ;ADDRESSING ERROR
1975  017476  104401                  6$:     SCOP1                   ;SW09=1?
1976  017500  005237  034704                  INC     FLAG            ;NEXT ADDRESS
1977  017504  02@737  002000  034704          CMP     #2000,FLAG      ;IS IT THE LAST
1978  017512  001335                          BNE     4$              ;BR IF NO
1979  017514  104400                  9$:     SCOPE                   ;SCOPE THIS TEST
1980
1981
1982                                          ;*************************** TEST 11 ****************************
1983                                          ;*IOP MAR TEST
1984                                          ;*PERFORM DUAL ADDRESSING TEST
1985                                          ;*USING MAR AUTO-INC FEATURE
1986                                          ;:************************************************************
1987
1988                                          ;  TEST 11
1989                                          ;--------------
1990  017516  012737  000011  001226  TST11:  MOV     #11,TSTNO
1991  017524  012737  017632  001216          MOV     #TST12,NEXT
1992                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1993  017532  104412                          MSTCLR                  ;MASTER CLEAR DMC11
1994  017534  032737  100000  001366          BIT     #BIT15,STAT1    ;IS THIS AN IOP?
1995  017542  001432                          BEQ     4$              ;SKIP TEST IF NO
1996  017544  005002                          CLR     R2              ;START WITH A ZERO
1997  017546  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1998  017550  010000                          010000                  ;LOAD MAR WITH A ZERO
1999  017552  010261  000004          1$:     MOV     R2,4(R1)        ;WRITE DATA TO PORT4
2000  017556  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2001  017560  136500                          136500                  ;MEM←PORT4, AUTO-INC MAR
2002  017562  005202                          INC     R2              ;INCREMENT DATA
2003  017564  022702  002000                  CMP     #2000,R2        ;DONE YET?
2004  017570  001370                          BNE     1$              ;BR IF NO
2005  017572  005002                          CLR     R2              ;RESTART WITH A ZERO
2006  017574  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2007  017576  010000                          010000                  ;LOAD MAR WITH A ZERO
2008  017600                          2$:
2009  017600  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2010  017602  055224                          055224                  ;MOVE MEM TO PORT4
2011  017604  010205                          MOV     R2,R5           ;PUT "EXPECTED" IN R5
2012  017606  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
2013  017612  120504                          CMPB    R5,R4           ;DATA CORRECT?
2014  017614  001401                          BEQ     3$              ;BR IF YES
2015  017616  104011                          HLT     11              ;MAR ERROR
2016  017620  005202                  3$:     INC     R2              ;NEXT ADDRESS
2017  017622  022702  002000                  CMP     #2000,R2        ;DONE YET?
2018  017626  001364                          BNE     2$              ;BR IF NO
2019  017630  104400                  4$:     SCOPE                   ;SCOPE THIS TEST
2020
2021
2022                                          ;*************************** TEST 12 ****************************
2023                                          ;*IOP (CRAM) ODT BITS TEST
2024                                          ;*LOAD MAR WITH A 0 INC MAR UNTIL IT OVERFLOWS (2000 TIMES)
2025                                          ;*VERIFY THAT IBUS* 10 BITS IS SET ONLY WHEN MAR BIT 8 IS A ONE
2026                                          ;*AND THAT IBUS* 10 BIT6 IS SET ON MAR OVERFLOW(2000)
2027                                          ;:************************************************************
2028
2029                                          ;  TEST 12
```

```
2030
2031  017632  012737  000012  001226          TST12:  MOV     #12,TSTNO
2032  017640  012737  020040  001216                  MOV     #TST13,NEXT
2033  017646  012737  017674  001220                  MOV     #1$,LOCK
2034                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2035  017654  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
2036  017656  032737  100000  001366                  BIT     #BIT15,STAT1    ;IS THIS AN IOP?
2037  017664  001464                                  BEQ     2$              ;SKIP TEST IF NO
2038  017666  005002                                  CLR     R2              ;R2=SAME AS MAR CONTENTS
2039  017670  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2040  017672  010000                                  010000                  ;MAR←0
2041  017674                                  1$:
2042  017674  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2043  017676  121204                                  121204                  ;PORT4=IBUS* 10
2044  017700  005005                                  CLR     R5              ;R5="EXPECTED"
2045  017702  032702  000400                          BIT     #BIT8,R2        ;IS BIT8 SET IN MAR?
2046  017706  001402                                  BEQ     .+6             ;BR IF NO
2047  017710  012705  000040                          MOV     #BIT5,R5        ;IF YES THEN SET BITS
2048  017714  016104  000004                          MOV     4(R1),R4        ;R4="FOUND"
2049  017720  042704  177637                          BIC     #177637,R4      ;CLEAR UNWANTED BITS
2050  017724  020504                                  CMP     R5,R4           ;BITS 5&6 SHOULD BE CLEAR
2051  017726  001401                                  BEQ     .+4             ;BR IF OK
2052  017730  104007                                  HLT     7               ;ERROR BITS 5&6 NOT CLEAR
2053  017732  104401                                  SCOP1                   ;LOOP TO 11$ IF SW09=1
2054  017734  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2055  017736  014000                                  014000                  ;INC MAR
2056  017740  005202                                  INC     R2              ;BUMP MEM ADDRESS
2057  017742  022702  002000                          CMP     #2000,R2        ;OVERFLOWED YET?
2058  017746  001352                                  BNE     1$              ;BR IF NO
2059  017750  005037  001220                          CLR     LOCK            ;NO MORE SCOP1
2060  017754  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2061  017756  121204                                  121204                  ;PART4←IBUS* 10
2062  017760  012705  000100                          MOV     #BIT6,R5        ;R5="EXPECTED"
2063  017764  016104  000004                          MOV     4(R1),R4        ;R4="FOUND"
2064  017770  042704  177637                          BIC     #177637,R4      ;CLEAR UNWANTED BITS
2065  017774  020504                                  CMP     R5,R4           ;BIT6 SHOULD BE SET
2066  017776  001401                                  BEQ     .+4             ;BR IF OK
2067  020000  104007                                  HLT     7               ;ERROR, BIT6 NOT SET
2068  020002  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2069  020004  010000                                  010000                  ;MAR←0
2070  020006  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2071  020010  004000                                  004000                  ;MAR HI←0
2072  020012  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2073  020014  121204                                  121204                  ;PORT4←IBUS* 10
2074  020016  005005                                  CLR     R5              ;R5="EXPECTED"
2075  020020  016104  000004                          MOV     4(R1),R4        ;R4="FOUND"
2076  020024  042704  177637                          BIC     #177637,R4      ;CLEAR UNWANTED BITS
2077  020030  020504                                  CMP     R5,R4           ;BITS 5&6 SHOULD BE CLEAR
2078  020032  001401                                  BEQ     .+4             ;BR IF OK
2079  020034  104007                                  HLT     7               ;ERROR 5&6 NOT BOTH CLEAR
2080  020036  104400                          2$:     SCOPE                   ;SCOPE THIS TEST
2081
2082
2083                                                  ;*************************** TEST 13 ****************************
2084                                                  ;*CROM READ TEST
2085                                                  ;*THIS TEST READS EACH ROM LOCATION AND COMPARES
```

```
2086                                                ;*IT TO A SOFTWARE DUPLICATE OF THE CROM. THIS TEST
2087                                                ;*ALSO TESTS THE JUMP(I) MICRO-PROCESSOR INSTRUCTION.
2088                                                ;:*****************************************************************
2089
2090                                                ;  TEST 13
2091                                                ;--------------
2092  020040  012737  000013  001226      TST13:    MOV     #13,TSTNO
2093  020046  012737  020230  001216                MOV     #TST14,NEXT
2094  020054  012737  020106  001220                MOV     #1$,LOCK
2095                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2096  020062  104412                               MSTCLR                ;MASTER CLEAR DMC11
2097  020064  032737  100000  001366                BIT     #BIT15,STAT1  ;IS IT RAM OR ROM
2098  020072  001055                               BNE     4$            ;SKIP TEST IF CRAM
2099  020074  005011                               CLR     (R1)          ;CLEAR RUN
2100  020076  012700  011766                       MOV     #ROMMAP,R0    ;R0 POINTS TO SOFTWARE ROM MAP
2101  020102  005002                               CLR     R2            ;R2 CONTAINS ROM ADDRESS BITS 0-7
2102  020104  005003                               CLR     R3            ;R3 CONTAINS ROM ADDRESS BITS 8&9 IN BITS 11&12
2103  020106  042737  014377  020126      1$:     BIC     #14377,2$     ;CLEAR ADDRESS FIELDS OF INSTRUCTION
2104  020114  050237  020126                       BIS     R2,2$         ;ADD BITS 0-7 TO INSTRUCTION
2105  020120  050337  020126                       BIS     R3,2$         ;ADD BITS 11&12 TO INSTRUCTION
2106  020124  104414                               ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2107  020126  100400                       2$:     100400                ;JUMP(I) TO ROM ADDRESS IN R2 & R3
2108  020130  012711  002000                       MOV     #BIT10,(R1)   ;SET ROMO
2109  020134  011005                               MOV     (R0),R5       ;PUT "EXPECTED" IN R5
2110  020136  016104  000006                       MOV     6(R1),R4      ;PUT "FOUND" IN R4
2111  020142  020504                               CMP     R5,R4         ;COMPARE ROM CONTENTS TO SOFT DUP
2112  020144  001414                               BEQ     3$            ;BR IF OK
2113  020146  010337  001252                       MOV     R3,TEMP3      ;PUT ROM ADDRESS IN TEMP3
2114  020152  000241                               CLC                   ;FOR ERROR TYPEOUT
2115  020154  006037  001252                       ROR     TEMP3
2116  020160  006037  001252                       ROR     TEMP3
2117  020164  006037  001252                       ROR     TEMP3
2118  020170  050237  001252                       BIS     R2,TEMP3      ;TEMP3 NOW CONTAINS CORRECT ADDRESS
2119  020174  104004                               HLT     4             ;ROM READ ERROR
2120  020176  104401                       3$:     SCOP1                 ;LOOP TO 1$ IF SW09=1
2121  020200  005720                               TST     (R0)+         ;BUMP SOFT POINTER
2122  020202  005202                               INC     R2            ;BUMP ROM ADDRESS
2123  020204  022702  000400                       CMP     #400,R2       ;IS R2 TO MAX YET?
2124  020210  001336                               BNE     1$            ;BR IF NO
2125  020212  005002                               CLR     R2            ;YES, RESET R2 TO 0
2126  020214  062703  004000                       ADD     #4000,R3      ;INC  TO NEXT PAGE OF ROM
2127  020220  022703  020000                       CMP     #20000,R3     ;DONE YET?
2128  020224  001330                               BNE     1$            ;BR IF NO
2129  020226  104400                       4$:     SCOPE                 ;SCOPE THIS TEST
2130
2131
2132                                                ;*************************** TEST 14 ****************************
2133                                                ;*CROM TEST OF JUMP(I) NEVER MICRO-PROCESSOR INSTRUCTION.
2134                                                ;*PERFORM THE JUMP INSTRUCTION
2135                                                ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2136                                                ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2137                                                ;:*****************************************************************
2138
2139                                                ;  TEST 14
2140                                                ;--------------
2141  020230  012737  000014  001226      TST14:    MOV     #14,TSTNO
```

```
2142  020236  012737  020420  001216                  MOV     #TST15,NEXT
2143  020244  012737  020264  001220                  MOV     #1$,LOCK
2144                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2145  020252  104412                                   MSTCLR                ;MASTER CLEAR DMC11
2146  020254  032737  100000  001366                  BIT     #BIT15,STAT1  ;IS IT CRAM?
2147  020262  001055                                   BNE     6$+2          ;SKIP TEST IF YES
2148  020264                                    1$:
2149  020264  004737  035430                         JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2150  020270  104414                                   ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2151  020272  100400                                   100400                ;START AT ROM PC=0
2152  020274  104414                                   ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2153  020276  114377                                   114377!<400*0>        ;JUMP TO ROM PC OF 1777
2154  020300  004737  035522                         JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2155  020304  000002                                   2                     ;INDEX
2156  020306  020504                                   CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
2157  020310  001401                                   BEQ     2$            ;BR IF YES
2158  020312  104006                                   HLT     6             ;ERROR, CROM PC IS WRONG
2159  020314  104401                            2$:    SCOP1                 ;LOOP TO 1$ IF SW09=1
2160  020316  012737  020324  001220                  MOV     #3$,LOCK      ;NEW SCOP1
2161  020324                                    3$:
2162  020324  004737  035430                         JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2163  020330  104414                                   ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2164  020332  100403                                   100403                ;START AT ROM PC=3
2165  020334  104414                                   ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2166  020336  100000                                   100000!<400*0>  ;JUMP TO ROM PC OF 0
2167  020340  004737  035522                         JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2168  020344  000010                                   10                    ;INDEX
2169  020346  020504                                   CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
2170  020350  001401                                   BEQ     4$            ;BR IF YES
2171  020352  104006                                   HLT     6             ;ERROR, CROM PC IS WRONG
2172  020354  104401                            4$:    SCOP1                 ;LOOP TO 3$ IF SW09=1
2173  020356  012737  020364  001220                  MOV     #5$,LOCK      ;NEW SCOP1
2174  020364                                    5$:
2175  020364  004737  035430                         JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2176  020370  104414                                   ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2177  020372  100406                                   100406                ;START AT ROM PC=6
2178  020374  104414                                   ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2179  020376  104125                                   104125!<400*0>        ;JUMP TO ROM PC OF 525
2180  020400  004737  035522                         JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2181  020404  000016                                   16                    ;INDEX
2182  020406  020504                                   CMP     R5,R4         ;ARE NEW ROM PC CONTENTS CORRECT?
2183  020410  001401                                   BEQ     6$            ;BR IF YES
2184  020412  104006                                   HLT     6             ;ERROR, CROM PC IS WRONG
2185  020414  104401                            6$:    SCOP1                 ;LOOP TO 5$ IF SW59=1
2186  020416  104400                                   SCOPE                 ;SCOPE THIS TEST
2187
2188
2189                                                    ;*************************** TEST 15 ***************************
2190                                                    ;*CROM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
2191                                                    ;*PERFORM THE JUMP INSTRUCTION
2192                                                    ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2193                                                    ;:***************************************************************
2194
2195                                                    ;  TEST 15
2196                                                    ;--------------
2197  020420  012737  000015  001226            TST15:  MOV     #15,TSTNO
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2198  020426  012737  020574  001216                  MOV     #TST16,NEXT
2199  020434  012737  020454  001220                  MOV     #1$,LOCK
2200                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2201  020442  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
2202  020444  032737  100000  001366                  BIT     #BIT15,STAT1    ;IS IT CRAM?
2203  020452  001047                                   BNE     6$+2            ;SKIP TEST IF YES
2204  020454                                  1$:
2205  020454  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2206  020456  100400                                   100400                  ;START AT ROM PC=0
2207  020460  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2208  020462  114777                                   114377!<400*1>          ;JUMP TO ROM PC OF 1777
2209  020464  004737  035522                          JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2210  020470  003776                                   3776                    ;INDEX
2211  020472  020504                                   CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2212  020474  001401                                   BEQ     2$              ;BR IF YES
2213  020476  104006                                   HLT     6               ;ERROR, CROM PC IS WRONG
2214  020500  104401                                  2$:     SCOP1           ;LOOP TO 1$ IF SW09=1
2215  020502  012737  020510  001220                  MOV     #3$,LOCK        ;NEW SCOP1
2216  020510                                  3$:
2217  020510  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2218  020512  100403                                   100403                  ;START AT ROM PC=3
2219  020514  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2220  020516  100400                                   100000!<400*1>  ;JUMP TO ROM PC OF 0
2221  020520  004737  035522                          JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2222  020524  000000                                   0                       ;INDEX
2223  020526  020504                                   CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2224  020530  001401                                   BEQ     4$              ;BR IF YES
2225  020532  104006                                   HLT     6               ;ERROR, CROM PC IS WRONG
2226  020534  104401                                  4$:     SCOP1           ;LOOP TO 3$ IF SW09=1
2227  020536  012737  020544  001220                  MOV     #5$,LOCK        ;NEW SCOP1
2228  020544                                  5$:
2229  020544  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2230  020546  100406                                   100406                  ;START AT ROM PC=6
2231  020550  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2232  020552  104525                                   104125!<400*1>          ;JUMP TO ROM PC OF 525
2233  020554  004737  035522                          JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2234  020560  001252                                   1252                    ;INDEX
2235  020562  020504                                   CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2236  020564  001401                                   BEQ     6$              ;BR IF YES
2237  020566  104006                                   HLT     6               ;ERROR, CROM PC IS WRONG
2238  020570  104401                                  6$:     SCOP1           ;LOOP TO 5$ IF SW59=1
2239  020572  104400                                   SCOPE                   ;SCOPE THIS TEST
2240
2241
2242                                                   ;*************************** TEST 16 ***************************
2243                                                   ;*CROM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
2244                                                   ;*SET THE C BIT, PERFORM THE JUMP INSTRUCTION,
2245                                                   ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2246                                                   ;:***********************************************************
2247
2248                                                   ;  TEST 16
2249                                                   ;--------------
2250  020574  012737  000016  001226          TST16:  MOV     #16,TSTNO
2251  020602  012737  020764  001216                  MOV     #TST17,NEXT
2252  020610  012737  020630  001220                  MOV     #1$,LOCK
2253                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
```

```
2254  020616  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2255  020620  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2256  020626  001055                          BNE     6$+2            ;SKIP TEST IF YES
2257  020630                          1$:
2258  020630  004737  035476                  JSR     PC,SETC ;SET THE C BIT'
2259  020634  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2260  020636  100400                          100400                  ;START AT ROM PC=0
2261  020640  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2262  020642  115377                          114377!<400*2>          ;JUMP TO ROM PC OF 1777
2263  020644  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2264  020650  003776                          3776                    ;INDEX
2265  020652  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2266  020654  001401                          BEQ     2$              ;BR IF YES
2267  020656  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2268  020660  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2269  020662  012737  020670  001220          MOV     #3$,LOCK        ;NEW SCOP1
2270  020670                          3$:
2271  020670  004737  035476                  JSR     PC,SETC ;SET THE C BIT'
2272  020674  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2273  020676  100403                          100403                  ;START AT ROM PC=3
2274  020700  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2275  020702  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
2276  020704  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2277  020710  000000                          0                       ;INDEX
2278  020712  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2279  020714  001401                          BEQ     4$              ;BR IF YES
2280  020716  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2281  020720  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2282  020722  012737  020730  001220          MOV     #5$,LOCK        ;NEW SCOP1
2283  020730                          5$:
2284  020730  004737  035476                  JSR     PC,SETC ;SET THE C BIT'
2285  020734  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2286  020736  100406                          100406                  ;START AT ROM PC=6
2287  020740  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2288  020742  105125                          104125!<400*2>          ;JUMP TO ROM PC OF 525
2289  020744  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2290  020750  001252                          1252                    ;INDEX
2291  020752  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2292  020754  001401                          BEQ     6$              ;BR IF YES
2293  020756  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2294  020760  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2295  020762  104400                          SCOPE                   ;SCOPE THIS TEST
2296
2297
2298                                          ;*************************** TEST 17 ***************************
2299                                          ;*CROM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
2300                                          ;*SET THE Z BIT, PERFORM THE JUMP INSTRUCTION,
2301                                          ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2302                                          ;:***********************************************************************
2303
2304                                          ;  TEST 17
2305                                          ;--------------
2306  020764  012737  000017  001226  TST17:  MOV     #17,TSTNO
2307  020772  012737  021154  001216          MOV     #TST20,NEXT
2308  021000  012737  021020  001220          MOV     #1$,LOCK
2309                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
```

```
2310  021006  104412                        MSTCLR                  ;MASTER CLEAR DMC11
2311  021010  032737  100000  001366        BIT     #BIT15,STAT1    ;IS IT CRAM?
2312  021016  001055                        BNE     6$+2            ;SKIP TEST IF YES
2313  021020                          1$:
2314  021020  004737  035514                JSR     PC,SETZ ;SET THE Z BIT'
2315  021024  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2316  021026  100400                        100400                  ;START AT ROM PC=0
2317  021030  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2318  021032  115777                        114377!<400*3>          ;JUMP TO ROM PC OF 1777
2319  021034  004737  035522                JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2320  021040  003776                        3776                    ;INDEX
2321  021042  020504                        CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2322  021044  001401                        BEQ     2$              ;BR IF YES
2323  021046  104006                        HLT     6               ;ERROR, CROM PC IS WRONG
2324  021050  104401                  2$:   SCOP1                   ;LOOP TO 1$ IF SW09=1
2325  021052  012737  021060  001220        MOV     #3$,LOCK        ;NEW SCOP1
2326  021060                          3$:
2327  021060  004737  035514                JSR     PC,SETZ ;SET THE Z BIT'
2328  021064  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2329  021066  100403                        100403                  ;START AT ROM PC=3
2330  021070  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2331  021072  101400                        100000!<400*3>  ;JUMP TO ROM PC OF 0
2332  021074  004737  035522                JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2333  021100  000000                        0                       ;INDEX
2334  021102  020504                        CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2335  021104  001401                        BEQ     4$              ;BR IF YES
2336  021106  104006                        HLT     6               ;ERROR, CROM PC IS WRONG
2337  021110  104401                  4$:   SCOP1                   ;LOOP TO 3$ IF SW09=1
2338  021112  012737  021120  001220        MOV     #5$,LOCK        ;NEW SCOP1
2339  021120                          5$:
2340  021120  004737  035514                JSR     PC,SETZ ;SET THE Z BIT'
2341  021124  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2342  021126  100406                        100406                  ;START AT ROM PC=6
2343  021130  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2344  021132  105525                        104125!<400*3>          ;JUMP TO ROM PC OF 525
2345  021134  004737  035522                JSR     PC,RCMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2346  021140  001252                        1252                    ;INDEX
2347  021142  020504                        CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2348  021144  001401                        BEQ     6$              ;BR IF YES
2349  021146  104006                        HLT     6               ;ERROR, CROM PC IS WRONG
2350  021150  104401                  6$:   SCOP1                   ;LOOP TO 5$ IF SW59=1
2351  021152  104400                        SCOPE                   ;SCOPE THIS TEST
2352
2353
2354                                        ;*************************** TEST 20 ****************************
2355                                        ;*CROM TEST OF JUMP(I) ON BRO SET MICRO-PROCESSOR INSTRUCTION.
2356                                        ;*SET THE BRO BIT, PERFORM THE JUMP INSTRUCTION,
2357                                        ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2358                                        ;:************************************************************
2359
2360                                        ;  TEST 20
2361                                        ;--------------
2362  021154  012737  000020  001226  TST20: MOV     #20,TSTNO
2363  021162  012737  021344  001216        MOV     #TST21,NEXT
2364  021170  012737  021210  001220        MOV     #1$,LOCK
2365                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
```

```
2366  021176  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2367  021200  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2368  021206  001055                          BNE     6$+2            ;SKIP TEST IF YES
2369  021210                          1$:
2370  021210  004737  035446                  JSR     PC,SETBRQ       ;SET THE BRQ BIT'
2371  021214  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2372  021216  100400                          100400                  ;START AT ROM PC=0
2373  021220  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2374  021222  116377                          114377!<400*4>          ;JUMP TO ROM PC OF 1777
2375  021224  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2376  021230  003776                          3776                    ;INDEX
2377  021232  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2378  021234  001401                          BEQ     2$              ;BR IF YES
2379  021236  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2380  021240  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2381  021242  012737  021250  001220          MOV     #3$,LOCK        ;NEW SCOP1
2382  021250                          3$:
2383  021250  004737  035446                  JSR     PC,SETBRQ       ;SET THE BRQ BIT'
2384  021254  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2385  021256  100403                          100403                  ;START AT ROM PC=3
2386  021260  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2387  021262  102000                          100000!<400*4>  ;JUMP TO ROM PC OF 0
2388  021264  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2389  021270  000000                          0                       ;INDEX
2390  021272  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2391  021274  001401                          BEQ     4$              ;BR IF YES
2392  021276  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2393  021300  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2394  021302  012737  021310  001220          MOV     #5$,LOCK        ;NEW SCOP1
2395  021310                          5$:
2396  021310  004737  035446                  JSR     PC,SETBRQ       ;SET THE BRQ BIT'
2397  021314  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2398  021316  100406                          100406                  ;START AT ROM PC=6
2399  021320  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2400  021322  106125                          104125!<400*4>          ;JUMP TO ROM PC OF 525
2401  021324  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2402  021330  001252                          1252                    ;INDEX
2403  021332  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2404  021334  001401                          BEQ     6$              ;BR IF YES
2405  021336  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2406  021340  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2407  021342  104400                          SCOPE                   ;SCOPE THIS TEST
2408
2409
2410                                          ;*************************** TEST 21 ***************************
2411                                          ;*CROM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
2412                                          ;*SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
2413                                          ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2414                                          ;:***********************************************************************
2415
2416                                          ;  TEST 21
2417                                          ;--------------
2418  021344  012737  000021  001226  TST21:  MOV     #21,TSTNO
2419  021352  012737  021534  001216          MOV     #TST22,NEXT
2420  021360  012737  021400  001220          MOV     #1$,LOCK
2421                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
```

```
2422  021366  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2423  021370  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2424  021376  001055                          BNE     6$+2            ;SKIP TEST IF YES
2425  021400                          1$:
2426  021400  004737  035454                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
2427  021404  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2428  021406  100400                          100400                  ;START AT ROM PC=0
2429  021410  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2430  021412  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
2431  021414  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2432  021420  003776                          3776                    ;INDEX
2433  021422  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2434  021424  001401                          BEQ     2$              ;BR IF YES
2435  021426  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2436  021430  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2437  021432  012737  021440  001220          MOV     #3$,LOCK        ;NEW SCOP1
2438  021440                          3$:
2439  021440  004737  035454                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
2440  021444  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2441  021446  100403                          100403                  ;START AT ROM PC=3
2442  021450  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2443  021452  102400                          100000!<400*5>  ;JUMP TO ROM PC OF 0
2444  021454  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2445  021460  000000                          0                       ;INDEX
2446  021462  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2447  021464  001401                          BEQ     4$              ;BR IF YES
2448  021466  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2449  021470  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2450  021472  012737  021500  001220          MOV     #5$,LOCK        ;NEW SCOP1
2451  021500                          5$:
2452  021500  004737  035454                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
2453  021504  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2454  021506  100406                          100406                  ;START AT ROM PC=6
2455  021510  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2456  021512  106525                          104125!<400*5>          ;JUMP TO ROM PC OF 525
2457  021514  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2458  021520  001252                          1252                    ;INDEX
2459  021522  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2460  021524  001401                          BEQ     6$              ;BR IF YES
2461  021526  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2462  021530  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2463  021532  104400                          SCOPE                   ;SCOPE THIS TEST
2464
2465
2466                                          ;*************************** TEST 22 ***************************
2467                                          ;*CROM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
2468                                          ;*SET THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
2469                                          ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2470                                          ;:***********************************************************************
2471
2472                                          ;  TEST 22
2473                                          ;--------------
2474  021534  012737  000022  001226  TST22:  MOV     #22,TSTNO
2475  021542  012737  021724  001216          MOV     #TST23,NEXT
2476  021550  012737  021570  001220          MOV     #1$,LOCK
2477                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
```

```
2478  021556  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2479  021560  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2480  021566  001055                          BNE     6$+2            ;SKIP TEST IF YES
2481  021570                          1$:
2482  021570  004737  035462                  JSR     PC,SETBR4       ;SET THE BR4 BIT'
2483  021574  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2484  021576  100400                          100400                  ;START AT ROM PC=0
2485  021600  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2486  021602  117377                          114377!<400*6>          ;JUMP TO ROM PC OF 1777
2487  021604  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2488  021610  003776                          3776                    ;INDEX
2489  021612  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2490  021614  001401                          BEQ     2$              ;BR IF YES
2491  021616  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2492  021620  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2493  021622  012737  021630  001220          MOV     #3$,LOCK        ;NEW SCOP1
2494  021630                          3$:
2495  021630  004737  035462                  JSR     PC,SETBR4       ;SET THE BR4 BIT'
2496  021634  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2497  021636  100403                          100403                  ;START AT ROM PC=3
2498  021640  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2499  021642  103000                          100000!<400*6>  ;JUMP TO ROM PC OF 0
2500  021644  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2501  021650  000000                          0                       ;INDEX
2502  021652  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2503  021654  001401                          BEQ     4$              ;BR IF YES
2504  021656  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2505  021660  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2506  021662  012737  021670  001220          MOV     #5$,LOCK        ;NEW SCOP1
2507  021670                          5$:
2508  021670  004737  035462                  JSR     PC,SETBR4       ;SET THE BR4 BIT'
2509  021674  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2510  021676  100406                          100406                  ;START AT ROM PC=6
2511  021700  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2512  021702  107125                          104125!<400*6>          ;JUMP TO ROM PC OF 525
2513  021704  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2514  021710  001252                          1252                    ;INDEX
2515  021712  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2516  021714  001401                          BEQ     6$              ;BR IF YES
2517  021716  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2518  021720  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2519  021722  104400                          SCOPE                   ;SCOPE THIS TEST
2520
2521
2522                                          ;*************************** TEST 23 ****************************
2523                                          ;*CROM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
2524                                          ;*SET THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
2525                                          ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2526                                          ;:************************************************************
2527
2528                                          ;  TEST 23
2529                                          ;--------------
2530  021724  012737  000023  001226  TST23:  MOV     #23,TSTNO
2531  021732  012737  022114  001216          MOV     #TST24,NEXT
2532  021740  012737  021760  001220          MOV     #1$,LOCK
2533                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
```

```
2534  021746  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2535  021750  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2536  021756  001055                          BNE     6$+2            ;SKIP TEST IF YES
2537  021760                          1$:
2538  021760  004737  035470                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
2539  021764  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2540  021766  100400                          100400                  ;START AT ROM PC=0
2541  021770  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2542  021772  117777                          114377!<400*7>          ;JUMP TO ROM PC OF 1777
2543  021774  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2544  022000  003776                          3776                    ;INDEX
2545  022002  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2546  022004  001401                          BEQ     2$              ;BR IF YES
2547  022006  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2548  022010  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2549  022012  012737  022020  001220          MOV     #3$,LOCK        ;NEW SCOP1
2550  022020                          3$:
2551  022020  004737  035470                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
2552  022024  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2553  022026  100403                          100403                  ;START AT ROM PC=3
2554  022030  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2555  022032  103400                          100000!<400*7>  ;JUMP TO ROM PC OF 0
2556  022034  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2557  022040  000000                          0                       ;INDEX
2558  022042  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2559  022044  001401                          BEQ     4$              ;BR IF YES
2560  022046  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2561  022050  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2562  022052  012737  022060  001220          MOV     #5$,LOCK        ;NEW SCOP1
2563  022060                          5$:
2564  022060  004737  035470                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
2565  022064  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2566  022066  100406                          100406                  ;START AT ROM PC=6
2567  022070  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2568  022072  107525                          104125!<400*7>          ;JUMP TO ROM PC OF 525
2569  022074  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2570  022100  001252                          1252                    ;INDEX
2571  022102  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2572  022104  001401                          BEQ     6$              ;BR IF YES
2573  022106  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2574  022110  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2575  022112  104400                          SCOPE                   ;SCOPE THIS TEST
2576
2577
2578                                          ;*************************** TEST 24 ****************************
2579                                          ;*CROM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
2580                                          ;*CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
2581                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2582                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2583                                          ;:****************************************************************
2584
2585                                          ;  TEST 24
2586                                          ;--------------
2587  022114  012737  000024  001226  TST24:  MOV     #24,TSTNO
2588  022122  012737  022304  001216          MOV     #TST25,NEXT
2589  022130  012737  022150  001220          MOV     #1$,LOCK
```

```
2590
2591  022136  104412                        MSTCLR                  ;R1 CONTAINS BASE DMC11 ADDRESS
2592  022140  032737  100000  001366        BIT     #BIT15,STAT1    ;MASTER CLEAR DMC11
2593  022146  001055                        BNE     6$+2            ;IS IT CRAM?
2594  022150                          1$:                           ;SKIP TEST IF YES
2595  022150  004737  035430                JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2596  022154  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2597  022156  100400                        100400                  ;START AT ROM PC=0
2598  022160  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2599  022162  115377                        114377!<400*2>          ;JUMP TO ROM PC OF 1777
2600  022164  004737  035522                JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2601  022170  000002                        2                       ;INDEX
2602  022172  020504                        CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2603  022174  001401                        BEQ     2$              ;BR IF YES
2604  022176  104006                        HLT     6               ;ERROR, CROM PC IS WRONG
2605  022200  104401                  2$:   SCOP1                   ;LOOP TO 1$ IF SW09=1
2606  022202  012737  022210  001220        MOV     #3$,LOCK        ;NEW SCOP1
2607  022210                          3$:
2608  022210  004737  035430                JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2609  022214  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2610  022216  100403                        100403                  ;START AT ROM PC=3
2611  022220  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2612  022222  101000                        100000!<400*2>  ;JUMP TO ROM PC OF 0
2613  022224  004737  035522                JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2614  022230  000010                        10                      ;INDEX
2615  022232  020504                        CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2616  022234  001401                        BEQ     4$              ;BR IF YES
2617  022236  104006                        HLT     6               ;ERROR, CROM PC IS WRONG
2618  022240  104401                  4$:   SCOP1                   ;LOOP TO 3$ IF SW09=1
2619  022242  012737  022250  001220        MOV     #5$,LOCK        ;NEW SCOP1
2620  022250                          5$:
2621  022250  004737  035430                JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2622  022254  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2623  022256  100406                        100406                  ;START AT ROM PC=6
2624  022260  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2625  022262  105125                        104125!<400*2>          ;JUMP TO ROM PC OF 525
2626  022264  004737  035522                JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2627  022270  000016                        16                      ;INDEX
2628  022272  020504                        CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2629  022274  001401                        BEQ     6$              ;BR IF YES
2630  022276  104006                        HLT     6               ;ERROR, CROM PC IS WRONG
2631  022300  104401                  6$:   SCOP1                   ;LOOP TO 5$ IF SW59=1
2632  022302  104400                        SCOPE                   ;SCOPE THIS TEST
2633
2634
2635                                        ;************************** TEST 25 **************************
2636                                        ;*CROM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
2637                                        ;*CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
2638                                        ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2639                                        ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2640                                        ;:************************************************************
2641
2642                                        ;  TEST 25
2643                                        ;--------------
2644  022304  012737  000025  001226  TST25: MOV     #25,TSTNO
2645  022312  012737  022474  001216        MOV     #TST26,NEXT
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2646  022320  012737  022340  001220                MOV     #1$,LOCK
2647
2648  022326  104412                                MSTCLR                  ;R1 CONTAINS BASE DMC11 ADDRESS
2649  022330  032737  100000  001366                BIT     #BIT15,STAT1    ;MASTER CLEAR DMC11
2650  022336  001055                                BNE     6$+2            ;IS IT CRAM?
2651  022340                                1$:     ;SKIP TEST IF YES
2652  022340  004737  035430                        JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2653  022344  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2654  022346  100400                                100400                  ;START AT ROM PC=0
2655  022350  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2656  022352  115777                                114377!<400*3>          ;JUMP TO ROM PC OF 1777
2657  022354  004737  035522                        JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2658  022360  000002                                2                       ;INDEX
2659  022362  020504                                CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2660  022364  001401                                BEQ     2$              ;BR IF YES
2661  022366  104006                                HLT     6               ;ERROR, CROM PC IS WRONG
2662  022370  104401                        2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2663  022372  012737  022400  001220                MOV     #3$,LOCK        ;NEW SCOP1
2664  022400                                3$:
2665  022400  004737  035430                        JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2666  022404  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2667  022406  100403                                100403                  ;START AT ROM PC=3
2668  022410  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2669  022412  101400                                100000!<400*3>  ;JUMP TO ROM PC OF 0
2670  022414  004737  035522                        JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2671  022420  000010                                10                      ;INDEX
2672  022422  020504                                CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2673  022424  001401                                BEQ     4$              ;BR IF YES
2674  022426  104006                                HLT     6               ;ERROR, CROM PC IS WRONG
2675  022430  104401                        4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2676  022432  012737  022440  001220                MOV     #5$,LOCK        ;NEW SCOP1
2677  022440                                5$:
2678  022440  004737  035430                        JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2679  022444  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2680  022446  100406                                100406                  ;START AT ROM PC=6
2681  022450  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2682  022452  105525                                104125!<400*3>          ;JUMP TO ROM PC OF 525
2683  022454  004737  035522                        JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2684  022460  000016                                16                      ;INDEX
2685  022462  020504                                CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2686  022464  001401                                BEQ     6$              ;BR IF YES
2687  022466  104006                                HLT     6               ;ERROR, CROM PC IS WRONG
2688  022470  104401                        6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2689  022472  104400                                SCOPE                   ;SCOPE THIS TEST
2690
2691
2692                                                ;*************************** TEST 26 ***************************
2693                                                ;*CROM TEST OF JUMP(I) ON BRO SET MICRO-PROCESSOR INSTRUCTION.
2694                                                ;*CLEAR THE BRO BIT, PERFORM THE JUMP INSTRUCTION,
2695                                                ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2696                                                ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2697                                                ;:***********************************************************
2698
2699                                                ;  TEST 26
2700                                                ;--------------
2701  022474  012737  000026  001226        TST26:  MOV     #26,TSTNO
```

```
2702  022502  012737  022664  001216                MOV     #TST27,NEXT
2703  022510  012737  022530  001220                MOV     #1$,LOCK
2704                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
2705  022516  104412                                 MSTCLR                ;MASTER CLEAR DMC11
2706  022520  032737  100000  001366                BIT     #BIT15,STAT1  ;IS IT CRAM?
2707  022526  001055                                 BNE     6$+2          ;SKIP TEST IF YES
2708  022530                                1$:
2709  022530  004737  035430                        JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2710  022534  104414                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2711  022536  100400                                 100400                ;START AT ROM PC=0
2712  022540  104414                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2713  022542  116377                                 114377!<400*4>        ;JUMP TO ROM PC OF 1777
2714  022544  004737  035522                        JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2715  022550  000002                                 2                     ;INDEX
2716  022552  020504                                 CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
2717  022554  001401                                 BEQ     2$            ;BR IF YES
2718  022556  104006                                 HLT     6             ;ERROR, CROM PC IS WRONG
2719  022560  104401                        2$:     SCOP1                 ;LOOP TO 1$ IF SW09=1
2720  022562  012737  022570  001220                MOV     #3$,LOCK      ;NEW SCOP1
2721  022570                                3$:
2722  022570  004737  035430                        JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2723  022574  104414                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2724  022576  100403                                 100403                ;START AT ROM PC=3
2725  022600  104414                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2726  022602  102000                                 100000!<400*4>  ;JUMP TO ROM PC OF 0
2727  022604  004737  035522                        JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2728  022610  000010                                 10                    ;INDEX
2729  022612  020504                                 CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
2730  022614  001401                                 BEQ     4$            ;BR IF YES
2731  022616  104006                                 HLT     6             ;ERROR, CROM PC IS WRONG
2732  022620  104401                        4$:     SCOP1                 ;LOOP TO 3$ IF SW09=1
2733  022622  012737  022630  001220                MOV     #5$,LOCK      ;NEW SCOP1
2734  022630                                5$:
2735  022630  004737  035430                        JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2736  022634  104414                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2737  022636  100406                                 100406                ;START AT ROM PC=6
2738  022640  104414                                 ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2739  022642  106125                                 104125!<400*4>        ;JUMP TO ROM PC OF 525
2740  022644  004737  035522                        JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2741  022650  000016                                 16                    ;INDEX
2742  022652  020504                                 CMP     R5,R4         ;ARE NEW ROM PC CONTENTS CORRECT?
2743  022654  001401                                 BEQ     6$            ;BR IF YES
2744  022656  104006                                 HLT     6             ;ERROR, CROM PC IS WRONG
2745  022660  104401                        6$:     SCOP1                 ;LOOP TO 5$ IF SW59=1
2746  022662  104400                                 SCOPE                 ;SCOPE THIS TEST
2747
2748
2749                                                ;*************************** TEST 27 ***************************
2750                                                ;*CROM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
2751                                                ;*CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
2752                                                ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2753                                                ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2754                                                ;;***********************************************************
2755
2756                                                ;  TEST 27
2757                                                ;--------------
```

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2758  022664  012737  000027  001226  TST27:  MOV     #27,TSTNO
2759  022672  012737  023054  001216          MOV     #TST30,NEXT
2760  022700  012737  022720  001220          MOV     #1$,LOCK
2761                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2762  022706  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2763  022710  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2764  022716  001055                          BNE     6$+2            ;SKIP TEST IF YES
2765  022720                          1$:
2766  022720  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2767  022724  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2768  022726  100400                          100400                  ;START AT ROM PC=0
2769  022730  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2770  022732  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
2771  022734  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2772  022740  000002                          2                       ;INDEX
2773  022742  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2774  022744  001401                          BEQ     2$              ;BR IF YES
2775  022746  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2776  022750  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2777  022752  012737  022760  001220          MOV     #3$,LOCK        ;NEW SCOP1
2778  022760                          3$:
2779  022760  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2780  022764  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2781  022766  100403                          100403                  ;START AT ROM PC=3
2782  022770  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2783  022772  102400                          100000!<400*5>  ;JUMP TO ROM PC OF 0
2784  022774  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2785  023000  000010                          10                      ;INDEX
2786  023002  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2787  023004  001401                          BEQ     4$              ;BR IF YES
2788  023006  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2789  023010  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2790  023012  012737  023020  001220          MOV     #5$,LOCK        ;NEW SCOP1
2791  023020                          5$:
2792  023020  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2793  023024  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2794  023026  100406                          100406                  ;START AT ROM PC=6
2795  023030  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2796  023032  106525                          104125!<400*5>          ;JUMP TO ROM PC OF 525
2797  023034  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2798  023040  000016                          16                      ;INDEX
2799  023042  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2800  023044  001401                          BEQ     6$              ;BR IF YES
2801  023046  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2802  023050  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2803  023052  104400                          SCOPE                   ;SCOPE THIS TEST
2804
2805
2806                                          ;*************************** TEST 30 ***************************
2807                                          ;*CROM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
2808                                          ;*CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
2809                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2810                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2811                                          ;:***************************************************************
2812
2813                                          ;  TEST 30
```

```
2814
2815  023054  012737  000030  001226  TST30:  MOV     #30,TSTNO
2816  023062  012737  023244  001216          MOV     #TST31,NEXT
2817  023070  012737  023110  001220          MOV     #1$,LOCK
2818                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2819  023076  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2820  023100  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2821  023106  001055                          BNE     6$+2            ;SKIP TEST IF YES
2822  023110                                  1$:
2823  023110  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2824  023114  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2825  023116  100400                          100400                  ;START AT ROM PC=0
2826  023120  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2827  023122  117377                          114377!<400*6>          ;JUMP TO ROM PC OF 1777
2828  023124  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2829  023130  000002                          2                       ;INDEX
2830  023132  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2831  023134  001401                          BEQ     2$              ;BR IF YES
2832  023136  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2833  023140  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2834  023142  012737  023150  001220          MOV     #3$,LOCK        ;NEW SCOP1
2835  023150                                  3$:
2836  023150  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2837  023154  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2838  023156  100403                          100403                  ;START AT ROM PC=3
2839  023160  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2840  023162  103000                          100000!<400*6>  ;JUMP TO ROM PC OF 0
2841  023164  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2842  023170  000010                          10                      ;INDEX
2843  023172  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2844  023174  001401                          BEQ     4$              ;BR IF YES
2845  023176  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2846  023200  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2847  023202  012737  023210  001220          MOV     #5$,LOCK        ;NEW SCOP1
2848  023210                                  5$:
2849  023210  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2850  023214  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2851  023216  100406                          100406                  ;START AT ROM PC=6
2852  023220  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2853  023222  107125                          104125!<400*6>          ;JUMP TO ROM PC OF 525
2854  023224  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2855  023230  000016                          16                      ;INDEX
2856  023232  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2857  023234  001401                          BEQ     6$              ;BR IF YES
2858  023236  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2859  023240  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2860  023242  104400                          SCOPE                   ;SCOPE THIS TEST
2861
2862
2863                                          ;*************************** TEST 31 ****************************
2864                                          ;*CROM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
2865                                          ;*CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
2866                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2867                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2868                                          ;:************************************************************
2869
```

```
2870
2871
2872  023244  012737  000031  001226  TST31:  MOV     #31,TSTNO
2873  023252  012737  023434  001216          MOV     #TST32,NEXT
2874  023260  012737  023300  001220          MOV     #1$,LOCK
2875                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2876  023266  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2877  023270  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2878  023276  001055                          BNE     6$+2            ;SKIP TEST IF YES
2879  023300                                  1$:
2880  023300  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2881  023304  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2882  023306  100400                          100400                  ;START AT ROM PC=0
2883  023310  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2884  023312  117777                          114377!<400*7>          ;JUMP TO ROM PC OF 1777
2885  023314  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2886  023320  000002                          2                       ;INDEX
2887  023322  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2888  023324  001401                          BEQ     2$              ;BR IF YES
2889  023326  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2890  023330  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2891  023332  012737  023340  001220          MOV     #3$,LOCK        ;NEW SCOP1
2892  023340                                  3$:
2893  023340  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2894  023344  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2895  023346  100403                          100403                  ;START AT ROM PC=3
2896  023350  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2897  023352  103400                          100000!<400*7>  ;JUMP TO ROM PC OF 0
2898  023354  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2899  023360  000010                          10                      ;INDEX
2900  023362  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2901  023364  001401                          BEQ     4$              ;BR IF YES
2902  023366  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2903  023370  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2904  023372  012737  023400  001220          MOV     #5$,LOCK        ;NEW SCOP1
2905  023400                                  5$:
2906  023400  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2907  023404  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2908  023406  100406                          100406                  ;START AT ROM PC=6
2909  023410  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2910  023412  107525                          104125!<400*7>          ;JUMP TO ROM PC OF 525
2911  023414  004737  035522                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2912  023420  000016                          16                      ;INDEX
2913  023422  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2914  023424  001401                          BEQ     6$              ;BR IF YES
2915  023426  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2916  023430  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2917  023432  104400                          SCOPE                   ;SCOPE THIS TEST
2918
2919
2920                                          ;*************************** TEST 32 ****************************
2921                                          ;*CRAM TEST OF JUMP(I) NEVER MICRO-PROCESSOR INSTRUCTION.
2922                                          ;*PERFORM THE JUMP INSTRUCTION
2923                                          ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
2924                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
2925                                          ;*BR WITH THE LOWEST 9 BITS OF THE CRAM PC. AT THIS POINT
```

```
2926                                                    ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
2927                                                    ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
2928                                                    ;*THEN PORT4 CONTAINS A 37
2929                                                    ;:**********************************************************************
2930
2931                                                    ;  TEST 32
2932                                                    ;--------------
2933  023434  012737  000032  001226        TST32:    MOV     #32,TSTNO
2934  023442  012737  023630  001216                  MOV     #TST33,NEXT
2935  023450  012737  023474  001220                  MOV     #1$,LOCK
2936                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
2937  023456  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
2938  023460  032737  100000  001366                  BIT     #BIT15,STAT1    ;IS IT CRAM?
2939  023466  001457                                   BEQ     6$+2            ;SKIP TEST IF NO
2940  023470  004737  035654                         JSR     PC,MEMSET       ;SET MEM AND RAM
2941  023474                                    1$:
2942  023474  004737  035430                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2943  023500  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2944  023502  100400                                   100400                  ;START AT ROM PC=0
2945  023504  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2946  023506  114377                                   114377!<400*0>          ;JUMP TO ROM PC OF 1777
2947  023510  004737  035550                         JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
2948  023514  000001                                   1                       ;EXPECTED DATA
2949  023516  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
2950  023520  001401                                   BEQ     2$              ;BR IF YES
2951  023522  104005                                   HLT     5               ;ERROR, CRAM PC IS WRONG
2952  023524  104401                              2$:  SCOP1                   ;LOOP TO 1$ IF SW09=1
2953  023526  012737  023534  001220                  MOV     #3$,LOCK        ;NEW SCOP1
2954  023534                                    3$:
2955  023534  004737  035430                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2956  023540  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2957  023542  100403                                   100403                  ;START AT ROM PC=3
2958  023544  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2959  023546  100000                                   100000!<400*0>  ;JUMP TO ROM PC OF 0
2960  023550  004737  035550                         JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
2961  023554  000004                                   4                       ;EXPECTED DATA
2962  023556  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
2963  023560  001401                                   BEQ     4$              ;BR IF YES
2964  023562  104005                                   HLT     5               ;ERROR, CRAM PC IS WRONG
2965  023564  104401                              4$:  SCOP1                   ;LOOP TO 3$ IF SW09=1
2966  023566  012737  023574  001220                  MOV     #5$,LOCK        ;NEW SCOP1
2967  023574                                    5$:
2968  023574  004737  035430                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2969  023600  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2970  023602  100406                                   100406                  ;START AT ROM PC=6
2971  023604  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2972  023606  104125                                   104125!<400*0>          ;JUMP TO ROM PC OF 525
2973  023610  004737  035550                         JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
2974  023614  000007                                   7                       ;EXPECTED DATA
2975  023616  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
2976  023620  001401                                   BEQ     6$              ;BR IF YES
2977  023622  104005                                   HLT     5               ;ERROR, CRAM PC IS WRONG
2978  023624  104401                              6$:  SCOP1                   ;LOOP TO 5$ IF SW59=1
2979  023626  104400                                   SCOPE                   ;SCOPE THIS TEST
2980
2981
```

```
                                        ;*************************** TEST 33 ***************************
                                        ;*CRAM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
                                        ;*PERFORM THE JUMP INSTRUCTION
                                        ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
                                        ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
                                        ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
                                        ;*THEN PORT4 WILL CONTAIN A 37
                                        ;:*************************************************************

                                        ;  TEST 33
                                        ;--------------
023630  012737  000033  001226  TST33:  MOV     #33,ISTNO
023636  012737  024010  001216          MOV     #TST34,NEXT
023644  012737  023670  001220          MOV     #1$,LOCK
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
023652  104412                          MSTCLR                  ;MASTER CLEAR DMC11
023654  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
023662  001451                          BEQ     6$+2            ;SKIP TEST IF NO
023664  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
023670                          1$:
023670  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023672  100400                          100400                  ;START AT ROM PC=0
023674  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023676  114777                          114377!<400*1>          ;JUMP TO ROM PC OF 1777
023700  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
023704  000377                          377                     ;EXPECTED DATA
023706  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
023710  001401                          BEQ     2$              ;BR IF YES
023712  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
023714  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
023716  012737  023724  001220          MOV     #3$,LOCK        ;NEW SCOP1
023724                          3$:
023724  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023726  100403                          100403                  ;START AT ROM PC=3
023730  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023732  100400                          100000!<400*1>  ;JUMP TO ROM PC OF 0
023734  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
023740  000000                          0                       ;EXPECTED DATA
023742  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
023744  001401                          BEQ     4$              ;BR IF YES
023746  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
023750  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
023752  012737  023760  001220          MOV     #5$,LOCK        ;NEW SCOP1
023760                          5$:
023760  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023762  100406                          100406                  ;START AT ROM PC=6
023764  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023766  104525                          104125!<400*1>          ;JUMP TO ROM PC OF 525
023770  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
023774  000125                          125                     ;EXPECTED DATA
023776  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
024000  001401                          BEQ     6$              ;BR IF YES
024002  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
024004  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
```

```
3038  024006  104400                          SCOPE                   ;SCOPE THIS TEST
3039
3040
3041                                          ;*************************** TEST 34 ****************************
3042                                          ;*CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
3043                                          ;*SET THE C BIT, PERFORM THE JUMP INSTRUCTION,
3044                                          ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
3045                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3046                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3047                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
3048                                          ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
3049                                          ;*THEN PORT4 WILL CONTAIN A 37
3050                                          ;:************************************************************
3051
3052                                          ;  TEST 34
3053                                          ;--------------
3054  024010  012737  000034  001226  TST34:  MOV     #34,TSTNO
3055  024016  012737  024204  001216          MOV     #TST35,NEXT
3056  024024  012737  024050  001220          MOV     #1$,LOCK
3057                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3058  024032  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3059  024034  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3060  024042  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3061  024044  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3062  024050                          1$:
3063  024050  004737  035476                  JSR     PC,SETC ;SET THE C BIT'
3064  024054  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3065  024056  100400                          100400                  ;START AT ROM PC=0
3066  024060  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3067  024062  115377                          114377!<400*2>          ;JUMP TO ROM PC OF 1777
3068  024064  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3069  024070  000377                          377                     ;EXPECTED DATA
3070  024072  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3071  024074  001401                          BEQ     2$              ;BR IF YES
3072  024076  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3073  024100  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
3074  024102  012737  024110  001220          MOV     #3$,LOCK        ;NEW SCOP1
3075  024110                          3$:
3076  024110  004737  035476                  JSR     PC,SETC ;SET THE C BIT'
3077  024114  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3078  024116  100403                          100403                  ;START AT ROM PC=3
3079  024120  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3080  024122  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
3081  024124  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3082  024130  000000                          0                       ;EXPECTED DATA
3083  024132  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3084  024134  001401                          BEQ     4$              ;BR IF YES
3085  024136  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3086  024140  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3087  024142  012737  024150  001220          MOV     #5$,LOCK        ;NEW SCOP1
3088  024150                          5$:
3089  024150  004737  035476                  JSR     PC,SETC ;SET THE C BIT'
3090  024154  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3091  024156  100406                          100406                  ;START AT ROM PC=6
3092  024160  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3093  024162  105125                          104125!<400*2>          ;JUMP TO ROM PC OF 525
```

```
3094  024164  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3095  024170  000125                          125                     ;EXPECTED DATA
3096  024172  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3097  024174  001401                          BEQ     6$              ;BR IF YES
3098  024176  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3099  024200  104401              6$:         SCOP1                   ;LOOP TO 5$ IF SW59=1
3100  024202  104400                          SCOPE                   ;SCOPE THIS TEST
3101
3102
3103                                          ;************************** TEST 35 **************************
3104                                          ;*CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
3105                                          ;*SET THE Z BIT, PERFORM THE JUMP INSTRUCTION,
3106                                          ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
3107                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3108                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3109                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
3110                                          ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
3111                                          ;*THEN PORT4 WILL CONTAIN A 37
3112                                          ;:**********************************************************
3113
3114                                          ;  TEST 35
3115                                          ;--------------
3116  024204  012737  000035  001226  TST35:  MOV     #35,TSTNO
3117  024212  012737  024400  001216          MOV     #TST36,NEXT
3118  024220  012737  024244  001220          MOV     #1$,LOCK
3119                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3120  024226  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3121  024230  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3122  024236  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3123  024240  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3124  024244                          1$:
3125  024244  004737  035514                  JSR     PC,SETZ ;SET THE Z BIT'
3126  024250  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3127  024252  100400                          100400                  ;START AT ROM PC=0
3128  024254  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3129  024256  115777                          114377!<400*3>          ;JUMP TO ROM PC OF 1777
3130  024260  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3131  024264  000377                          377                     ;EXPECTED DATA
3132  024266  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3133  024270  001401                          BEQ     2$              ;BR IF YES
3134  024272  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3135  024274  104401              2$:         SCOP1                   ;LOOP TO 1$ IF SW09=1
3136  024276  012737  024304  001220          MOV     #3$,LOCK        ;NEW SCOP1
3137  024304                          3$:
3138  024304  004737  035514                  JSR     PC,SETZ ;SET THE Z BIT'
3139  024310  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3140  024312  100403                          100403                  ;START AT ROM PC=3
3141  024314  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3142  024316  101400                          100000!<400*3>  ;JUMP TO ROM PC OF 0
3143  024320  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3144  024324  000000                          0                       ;EXPECTED DATA
3145  024326  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3146  024330  001401                          BEQ     4$              ;BR IF YES
3147  024332  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3148  024334  104401              4$:         SCOP1                   ;LOOP TO 3$ IF SW09=1
3149  024336  012737  024344  001220          MOV     #5$,LOCK        ;NEW SCOP1
```

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3150  024344                                  5$:
3151  024344  004737  035514                        JSR     PC,SETZ ;SET THE Z BIT'
3152  024350  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3153  024352  100406                                100406                  ;START AT ROM PC=6
3154  024354  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3155  024356  105525                                104125!<400*3>          ;JUMP TO ROM PC OF 525
3156  024360  004737  035550                        JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3157  024364  000125                                125                     ;EXPECTED DATA
3158  024366  120504                                CMPB    R5,R4           ;IS ROM PC CORRECT?
3159  024370  001401                                BEQ     6$              ;BR IF YES
3160  024372  104005                                HLT     5               ;ERROR, CRAM PC IS WRONG
3161  024374  104401                          6$:   SCOP1                   ;LOOP TO 5$ IF SW59=1
3162  024376  104400                                SCOPE                   ;SCOPE THIS TEST
3163
3164
3165                                                ;************************** TEST 36 **************************
3166                                                ;*CRAM TEST OF JUMP(I) ON BRO SET MICRO-PROCESSOR INSTRUCTION.
3167                                                ;*SET THE BRO BIT, PERFORM THE JUMP INSTRUCTION,
3168                                                ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
3169                                                ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3170                                                ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3171                                                ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
3172                                                ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
3173                                                ;*THEN PORT4 WILL CONTAIN A 37
3174                                                ;:**********************************************************
3175
3176                                                ;  TEST 36
3177                                                ;--------------
3178  024400  012737  000036  001226          TST36: MOV     #36,TSTNO
3179  024406  012737  024574  001216                 MOV     #TST37,NEXT
3180  024414  012737  024440  001220                 MOV     #1$,LOCK
3181                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
3182  024422  104412                                MSTCLR                  ;MASTER CLEAR DMC11
3183  024424  032737  100000  001366                 BIT     #BIT15,STAT1    ;IS IT CRAM?
3184  024432  001457                                BEQ     6$+2            ;SKIP TEST IF NO
3185  024434  004737  035654                        JSR     PC,MEMSET       ;SET MEM AND RAM
3186  024440                                   1$:
3187  024440  004737  035446                        JSR     PC,SETBRO       ;SET THE BRO BIT'
3188  024444  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3189  024446  100400                                100400                  ;START AT ROM PC=0
3190  024450  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3191  024452  116377                                114377!<400*4>          ;JUMP TO ROM PC OF 1777
3192  024454  004737  035550                        JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3193  024460  000377                                377                     ;EXPECTED DATA
3194  024462  120504                                CMPB    R5,R4           ;IS ROM PC CORRECT?
3195  024464  001401                                BEQ     2$              ;BR IF YES
3196  024466  104005                                HLT     5               ;ERROR, CRAM PC IS WRONG
3197  024470  104401                          2$:   SCOP1                   ;LOOP TO 1$ IF SW09=1
3198  024472  012737  024500  001220                 MOV     #3$,LOCK        ;NEW SCOP1
3199  024500                                   3$:
3200  024500  004737  035446                        JSR     PC,SETBRO       ;SET THE BRO BIT'
3201  024504  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3202  024506  100403                                100403                  ;START AT ROM PC=3
3203  024510  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3204  024512  102000                                100000!<400*4>  ;JUMP TO ROM PC OF 0
3205  024514  004737  035550                        JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
```

```
3206  024520  000000                          0                       ;EXPECTED DATA
3207  024522  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3208  024524  001401                          BEQ     4$              ;BR IF YES
3209  024526  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3210  024530  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3211  024532  012737  024540  001220          MOV     #5$,LOCK        ;NEW SCOP1
3212  024540                          5$:
3213  024540  004737  035446                  JSR     PC,SETBR0       ;SET THE BR0 BIT'
3214  024544  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3215  024546  100406                          100406                  ;START AT ROM PC=6
3216  024550  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3217  024552  106125                          104125!<400*4>          ;JUMP TO ROM PC OF 525
3218  024554  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3219  024560  000125                          125                     ;EXPECTED DATA
3220  024562  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3221  024564  001401                          BEQ     6$              ;BR IF YES
3222  024566  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3223  024570  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3224  024572  104400                          SCOPE                   ;SCOPE THIS TEST
3225
3226
3227                                          ;************************** TEST 37 **************************
3228                                          ;*CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
3229                                          ;*SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
3230                                          ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
3231                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3232                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3233                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
3234                                          ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
3235                                          ;*THEN PORT4 WILL CONTAIN A 37
3236                                          ;:************************************************************
3237
3238                                          ;  TEST 37
3239                                          ;--------------
3240  024574  012737  000037  001226  TST37:  MOV     #37,TSTNO
3241  024602  012737  024770  001216          MOV     #TST40,NEXT
3242  024610  012737  024634  001220          MOV     #1$,LOCK
3243                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3244  024616  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3245  024620  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3246  024626  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3247  024630  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3248  024634                          1$:
3249  024634  004737  035454                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
3250  024640  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3251  024642  100400                          100400                  ;START AT ROM PC=0
3252  024644  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3253  024646  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
3254  024650  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3255  024654  000377                          377                     ;EXPECTED DATA
3256  024656  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3257  024660  001401                          BEQ     2$              ;BR IF YES
3258  024662  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3259  024664  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
3260  024666  012737  024674  001220          MOV     #3$,LOCK        ;NEW SCOP1
3261  024674                          3$:
```

```
3262  024674  004737  035454                      JSR     PC,SETBR1       ;SET THE BR1 BIT'
3263  024700  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3264  024702  100403                              100403                  ;START AT ROM PC=3
3265  024704  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3266  024706  102400                              100000!<400*5>  ;JUMP TO ROM PC OF 0
3267  024710  004737  035550                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3268  024714  000000                              0                       ;EXPECTED DATA
3269  024716  120504                              CMPB    R5,R4           ;IS ROM PC CORRECT?
3270  024720  001401                              BEQ     4$              ;BR IF YES
3271  024722  104005                              HLT     5               ;ERROR, CRAM PC IS WRONG
3272  024724  104401                      4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3273  024726  012737  024734  001220              MOV     #5$,LOCK        ;NEW SCOP1
3274  024734                              5$:
3275  024734  004737  035454                      JSR     PC,SETBR1       ;SET THE BR1 BIT'
3276  024740  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3277  024742  100406                              100406                  ;START AT ROM PC=6
3278  024744  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3279  024746  106525                              104125!<400*5>          ;JUMP TO ROM PC OF 525
3280  024750  004737  035550                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3281  024754  000125                              125                     ;EXPECTED DATA
3282  024756  120504                              CMPB    R5,R4           ;IS ROM PC CORRECT?
3283  024760  001401                              BEQ     6$              ;BR IF YES
3284  024762  104005                              HLT     5               ;ERROR, CRAM PC IS WRONG
3285  024764  104401                      6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3286  024766  104400                              SCOPE                   ;SCOPE THIS TEST
3287
3288
3289                                              ;************************** TEST 40 **************************
3290                                              ;*CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
3291                                              ;*SET THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
3292                                              ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
3293                                              ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3294                                              ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3295                                              ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
3296                                              ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
3297                                              ;*THEN PORT4 WILL CONTAIN A 37
3298                                              ;:**********************************************************
3299
3300                                              ;  TEST 40
3301                                              ;--------------
3302  02477C  012737  000040  001226      TST40:  MOV     #40,TSTNO
3303  024776  012737  025164  001216              MOV     #TST41,NEXT
3304  025004  012737  025030  001220              MOV     #1$,LOCK
3305                                                                      ;R1 CONTAINS BASE DMC11 ADDRESS
3306  025012  104412                              MSTCLR                  ;MASTER CLEAR DMC11
3307  025014  032737  100000  001366              BIT     #BIT15,STAT1    ;IS IT CRAM?
3308  025022  001457                              BEQ     6$+2            ;SKIP TEST IF NO
3309  025024  004737  035654                      JSR     PC,MEMSET       ;SET MEM AND RAM
3310  025030                              1$:
3311  025030  004737  035462                      JSR     PC,SETBR4       ;SET THE BR4 BIT'
3312  025034  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3313  025036  100400                              100400                  ;START AT ROM PC=0
3314  025040  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3315  025042  117377                              114377!<400*6>          ;JUMP TO ROM PC OF 1777
3316  025044  004737  035550                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3317  025050  000377                              377                     ;EXPECTED DATA
```

```
3318  025052  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3319  025054  001401                          BEQ     2$              ;BR IF YES
3320  025056  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3321  025060  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
3322  025062  012737  025070  001220          MOV     #3$,LOCK        ;NEW SCOP1
3323  025070                          3$:
3324  025070  004737  035462                  JSR     PC,SETBR4       ;SET THE BR4 BIT'
3325  025074  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3326  025076  100403                          100403                  ;START AT ROM PC=3
3327  025100  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3328  025102  103000                          100000!<400*6>  ;JUMP TO ROM PC OF 0
3329  025104  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3330  025110  000000                          0                       ;EXPECTED DATA
3331  025112  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3332  025114  001401                          BEQ     4$              ;BR IF YES
3333  025116  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3334  025120  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3335  025122  012737  025130  001220          MOV     #5$,LOCK        ;NEW SCOP1
3336  025130                          5$:
3337  025130  004737  035462                  JSR     PC,SETBR4       ;SET THE BR4 BIT'
3338  025134  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3339  025136  100406                          100406                  ;START AT ROM PC=6
3340  025140  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3341  025142  107125                          104125!<400*6>          ;JUMP TO ROM PC OF 525
3342  025144  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3343  025150  000125                          125                     ;EXPECTED DATA
3344  025152  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3345  025154  001401                          BEQ     6$              ;BR IF YES
3346  025156  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3347  025160  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3348  025162  104400                          SCOPE                   ;SCOPE THIS TEST
3349
3350
3351                                          ;*************************** TEST 41 ****************************
3352                                          ;*CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
3353                                          ;*SET THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
3354                                          ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
3355                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3356                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3357                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
3358                                          ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
3359                                          ;*THEN PORT4 WILL CONTAIN A 37
3360                                          ;:*************************************************************
3361
3362                                          ;  TEST 41
3363                                          ;--------------
3364  025164  012737  000041  001226  TST41:  MOV     #41,TSTNO
3365  025172  012737  025360  001216          MOV     #TST42,NEXT
3366  025200  012737  025224  001220          MOV     #1$,LOCK
3367                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3368  025206  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3369  025210  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3370  025216  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3371  025220  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3372  025224                          1$:
3373  025224  004737  035470                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
```

```
3374  025230  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3375  025232  100400                          100400                  ;START AT ROM PC=0
3376  025234  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3377  025236  117777                          114377!<400*7>          ;JUMP TO ROM PC OF 1777
3379  025240  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3379  025244  000377                          377                     ;EXPECTED DATA
3380  025246  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3381  025250  001401                          BEQ     2$              ;BR IF YES
3382  025252  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3383  025254  104401              2$:         SCOP1                   ;LOOP TO 1$ IF SW09=1
3384  025256  012737  025264  001220          MOV     #3$,LOCK        ;NEW SCOP1
3385  025264                      3$:
3386  025264  004737  035470                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
3387  025270  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3388  025272  100403                          100403                  ;START AT ROM PC=3
3389  025274  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3390  025276  103400                          100000!<400*7>  ;JUMP TO ROM PC OF 0
3391  025300  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3392  025304  000000                          0                       ;EXPECTED DATA
3393  025306  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3394  025310  001401                          BEQ     4$              ;BR IF YES
3395  025312  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3396  025314  104401              4$:         SCOP1                   ;LOOP TO 3$ IF SW09=1
3397  025316  012737  025324  001220          MOV     #5$,LOCK        ;NEW SCOP1
3398  025324                      5$:
3399  025324  004737  035470                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
3400  025330  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3401  025332  100406                          100406                  ;START AT ROM PC=6
3402  025334  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3403  025336  107525                          104125!<400*7>          ;JUMP TO ROM PC OF 525
3404  025340  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3405  025344  000125                          125                     ;EXPECTED DATA
3406  025346  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3407  025350  001401                          BEQ     6$              ;BR IF YES
3408  025352  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3409  025354  104401              6$:         SCOP1                   ;LOOP TO 5$ IF SW59=1
3410  025356  104400                          SCOPE                   ;SCOPE THIS TEST
3411
3412
3413                                          ;************************** TEST 42 **************************
3414                                          ;*CRAM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
3415                                          ;*CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
3416                                          ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
3417                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3418                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3419                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
3420                                          ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
3421                                          ;*THEN PORT4 CONTAINS A 37
3422                                          ;;*************************************************************
3423
3424                                          ;  TEST 42
3425                                          ;--------------
3426  025360  012737  000042  001226  TST42:  MOV     #42,TSTNO
3427  025366  012737  025554  001216          MOV     #TST43,NEXT
3428  025374  012737  025420  001220          MOV     #1$,LOCK
3429                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
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3430  025402  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3431  025404  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3432  025412  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3433  025414  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3434  025420                          1$:
3435  025420  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3436  025424  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3437  025426  100400                          100400                  ;START AT ROM PC=0
3438  025430  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3439  025432  115377                          114377!<400*2>          ;JUMP TO ROM PC OF 1777
3440  025434  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3441  025440  000001                          1                       ;EXPECTED DATA
3442  025442  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3443  025444  001401                          BEQ     2$              ;BR IF YES
3444  025446  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3445  025450  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
3446  025452  012737  025460  001220          MOV     #3$,LOCK        ;NEW SCOP1
3447  025460                          3$:
3448  025460  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3449  025464  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3450  025466  100403                          100403                  ;START AT ROM PC=3
3451  025470  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3452  025472  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
3453  025474  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3454  025500  000004                          4                       ;EXPECTED DATA
3455  025502  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3456  025504  001401                          BEQ     4$              ;BR IF YES
3457  025506  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3458  025510  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3459  025512  012737  025520  001220          MOV     #5$,LOCK        ;NEW SCOP1
3460  025520                          5$:
3461  025520  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3462  025524  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3463  025526  100406                          100406                  ;START AT ROM PC=6
3464  025530  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3465  025532  105125                          104125!<400*2>          ;JUMP TO ROM PC OF 525
3466  025534  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3467  025540  000007                          7                       ;EXPECTED DATA
3468  025542  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3469  025544  001401                          BEQ     6$              ;BR IF YES
3470  025546  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3471  025550  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3472  025552  104400                          SCOPE                   ;SCOPE THIS TEST
3473
3474
3475                                  ;*************************** TEST 43 ***************************
3476                                  ;*CRAM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
3477                                  ;*CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
3478                                  ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
3479                                  ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3480                                  ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3481                                  ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
3482                                  ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
3483                                  ;*THEN PORT4 CONTAINS A 37
3484                                  ;;*************************************************************
3485
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3486                                                    ;  TEST 43
3487                                                    ;--------------
3488  025554  012737  000043  001226          TST43:  MOV     #43,TSTNO
3489  025562  012737  025750  001216                  MOV     #TST44,NEXT
3490  025570  012737  025614  001220                  MOV     #1$,LOCK
3491                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
3492  025576  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
3493  025600  032737  100000  001366                  BIT     #BIT15,STAT1    ;IS IT CRAM?
3494  025606  001457                                   BEQ     6$+2            ;SKIP TEST IF NO
3495  025610  004737  035654                          JSR     PC,MEMSET       ;SET MEM AND RAM
3496  025614                                    1$:
3497  025614  004737  035430                          JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3498  025620  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3499  025622  100400                                   100400                  ;START AT ROM PC=0
3500  025624  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3501  025626  115777                                   114377!<400*3>          ;JUMP TO ROM PC OF 1777
3502  025630  004737  035550                          JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3503  025634  000001                                   1                       ;EXPECTED DATA
3504  025636  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
3505  025640  001401                                   BEQ     2$              ;BR IF YES
3506  025642  104005                                   HLT     5               ;ERROR, CRAM PC IS WRONG
3507  025644  104401                            2$:    SCOP1                   ;LOOP TO 1$ IF SW09=1
3508  025646  012737  025654  001220                  MOV     #3$,LOCK        ;NEW SCOP1
3509  025654                                    3$:
3510  025654  004737  035430                          JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3511  025660  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3512  025662  100403                                   100403                  ;START AT ROM PC=3
3513  025664  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3514  025666  101400                                   100000!<400*3>  ;JUMP TO ROM PC OF 0
3515  025670  004737  035550                          JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3516  025674  000004                                   4                       ;EXPECTED DATA
3517  025676  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
3518  025700  001401                                   BEQ     4$              ;BR IF YES
3519  025702  104005                                   HLT     5               ;ERROR, CRAM PC IS WRONG
3520  025704  104401                            4$:    SCOP1                   ;LOOP TO 3$ IF SW09=1
3521  025706  012737  025714  001220                  MOV     #5$,LOCK        ;NEW SCOP1
3522  025714                                    5$:
3523  025714  004737  035430                          JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3524  025720  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3525  025722  100406                                   100406                  ;START AT ROM PC=6
3526  025724  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3527  025726  105525                                   104125!<400*3>          ;JUMP TO ROM PC OF 525
3528  025730  004737  035550                          JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3529  025734  000007                                   7                       ;EXPECTED DATA
3530  025736  120504                                   CMPB    R5,R4           ;IS ROM PC CORRECT?
3531  025740  001401                                   BEQ     6$              ;BR IF YES
3532  025742  104005                                   HLT     5               ;ERROR, CRAM PC IS WRONG
3533  025744  104401                            6$:    SCOP1                   ;LOOP TO 5$ IF SW59=1
3534  025746  104400                                   SCOPE                   ;SCOPE THIS TEST
3535
3536
3537                                                    ;*************************** TEST 44 ****************************
3538                                                    ;*CRAM TEST OF JUMP(I) ON BRO SET MICRO-PROCESSOR INSTRUCTION.
3539                                                    ;*CLEAR THE BRO BIT, PERFORM THE JUMP INSTRUCTION,
3540                                                    ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
3541                                                    ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
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3542                                        ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3543                                        ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
3544                                        ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
3545                                        ;*THEN PORT4 CONTAINS A 37
3546                                        ;;*****************************************************************
3547
3548                                        ;  TEST 44
3549                                        ;--------------
3550  025750  012737  000044  001226  TST44: MOV     #44,TSTNO
3551  025756  012737  026144  001216        MOV     #TST45,NEXT
3552  025764  012737  026010  001220        MOV     #1$,LOCK
3553                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
3554  025772  104412                       MSTCLR                  ;MASTER CLEAR DMC11
3555  025774  032737  100000  001366        BIT     #BIT15,STAT1    ;IS IT CRAM?
3556  026002  001457                       BEQ     6$+2            ;SKIP TEST IF NO
3557  026004  004737  035654               JSR     PC,MEMSET       ;SET MEM AND RAM
3558  026010                          1$:
3559  026010  004737  035430               JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3560  026014  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3561  026016  100400                       100400                  ;START AT ROM PC=0
3562  026020  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3563  026022  116377                       114377!<400*4>          ;JUMP TO ROM PC OF 1777
3564  026024  004737  035550               JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3565  026030  000001                       1                       ;EXPECTED DATA
3566  026032  120504                       CMPB    R5,R4           ;IS ROM PC CORRECT?
3567  026034  001401                       BEQ     2$              ;BR IF YES
3568  026036  104005                       HLT     5               ;ERROR, CRAM PC IS WRONG
3569  026040  104401                  2$:  SCOP1                   ;LOOP TO 1$ IF SW09=1
3570  026042  012737  026050  001220        MOV     #3$,LOCK        ;NEW SCOP1
3571  026050                          3$:
3572  026050  004737  035430               JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3573  026054  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3574  026056  100403                       100403                  ;START AT ROM PC=3
3575  026060  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3576  026062  102000                       100000!<400*4>  ;JUMP TO ROM PC OF 0
3577  026064  004737  035550               JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3578  026070  000004                       4                       ;EXPECTED DATA
3579  026072  120504                       CMPB    R5,R4           ;IS ROM PC CORRECT?
3580  026074  001401                       BEQ     4$              ;BR IF YES
3581  026076  104005                       HLT     5               ;ERROR, CRAM PC IS WRONG
3582  026100  104401                  4$:  SCOP1                   ;LOOP TO 3$ IF SW09=1
3583  026102  012737  026110  001220        MOV     #5$,LOCK        ;NEW SCOP1
3584  026110                          5$:
3585  026110  004737  035430               JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3586  026114  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3587  026116  100406                       100406                  ;START AT ROM PC=6
3588  026120  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3589  026122  106125                       104125!<400*4>          ;JUMP TO ROM PC OF 525
3590  026124  004737  035550               JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3591  026130  000007                       7                       ;EXPECTED DATA
3592  026132  120504                       CMPB    R5,R4           ;IS ROM PC CORRECT?
3593  026134  001401                       BEQ     6$              ;BR IF YES
3594  026136  104005                       HLT     5               ;ERROR, CRAM PC IS WRONG
3595  026140  104401                  6$:  SCOP1                   ;LOOP TO 5$ IF SW59=1
3596  026142  104400                       SCOPE                   ;SCOPE THIS TEST
3597
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3598
3599                                    ;*************************** TEST 45 ****************************
3600                                    ;*CRAM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
3601                                    ;*CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
3602                                    ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
3603                                    ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3604                                    ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3605                                    ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
3606                                    ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
3607                                    ;*THEN PORT4 CONTAINS A 37
3608                                    ;;*************************************************************
3609
3610                                    ;  TEST 45
3611                                    ;--------------
3612  026144  012737  000045  001226  TST45:  MOV     #45,TSTNO
3613  026152  012737  026340  001216          MOV     #TST46,NEXT
3614  026160  012737  026204  001220          MOV     #1$,LOCK
3615                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3616  026166  104412                         MSTCLR                  ;MASTER CLEAR DMC11
3617  026170  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3618  026176  001457                         BEQ     6$+2            ;SKIP TEST IF NO
3619  026200  004737  035654                 JSR     PC,MEMSET       ;SET MEM AND RAM
3620  026204                          1$:
3621  026204  004737  035430                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3622  026210  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3623  026212  100400                         100400                  ;START AT ROM PC=0
3624  026214  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3625  026216  116777                         114377!<400*5>          ;JUMP TO ROM PC OF 1777
3626  026220  004737  035550                 JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3627  026224  000001                         1                       ;EXPECTED DATA
3628  026226  120504                         CMPB    R5,R4           ;IS ROM PC CORRECT?
3629  026230  001401                         BEQ     2$              ;BR IF YES
3630  026232  104005                         HLT     5               ;ERROR, CRAM PC IS WRONG
3631  026234  104401                  2$:    SCOP1                   ;LOOP TO 1$ IF SW09=1
3632  026236  012737  026244  001220         MOV     #3$,LOCK        ;NEW SCOP1
3633  026244                          3$:
3634  026244  004737  035430                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3635  026250  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3636  026252  100403                         100403                  ;START AT ROM PC=3
3637  026254  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3638  026256  102400                         100000!<400*5>  ;JUMP TO ROM PC OF 0
3639  026260  004737  035550                 JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3640  026264  000004                         4                       ;EXPECTED DATA
3641  026266  120504                         CMPB    R5,R4           ;IS ROM PC CORRECT?
3642  026270  001401                         BEQ     4$              ;BR IF YES
3643  026272  104005                         HLT     5               ;ERROR, CRAM PC IS WRONG
3644  026274  104401                  4$:    SCOP1                   ;LOOP TO 3$ IF SW09=1
3645  026276  012737  026304  001220         MOV     #5$,LOCK        ;NEW SCOP1
3646  026304                          5$:
3647  026304  004737  035430                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3648  026310  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3649  026312  100406                         100406                  ;START AT ROM PC=6
3650  026314  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3651  026316  106525                         104125!<400*5>          ;JUMP TO ROM PC OF 525
3652  026320  004737  035550                 JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3653  026324  000007                         7                       ;EXPECTED DATA
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3654  026326  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3655  026330  001401                          BEQ     6$              ;BR IF YES
3656  026332  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3657  026334  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3658  026336  104400                          SCOPE                   ;SCOPE THIS TEST
3659
3660
3661                                          ;************************** TEST 46 **************************
3662                                          ;*CRAM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
3663                                          ;*CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
3664                                          ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
3665                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3666                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3667                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
3668                                          ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
3669                                          ;*THEN PORT4 CONTAINS A 37
3670                                          ;;**********************************************************
3671
3672                                          ;  TEST 46
3673                                          ;--------------
3674  026340  012737  000046  001226  TST46:  MOV     #46,TSTNO
3675  026346  012737  026534  001216          MOV     #TST47,NEXT
3676  026354  012737  026400  001220          MOV     #1$,LOCK
3677                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3678  026362  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3679  026364  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3680  026372  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3681  026374  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3682  026400                          1$:
3683  026400  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3684  026404  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3685  026406  100400                          100400                  ;START AT ROM PC=0
3686  026410  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3687  026412  117377                          114377!<400*6>          ;JUMP TO ROM PC OF 1777
3688  026414  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3689  026420  000001                          1                       ;EXPECTED DATA
3690  026422  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3691  026424  001401                          BEQ     2$              ;BR IF YES
3692  026426  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3693  026430  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
3694  026432  012737  026440  001220          MOV     #3$,LOCK        ;NEW SCOP1
3695  026440                          3$:
3696  026440  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3697  026444  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3698  026446  100403                          100403                  ;START AT ROM PC=3
3699  026450  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3700  026452  103000                          100000!<400*6>  ;JUMP TO ROM PC OF 0
3701  026454  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3702  026460  000004                          4                       ;EXPECTED DATA
3703  026462  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3704  026464  001401                          BEQ     4$              ;BR IF YES
3705  026466  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3706  026470  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3707  026472  012737  026500  001220          MOV     #5$,LOCK        ;NEW SCOP1
3708  026500                          5$:
3709  026500  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
```

```
3710  026504  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3711  026506  100406                          100406                  ;START AT ROM PC=6
3712  026510  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3713  026512  107125                          104125!<400*6>          ;JUMP TO ROM PC OF 525
3714  026514  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3715  026520  000007                          7                       ;EXPECTED DATA
3716  026522  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3717  026524  001401                          BEQ     6$              ;BR IF YES
3718  026526  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3719  026530  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3720  026532  104400                          SCOPE                   ;SCOPE THIS TEST
3721
3722
3723                                          ;************************** TEST 47 **************************
3724                                          ;*CRAM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
3725                                          ;*CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
3726                                          ;*VERIFY THE JUMP DID NOT OCCUR BY CLOCKING THE INSTRUCTION
3727                                          ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
3728                                          ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
3729                                          ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT
3730                                          ;*THE CRAM PC IS CORRECT, IF THE CRAM PC IS NOT RIGHT,
3731                                          ;*THEN PORT4 CONTAINS A 37
3732                                          ;;**********************************************************
3733
3734                                          ;  TEST 47
3735                                          ;--------------
3736  026534  012737  000047  001226  TST47:  MOV     #47,TSTNO
3737  026542  012737  026730  001216          MOV     #TST50,NEXT
3738  026550  012737  026574  001220          MOV     #1$,LOCK
3739                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3740  026556  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3741  026560  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3742  026566  001457                          BEQ     6$+2            ;SKIP TEST IF NO
3743  026570  004737  035654                  JSR     PC,MEMSET       ;SET MEM AND RAM
3744  026574                          1$:
3745  026574  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3746  026600  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3747  026602  100400                          100400                  ;START AT ROM PC=0
3748  026604  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3749  026606  117777                          114377!<400*7>          ;JUMP TO ROM PC OF 1777
3750  026610  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3751  026614  000001                          1                       ;EXPECTED DATA
3752  026616  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3753  026620  001401                          BEQ     2$              ;BR IF YES
3754  026622  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3755  026624  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
3756  026626  012737  026634  001220          MOV     #3$,LOCK        ;NEW SCOP1
3757  026634                          3$:
3758  026634  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3759  026640  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3760  026642  100403                          100403                  ;START AT ROM PC=3
3761  026644  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3762  026646  103400                          100000!<400*7>  ;JUMP TO ROM PC OF 0
3763  026650  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3764  026654  000004                          4                       ;EXPECTED DATA
3765  026656  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
```

```
3766  026660  001401                          BEQ     4$              ;BR IF YES
3767  026662  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3768  026664  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3769  026666  012737  026674  001220          MOV     #5$,LOCK        ;NEW SCOP1
3770  026674                          5$:
3771  026674  004737  035430                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3772  026700  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3773  026702  100406                          100406                  ;START AT ROM PC=6
3774  026704  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3775  026706  107525                          104125!<400*7>          ;JUMP TO ROM PC OF 525
3776  026710  004737  035550                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3777  026714  000007                          7                       ;EXPECTED DATA
3778  026716  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3779  026720  001401                          BEQ     6$              ;BR IF YES
3780  026722  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3781  026724  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
3782  026726  104400                          SCOPE                   ;SCOPE THIS TEST
3783
3784
3785                                          ;*************************** TEST 50 ****************************
3786                                          ;*FREE RUNNING FLAG MODE DATA TEST
3787                                          ;*TRANSMIT A MESSAGE AND VERIFY THE RECEIVED DATA
3788                                          ;*IF NO TURNAROUND CONNECTOR IS ON LINE UNIT LOOP IS SET.
3789                                          ;*ALL FOLLOWING TESTS ARE FREE RUNNING AND ARE PERFORMED
3790                                          ;*ONLY ON DMC'S WITH LINE UNITS. IF YOU WISH TO PERFORM
3791                                          ;*THESE FREE RUNNING TESTS ON A KMC (NORMALLY THE FREE RUNNING TESTS
3792                                          ;*WILL FAIL ON A KMC, THE TIMER IS TOO FAST) THEN YOU MUST
3793                                          ;*MANUALLY SET BIT0 OF STAT3 IN THE STATUS MAP.
3794                                          ;:***************************************************************
3795
3796                                          ;  TEST 50
3797                                          ;--------------
3798  026730  012737  000050  001226  TST50:  MOV     #50,TSTNO
3799  026736  012737  027742  001216          MOV     #TST51,NEXT
3800                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3801  026744  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3802  026746  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
3803  026754  001406                          BEQ     .+16            ;BR IF YES
3804  026756  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
3805  026764  001002                          BNE     .+6             ;BR IF YES
3806  026766  000137  027740                  JMP     14$             ;SKIP TEST
3807  026772  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
3808  027000  001372                          BNE     .-12            ;BR IF NO
3809  027002  004737  035602                  JSR     PC,WROM         ;WRITE MAP IN CRAM
3810  027006  013700  034760                  MOV     RCOUNT,R0       ;CLEAR RECEIVER BUFFER
3811  027012  062700  000002                  ADD     #2,R0           ;CLEAR 2 MORE LOCATIONS
3812  027016  012702  034762                  MOV     #RBUF,R2        ;CLEAR OUT RECEIVE BUFFER
3813  027022  105022                  10$:    CLRB    (R2)+           ;CLEAR BUFFER
3814  027024  005300                          DEC     R0              ;DONE YET!
3815  027026  001375                          BNE     10$             ;NO
3816  027030  005037  034706                  CLR     TFLAG           ;SET TFLAG TO 0
3817  027034  005037  034710                  CLR     RFLAG           ;SET RFLAG TO 0
3818  027040  012711  040000                  MOV     #BIT14,(R1)     ;MASTER CLEAR
3819  027044  032737  100000  001366          BIT     #BIT15,STAT1    ;CRAM?
3820  027052  001402                          BEQ     .+6             ;BR IF NO
3821  027054  012711  100000                  MOV     #BIT15,(R1)     ;IF CRAM SET RUN
```

```
3822  027060  105227  000000                      INCB    #0              ;DELAY
3823  027064  001375                              BNE     .-4             ;DELAY
3824  027066  005037  001416                      CLR     TEMP            ;GET SET TO DELAY
3825  027072  005711                      1$:     TST     (R1)            ;RUN SET?
3826  027074  100405                              BMI     .+14            ;BR IF YES
3827  027076  005237  001416                      INC     TEMP            ;INC DELAY
3828  027102  001373                              BNE     1$              ;BR IF NOT DONE
3829  027104  104014                              HLT     14              ;ERROR RUN NOT SET
3830  027106  000771                              BR      1$              ;TRY AGAIN
3831  027110  032737  040000  001366              BIT     #BIT14,STAT1    ;TURNAROUND CONNECTOR?
3832  027116  001002                              BNE     .+6             ;BR IF YES
3833  027120  052711  004000                      BIS     #BIT11,(R1)     ;SET LINE UNIT LOOP
3834  027124  152711  000043                      BISB#43,(R1)            ;BASE I
3835  027130  005037  001416                      CLR     TEMP            ;GET SET TO DELAY
3836  027134  105711                      2$:     TSTB    (R1)            ;RDI SET?
3837  027136  100404                              BMI     .+12            ;BR IF YES
3838  027140  005237  001416                      INC     TEMP            ;INC DELAY
3839  027144  001373                              BNE     2$              ;BR IF NOT DONE
3840  027146  104014                              HLT     14              ;ERROR,RDI NOT SET
3841  027150  012761  035030  000004              MOV     #BASE,4(R1)     ;SET UP BASE ADDRESS
3842  027156  005061  000006                      CLR     6(R1)           ;CLEAR COUNT
3843  027162  142711  000040                      BICB    #40,(R1)        ;CLEAR RQI
3844  027166  005037  001416                      CLR     TEMP            ;GET SET TO DELAY
3845  027172  105711                      3$:     TSTB    (R1)            ;IS RDI GONE?
3846  027174  100020                              BPL     8$              ;BR IF YES
3847  027176  005237  001416                      INC     TEMP            ;INC DELAY
3848  027202  001373                              BNE     3$              ;BR IF NOT DONE
3849  027204  105761  000002                      TSTB    2(R1)           ;IS THERE A CNTL O ERROR
3850  027210  100011                              BPL     18$             ;BR IF NO
3851  027212  016137  000004  001252              MOV     4(R1),TEMP3     ;SAVE SEL4 FOR TYPEOUT
3852  027220  016137  000006  001254              MOV     6(R1),TEMP4     ;SAVE SEL6 FOR TYPEOUT
3853  027226  104016                              HLT     16              ;CNTL O ERROR
3854  027230  000137  027740                      JMP     14$             ;FATAL ERROR STOP
3855  027234  104014                      18$:    HLT     14              ;ERROR RDI STILL SET
3856  027236                              8$:
3857  027236  152711  000041                      BISB    #41,(R1)        ;ASK FOR CNTL I
3858  027242  105711                      64$:    TSTB    (R1)            ;WAIT FOR RDI
3859  027244  100376                              BPL     64$             ;BR IF NOT SETY
3860  027246  005061  000006                      CLR     6(R1)           ;SET FULL DUPLEX
3861  027252  142711  000040                      BICB    #40,(R1)        ;CLEAR RQI
3862  027256  105711                      65$:    TSTB    (R1)            ;RDI UP?
3863  027260  100776                              BMI     65$             ;BR IF YES
3864  027262  152711  000044                      BISB    #44,(R1)        ;REC BA/CC
3865  027266  005037  001416                      CLR     TEMP            ;GET SET TO DELAY
3866  027272  105711                      4$:     TSTB    (R1)            ;IS RDI SET?
3867  027274  100404                              BMI     .+12            ;BR IF YES
3868  027276  005237  001416                      INC     TEMP            ;INC DELAY
3869  027302  001373                              BNE     4$              ;BR IF DELAY NOT DONE
3870  027304  104014                              HLT     14              ;ERROR RDI NOT SET
3871  027306  012761  034762  000004              MOV     #RBUF,4(R1)     ;LOAD REC BA
3872  027314  013761  034760  000006              MOV     RCOUNT,6(R1)    ;LOAD REC COUNT
3873  027322  142711  000040                      BICB    #40,(R1)        ;CLEAR RQI
3874  027326  005037  001416                      CLR     TEMP            ;GET SET TO DELAY
3875  027332  105711                      5$:     TSTB    (R1)            ;RDI GONE?
3876  027334  100004                              BPL     .+12            ;BR IF YES
3877  027336  005237  001416                      INC     TEMP            ;INC DELAY
```

```
3878  027342  001373                          BNE     5$              ;BR IF NO DONE
3879  027344  104014                          HLT     14              ;ERROR RDI STILL SET
3880  027346  152711  000040                  BISB    #40,(R1)        ;XMIT BA/CC
3881  027352  005037  001416                  CLR     TEMP            ;GET SET TO DELAY
3882  027356  105711                  6$:     TSTB    (R1)            ;RDI SET?
3883  027360  100404                          BMI     .+12            ;BR IF YES
3884  027362  005237  001416                  INC     TEMP            ;INC DELAY
3885  027366  001373                          BNE     6$              ;BR IF NOT DONE
3886  027370  104014                          HLT     14              ;ERROR RDI NOT SET
3887  027372  012761  034714  000004          MOV     #TBUF,4(R1)     ;LOAD XMIT BUFFER
3888  027400  013761  034712  000006          MOV     TCOUNT,6(R1)    ;LOAD COUNT
3889  027406  142711  000040                  BICB    #40,(R1)        ;CLEAR RQI
3890  027412  005037  001416                  CLR     TEMP            ;GET SET TO DELAY
3891  027416  105711                  7$:     TSTB    (R1)            ;RDI GONE?
3892  027420  100004                          BPL     .+12            ;BR IF YES
3893  027422  005237  001416                  INC     TEMP            ;INC DELAY
3894  027426  001373                          BNE     7$              ;BR IF NOT DONE DELAY
3895  027430  104014                          HLT     14              ;ERROR RDI STILL SET
3896  027432  005037  001416          16$:    CLR     TEMP            ;GET SET TO DELAY
3897  027436  012737  000022  001246          MOV     #22,TEMP1       ;GET SET FOR LONG DELAY
3898  027444  105761  000002          11$:    TSTB    2(R1)           ;RDO SET?
3899  027450  100407                          BMI     17$             ;BR IF YES
3900  027452  005237  001416                  INC     TEMP            ;INC DELAY
3901  027456  001372                          BNE     11$             ;BR IF DELAY NOT DONE
3902  027460  005337  001246                  DEC     TEMP1           ;DEC DELAY COUNT
3903  027464  001367                          BNE     11$             ;BR IF NOT DONE DELAY
3904  027466  104014                          HLT     14              ;ERROR RDO NOT SET
3905  027470  016137  000002  001250  17$:    MOV     2(R1),TEMP2     ;SAVE SEL2
3906  027476  001001                          BNE     .+4             ;BR IF OK
3907  027500  104014                          HLT     14              ;ERROR!!! SEL2 = 0!!!!!!
3908  027502  032761  000004  000002          BIT     #BIT2,2(R1)     ;REC OR XMIT?
3909  027510  001032                          BNE     13$             ;BR IF REC
3910  027512  005737  034706          12$:    TST     TFLAG           ;FIRST TIME HERE?
3911  027516  001401                          BEQ     .+4             ;BR IF YES
3912  027520  104014                          HLT     14              ;ERROR MULTIPLE XMIT DONES
3913  027522  012737  177777  034706          MOV     #-1,TFLAG       ;SET TFLAG TO -1
3914  027530  132761  000001  000002          BITB    #BIT0,2(R1)     ;IS IT CONTROL 0
3915  027536  001401                          BEQ     .+4             ;BR IF NO
3916  027540  104014                          HLT     14              ;XMIT ERROR
3917  027542  022761  034714  000004          CMP     #TBUF,4(R1)     ;XMIT BA CORRECT?
3918  027550  001401                          BEQ     .+4             ;BR IF YES
3919  027552  104014                          HLT     14              ;XMIT BA ERROR
3920  027554  023761  034712  000006          CMP     TCOUNT,6(R1)    ;COUNT OK?
3921  027562  001401                          BEQ     .+4             ;BR IF YES
3922  027564  104014                          HLT     14              ;XMIT COUNT ERROR
3923  027566  142761  000207  000002          BICB    #207,2(R1)      ;CLEAR RDO AND BITS 0-2
3924  027574  000453                          BR      15$             ;CONTINUE
3925  027576  005737  034710          13$:    TST     RFLAG           ;FIRST TIME HERE?
3926  027602  001401                          BEQ     .+4             ;BR IF YES
3927  027604  104014                          HLT     14              ;ERROR MULTIPLE REC DONES
3928  027606  012737  177777  034710          MOV     #-1,RFLAG       ;SET RFLAG TO -1
3929  027614  132761  000001  000002          BITB    #BIT0,2(R1)     ;IS IT CNTL 0
3930  027622  001401                          BEQ     .+4             ;BR IF NO
3931  027624  104014                          HLT     14              ;RECEIVE ERROR
3932  027626  022761  034762  000004          CMP     #RBUF,4(R1)     ;REC BA CORRECT?
3933  027634  001401                          BEQ     .+4             ;BR IF YES
```

```
3934  027636  104014                          HLT     14              ;REC BA ERROR
3935  027640  023761  034760  000006          CMP     RCOUNT,6(R1)    ;COUNT OK?
3936  027646  001401                          BEQ     .+4             ;BR IF YES
3937  027650  104014                          HLT     14              ;REC COUNT ERROR
3938  027652  013700  034760                  MOV     RCOUNT,R0       ;GET SET TO CHECK DATA
3939  027656  012702  034714                  MOV     #TBUF,R2        ;R2 POINTS TO GOOD DATA
3940  027662  012703  034762                  MOV     #RBUF,R3        ;R3 POINTS TO RECEIVE DATA
3941  027666  010337  001252          9$:     MOV     R3,TEMP3        ;SAVE ADDRESS FOR TYPEOUT
3942  027672  112205                          MOVB    (R2)+,R5        ;R5 = XMIT DATA
3943  027674  112304                          MOVB    (R3)+,R4        ;R4 = RECEIVE DATA
3944  027676  120504                          CMPB    R5,R4           ;CHECK DATA
3945  027700  001401                          BEQ     .+4             ;BR IF OK
3946  027702  104013                          HLT     13              ;DATA ERROR
3947  027704  005300                          DEC     R0              ;DEC COUNT
3948  027706  001367                          BNE     9$              ;BR IF NOT DONE
3949  027710  005713                          TST     (R3)            ;THIS SHOULD BE 0, ELSE
3950  027712  001401                          BEQ     .+4             ;IT RECEIVED TO MUCH!!
3951  027714  104014                          HLT     14              ;ERROR
3952  027716  142761  000207  000002          BICB    #207,2(R1)      ;CLEAR RDO AND BITS 0-2
3953  027724  005737  034710          15$:    TST     RFLAG           ;REC DONE?
3954  027730  001640                          BEQ     16$             ;BR IF NO
3955  027732  005737  034706                  TST     TFLAG           ;XMIT DONE?
3956  027736  001635                          BEQ     16$             ;BR IF NO
3957  027740  104400                  14$:    SCOPE                   ;SCOPE THIS TEST
3958
3959
3960                                          ;*************************** TEST 51 ****************************
3961                                          ;*OVERUN TEST
3962                                          ;*IN FREE RUNNING MODE SEND MESSAGE WITH NO RECEIVE
3963                                          ;*BUFFER AVAILABLE, VERIFY THAT AN OVERRUN ERROR OCCURS
3964                                          ;:************************************************************
3965
3966                                          ;  TEST 51
3967                                          ;--------------
3968  027742  012737  000051  001226  TST51:  MOV     #51,TSTNO
3969  027750  012737  030170  001216          MOV     #TST52,NEXT
3970                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3971  027756  104412                          MSTCLR                  ;MASTER CLEAR DMC11
3972  027760  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
3973  027766  001406                          BEQ     .+16            ;BR IF YES
3974  027770  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
3975  027776  001002                          BNE     .+6             ;BR IF YES
3976  030000  000137  030152                  JMP     10$             ;SKIP TEST
3977  030004  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
3978  030012  001372                          BNE     .-12            ;BR IF NO
3979  030014  004737  035602                  JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
3980  030020  004737  036002                  JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
3981  030024  004537  036272                  JSR     R5,XFRELD       ;LOAD XMIT BA/CC
3982  030030  034714                          TBUF                    ;BA
3983  030032  000044                          44                      ;CC
3984  030034  012700  000010                  MOV     #10,R0          ;R0 = RETRANSMISSION COUNT
3985  030040  012703  000010                  MOV     #10,R3          ;DELAY COUNT
3986  030044  005037  001416                  CLR     TEMP            ;CLEAR DELAY COUNTER
3987  030050  105761  000002          1$:     TSTB    2(R1)           ;IS RDY 0 SET?
3988  030054  100407                          BMI     .+20            ;BR IF SET
3989  030056  005237  001416                  INC     TEMP            ;INC DELAY COUNTER
```

```
3990  030062  001372                          BNE     1$              ;BR IF NOT DONE DELAY
3991  030064  005303                          DEC     R3              ;DEC DELAY COUNT
3992  030066  001370                          BNE     1$              ;BR IF DELAY NOT DONE
3993  030070  104014                          HLT     14              ;ERROR, RDY 0 NOT SET
3994  030072  000427                          BR      10$             ;GET OUT
3995  030074  132761  000001  000002          BITB    #BIT0,2(R1)     ;IS IT CNTL 0?
3996  030102  001002                          BNE     11$             ;BR IF YES
3997  030104  104014                          HLT     14              ;ERROR, NOT CNTL 0
3998  030106  000421                          BR      10$             ;CONTINUE
3999  030110  012705  000004          11$:    MOV     #BIT2,R5        ;PUT "EXPECTED" IN R5
4000  030114  016104  000006                  MOV     6(R1),R4        ;PUT "FOUND" IN R4
4001  030120  020504                          CMP     R5,R4           ;IS ORUN SET?
4002  030122  001404                          BEQ     12$             ;BR IF YES
4003  030124  022704  000001                  CMP     #1,R4           ;DATA CK ERROR?
4004  030130  001411                          BEQ     13$             ;BR IF YES
4005  030132  104015                          HLT     15              ;ERROR, ORUN NOT SET
4006  030134  042761  000207  000002  12$:    BIC     #207,2(R1)      ;CLEAR RDO
4007  030142  005037  001416                  CLR     TEMP            ;RESET DELAY
4008  030146  005300                          DEC     R0              ;DEC RETRANS COUNT
4009  030150  001337                          BNE     1$              ;COUNTINUE
4010  030152  104400                  10$:    SCOPE                   ;SCOPE THIS TEST
4011  030154  042761  000207  000002  13$:    BIC     #207,2(R1)      ;IGNOR THIS ERROR
4012  030162  005037  001416                  CLR     TEMP            ;RESET DELAY
4013  030166  000730                          BR      1$              ;CONTINUE
4014
4015
4016                                          ;************************** TEST 52 **************************
4017                                          ;*LOST DATA TEST
4018                                          ;*IN FREE RUNNING MODE SEND A MESSAGE LONGER THAN THE RECEIVE
4019                                          ;*BUFFER, VERIFY THAT A LOST DATA ERROR OCCURS.
4020                                          ;:************************************************************
4021
4022                                          ;  TEST 52
4023                                          ;--------------
4024  030170  012737  000052  001226  TST52:  MOV     #52,TSTNO
4025  030176  012737  030362  001216          MOV     #TST53,NEXT
4026                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
4027  030204  104412                          MSTCLR                  ;MASTER CLEAR DMC11
4028  030206  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4029  030214  001406                          BEQ     .+16            ;BR IF YES
4030  030216  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4031  030224  001002                          BNE     .+6             ;BR IF YES
4032  030226  000137  030360                  JMP     10$             ;SKIP TEST
4033  030232  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4034  030240  001372                          BNE     .-12            ;BR IF NO
4035  030242  004737  035602                  JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4036  030246  004737  036002                  JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4037  030252  004537  036240                  JSR     R5,RFRELD       ;LOAD RECEIVE BA/CC
4038  030256  034762                          RBUF                    ;BA
4039  030260  000020                          20                      ;CC
4040  030262  004537  036272                  JSR     R5,XFRELD       ;LOAD XMIT BA/CC
4041  030266  034714                          TBUF                    ;BA
4042  030270  000044                          44                      ;CC
4043  030272  012703  000010                  MOV     #10,R3          ;DELAY COUNT
4044  030276  005037  001416                  CLR     TEMP            ;CLEAR DELAY COUNTER
4045  030302  105761  000002          1$:     TSTB    2(R1)           ;IS RDY 0 SET?
```

```
4046  030306  100407                          BMI     .+20            ;BR IF SET
4047  030310  005237  001416                  INC     TEMP            ;INC DELAY COUNTER
4048  030314  001372                          BNE     1$              ;BR IF NOT DONE DELAY
4049  030316  005303                          DEC     R3              ;DEC DELAY COUNT
4050  030320  001370                          BNE     1$              ;BR IF DELAY NOT DONE
4051  030322  104014                          HLT     14              ;ERROR, RDY 0 NOT SET
4052  030324  000415                          BR      10$             ;GET OUT
4053  030326  132761  000001  000002          BITB    #BIT0,2(R1)     ;IS IT CNTL 0?
4054  030334  001002                          BNE     11$             ;BR IF YES
4055  030336  104014                          HLT     14              ;ERROR NOT CNTL 0
4056  030340  000407                          BR      10$             ;CONTINUE
4057  030342  012705  000020          11$:    MOV     #BIT4,R5        ;PUT "EXPECTED" IN R5
4058  030346  016104  000006                  MOV     6(R1),R4        ;PUT "FOUND" IN R4
4059  030352  020504                          CMP     R5,R4           ;IS LOST DATA SET?
4060  030354  001401                          BEQ     10$             ;BR IF YES
4061  030356  104015                          HLT     15              ;ERROR, LOST DATA NOT SET
4062  030360  104400          10$:    SCOPE                           ;SCOPE THIS TEST
4063
4064
4065                                  ;************************** TEST 53 **************************
4066                                  ;*TRANSMIT NON-EXISTENT MEMORY TEST
4067                                  ;*IN FREE RUNNING MODE, LOAD A TRANSMIT BA THAT WILL TIME OUT
4068                                  ;*VERIFY THAT A NON-EXISTENT MEMORY ERROR OCCURS
4069                                  ;:************************************************************
4070
4071                                  ;  TEST 53
4072                                  ;--------------
4073  030362  012737  000053  001226  TST53:  MOV     #53,TSTNO
4074  030370  012737  030544  001216          MOV     #TST54,NEXT
4075                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
4076  030376  104412                          MSTCLR                  ;MASTER CLEAR DMC11
4077  030400  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4078  030406  001406                          BEQ     .+16            ;BR IF YES
4079  030410  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4080  030416  001002                          BNE     .+6             ;BR IF YES
4081  030420  000137  030542                  JMP     10$             ;SKIP TEST
4082  030424  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4083  030432  001372                          BNE     .-12            ;BR IF NO
4084  030434  004737  035602                  JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4085  030440  004737  036002                  JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4086  030444  004537  036272                  JSR     R5,XFRELD       ;LOAD XMIT BA/CC
4087  030450  177320                          177320                  ;BA
4088  030452  140044                          140044                  ;CC
4089  030454  012703  000010                  MOV     #10,R3          ;DELAY COUNT
4090  030460  005037  001416                  CLR     TEMP            ;CLEAR DELAY COUNTER
4091  030464  105761  000002          1$:     TSTB    2(R1)           ;IS RDY 0 SET?
4092  030470  100407                          BMI     .+20            ;BR IF SET
4093  030472  005237  001416                  INC     TEMP            ;INC DELAY COUNTER
4094  030476  001372                          BNE     1$              ;BR IF NOT DONE DELAY
4095  030500  005303                          DEC     R3              ;DEC DELAY COUNT
4096  030502  001370                          BNE     1$              ;BR IF DELAY NOT DONE
4097  030504  104014                          HLT     14              ;ERROR, RDY 0 NOT SET
4098  030506  000415                          BR      10$             ;GET OUT
4099  030510  132761  000001  000002          BITB    #BIT0,2(R1)     ;IS IT CNTL 0?
4100  030516  001002                          BNE     11$             ;BR IF YES
4101  030520  104014                          HLT     14              ;ERROR, NOT CNTL 0
```

```
4102  030522  000407                        BR      10$             ;CONTINUE
4103  030524  012705  000400          11$:  MOV     #BIT8,R5        ;PUT "EXPECTED" IN R5
4104  030530  016104  000006                MOV     6(R1),R4        ;PUT "FOUND" IN R4
4105  030534  020504                        CMP     R5,R4           ;IS NON-EX-MEM SET?
4106  030536  001401                        BEQ     .+4             ;BR IF YES
4107  030540  104015                        HLT     15              ;ERROR NON-EX-MEM NOT SET
4108  030542  104400                  10$:  SCOPE                   ;SCOPE THIS TEST
4109
4110
4111                                        ;*************************** TEST 54 ****************************
4112                                        ;*RECEIVE NON-EXISTENT MEMORY TEST
4113                                        ;*IN FREE RUNNING MODE, LOAD A RECEIVE BA THAT WILL TIME OUT
4114                                        ;*VERIFY THAT A NON-EXISTENT MEMORY ERROR OCCURS
4115                                        ;:************************************************************
4116
4117                                        ;  TEST 54
4118                                        ;--------------
4119  030544  012737  000054  001226  TST54: MOV     #54,TSTNO
4120  030552  012737  030736  001216        MOV     #TST55,NEXT
4121                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
4122  030560  104412                        MSTCLR                  ;MASTER CLEAR DMC11
4123  030562  032737  100000  001366        BIT     #BIT15,STAT1    ;IS IT A DMC?
4124  030570  001406                        BEQ     .+16            ;BR IF YES
4125  030572  032737  000001  001372        BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4126  030600  001002                        BNE     .+6             ;BR IF YES
4127  030602  000137  030734                JMP     10$             ;SKIP TEST
4128  030606  032737  010000  001366        BIT     #BIT12,STAT1    ;LU PRESENT?
4129  030614  001372                        BNE     .-12            ;BR IF NO
4130  030616  004737  035602                JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4131  030622  004737  036002                JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4132  030626  004537  036240                JSR     R5,RFRELD       ;LOAD RECEIVE BA/CC
4133  030632  177320                        177320                  ;BA
4134  030634  140044                        140044                  ;CC
4135  030636  004537  036272                JSR     R5,XFRELD       ;LOAD XMIT BA/CC
4136  030642  034714                        TBUF                    ;BA
4137  030644  000044                        44                      ;CC
4138  030646  012703  000010                MOV     #10,R3          ;DELAY COUNT
4139  030652  005037  001416                CLR     TEMP            ;CLEAR DELAY COUNTER
4140  030656  105761  000002          1$:   TSTB    2(R1)           ;IS RDY 0 SET?
4141  030662  100407                        BMI     .+20            ;BR IF SET
4142  030664  005237  001416                INC     TEMP            ;INC DELAY COUNTER
4143  030670  001372                        BNE     1$              ;BR IF NOT DONE DELAY
4144  030672  005303                        DEC     R3              ;DEC DELAY COUNT
4145  030674  001370                        BNE     1$              ;BR IF DELAY NOT DONE
4146  030676  104014                        HLT     14              ;ERROR, RDY 0 NOT SET
4147  030700  000415                        BR      10$             ;GET OUT
4148  030702  132761  000001  000002        BITB    #BIT0,2(R1)     ;IS IT CNTL 0?
4149  030710  001002                        BNE     11$             ;BR IF YES
4150  030712  104014                        HLT     14              ;ERROR, NOT CNTL 0
4151  030714  000407                        BR      10$             ;CONTINUE
4152  030716  012705  000400          11$:  MOV     #BIT8,R5        ;PUT "EXPECTED" IN R5
4153  030722  016104  000006                MOV     6(R1),R4        ;PUT "FOUND" IN R4
4154  030726  020504                        CMP     R5,R4           ;IS NON-EX-MEM SET?
4155  030730  001401                        BEQ     .+4             ;BR IF YES
4156  030732  104015                        HLT     15              ;ERROR NON-EX-MEM NOT SET
4157  030734  104400                  10$:  SCOPE                   ;SCOPE THIS TEST
```

```
4158
4159
4160                                    ;*************************** TEST 55 ****************************
4161                                    ;*PROCESSOR ERROR TEST
4162                                    ;*IN FREE RUNNING MODE, DO A BASE TRANSFER REQUEST AFTER A
4163                                    ;*BASE HAS BEEN SET UP, VERIFY THAT A PROCESSOR ERROR OCCURS.
4164                                    ;:************************************************************
4165
4166                                    ;  TEST 55
4167                                    ;--------------
4168  030736  012737  000055  001226  TST55:  MOV     #55,TSTNO
4169  030744  012737  031114  001216          MOV     #TST56,NEXT
4170                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
4171  030752  104412                         MSTCLR                  ;MASTER CLEAR DMC11
4172  030754  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4173  030762  001406                         BEQ     .+16            ;BR IF YES
4174  030764  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4175  030772  001002                         BNE     .+6             ;BR IF YES
4176  030774  000137  031112                 JMP     10$             ;SKIP TEST
4177  031000  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4178  031006  001372                         BNE     .-12            ;BR IF NO
4179  031010  004737  035602                 JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4180  031014  004737  036002                 JSR     PC,BASELD       ;LOAD BASE ADDRESS
4181  031020  152711  000043          12$:    BISB    #43,(R1)        ;2ND BASE REQUEST
4182  031024  105711                         TSTB    (R1)            ;RDI SET?
4183  031026  100376                         BPL     .-2             ;BR IF NO
4184  031030  142711  000040                 BICB    #40,(R1)        ;CLEAR RQI
4185  031034  005037  001416                 CLR     TEMP            ;GET SET TO DELAY
4186  031040  105761  000002          13$:    TSTB    2(R1)           ;RDO SET?
4187  031044  100405                         BMI     14$             ;BR IF YES
4188  031046  005237  001416                 INC     TEMP            ;INC DELAY
4189  031052  001372                         BNE     13$             ;BR IF NOT DONE DELAY
4190  031054  104014                         HLT     14              ;ERROR, RDO NOT SET
4191  031056  000770                         BR      13$             ;TRY AGAIN
4192  031060  132761  000001  000002  14$:    BITB    #BIT0,2(R1)     ;IS IS CNTL 0?
4193  031066  001002                         BNE     11$             ;BR IF YES
4194  031070  104014                         HLT     14              ;ERROR NOT CNTL 0
4195  031072  000407                         BR      10$             ;CONTINUE
4196  031074  012705  001000          11$:    MOV     #BIT9,R5        ;PUT "EXPECTED" IN R5
4197  031100  016104  000006                 MOV     6(R1),R4        ;PUT "FOUND" IN R4
4198  031104  020504                         CMP     R5,R4           ;IS PROC ERROR SET?
4199  031106  001401                         BEQ     .+4             ;BR IF YES
4200  031110  104015                         HLT     15              ;ERROR, PROC ERROR NOT SET
4201  031112  104400                 10$:    SCOPE                   ;SCOPE THIS TEST
4202
4203
4204                                    ;*************************** TEST 56 ****************************
4205                                    ;*PROCESSOR ERROR TEST
4206                                    ;*IN FREE RUNNING MODE DO A RQI WITH AN ILLEGAL IO CODE
4207                                    ;*VERIFY THAT A PROCESSOR ERROR OCCURS
4208                                    ;:************************************************************
4209
4210                                    ;  TEST 56
4211                                    ;--------------
4212  031114  012737  000056  001226  TST56:  MOV     #56,TSTNO
4213  031122  012737  031272  001216          MOV     #TST57,NEXT
```

```
4214
4215  031130  104412                          MSTCLR                  ;R1 CONTAINS BASE DMC11 ADDRESS
                                                                      ;MASTER CLEAR DMC11
4216  031132  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4217  031140  001406                          BEQ     .+16            ;BR IF YES
4218  031142  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4219  031150  001002                          BNE     .+6             ;BR IF YES
4220  031152  000137  031270                  JMP     10$             ;SKIP TEST
4221  031156  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4222  031164  001372                          BNE     .-12            ;BR IF NO
4223  031166  004737  035602                  JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4224  031172  004737  036002                  JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4225  031176  152711  000046                  BISB    #46,(R1)        ;RQI AND ILLEGAL CODE
4226  031202  105711                          TSTB    (R1)            ;WAIT FOR RDI
4227  031204  100376                          BPL     .-2             ;BR IF NO RDI
4228  031206  142711  000040                  BICB    #40,(R1)        ;CLEAR RQI
4229  031212  005037  001416                  CLR     TEMP            ;CLEAR COUNTER
4230  031216  105761  000002          1$:     TSTB    2(R1)           ;RDY 0 SET?
4231  031222  100405                          BMI     .+14            ;BR IF YES
4232  031224  005237  001416                  INC     TEMP            ;BUMP COUNTER DELAY
4233  031230  001372                          BNE     1$              ;BR IF NOT DONE
4234  031232  104014                          HLT     14              ;ERROR NO RDY 0
4235  031234  000770                          BR      1$              ;TRY AGAIN
4236  031236  132761  000001  000002          BITB    #BIT0,2(R1)     ;IS IT CNTL 0
4237  031244  001002                          BNE     11$             ;BR IF YES
4238  031246  104014                          HLT     14              ;ERROR, NOT CNTL 0
4239  031250  000407                          BR      10$             ;CONTINUE
4240  031252  012705  001000          11$:    MOV     #BIT9,R5        ;PUT "EXPECTED" IN R5
4241  031256  016104  000006                  MOV     6(R1),R4        ;PUT "FOUND" IN R4
4242  031262  020504                          CMP     R5,R4           ;IS PROC ERROR SET?
4243  031264  001401                          BEQ     .+4             ;BR IF YES
4244  031266  104015                          HLT     15              ;ERROR PROC ERROR NOT SET
4245  031270  104400          10$:    SCOPE                           ;SCOPE THIS TEST
4246
4247
4248                                  ;*************************** TEST 57 ****************************
4249                                  ;*HALF DUPLEX TEST
4250                                  ;*IN FREE RUNNING MODE, SET HALF DUPLEX AND L U LOOP
4251                                  ;*SEND A MESSAGE AND VERIFY THAT THERE ARE NO DONES
4252                                  ;;************************************************************
4253
4254                                  ;  TEST 57
4255                                  ;--------------
4256  031272  012737  000057  001226  TST57:  MOV     #57,TSTNO
4257  031300  012737  031432  001216          MOV     #TST60,NEXT
4258                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
4259  031306  104412                          MSTCLR                  ;MASTER CLEAR DMC11
4260  031310  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4261  031316  001406                          BEQ     .+16            ;BR IF YES
4262  031320  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4263  031326  001002                          BNE     .+6             ;BR IF YES
4264  031330  000137  031424                  JMP     10$             ;SKIP TEST
4265  031334  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4266  031342  001372                          BNE     .-12            ;BR IF NO
4267  031344  004737  035602                  JSR     PC,WROM         ;WRITE MICRO-CODE
4268  031350  004737  036120                  JSR     PC,BASELH       ;LOAD BASE AND HALF DUPLEX
4269  031354  004537  036240                  JSR     R5,RFRELD       ;LOAD RECEIVE BUFFER
```

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4270  031360  034762                          RBUF                    ;BA
4271  031362  000044                          44                      ;CC
4272  031364  004537  036272                  JSR     R5,XFRELD       ;LOAD TRANSMIT BUFFER
4273  031370  034714                          TBUF                    ;BA
4274  031372  000044                          44                      ;CC
4275  031374  012703  000003                  MOV     #3,R3           ;LOAD DELAY COUNT
4276  031400  005037  001416                  CLR     TEMP            ;CLEAR DELAY
4277  031404  105761  000002          4$:     TSTB    2(R1)           ;IS DONE SET?
4278  031410  100406                          BMI     5$              ;BR IF YES (ERROR)
4279  031412  005237  001416                  INC     TEMP            ;INC DELAY
4280  031416  001372                          BNE     4$              ;BR IF DELAY NOT DONE
4281  031420  005303                          DEC     R3              ;DEC DELAY COUNT
4282  031422  001370                          BNE     4$              ;BR IF DELAY NOT DONE
4283  031424  104400                  10$:    SCOPE                   ;SCOPE THIS TEST
4284  031426  104014                  5$:     HLT     14              ;ERROR DONE WITH HALF-DUPLEX
4285  031430  000775                          BR      10$             ;GET OUT
4286
4287
4288                                          ;************************** TEST 60 **************************
4289                                          ;*FREE RUNNING DATA TEST (INTERRUPT DRIVEN EXERCISER)
4290                                          ;*THIS TEST REPEATEDLY QUEUES UP 7 RECEIVE BUFFERS AND
4291                                          ;*7 TRANSMIT BUFFERS AND CHECKS DATA WHEN ALL 7 BUFFERS
4292                                          ;*ARE RECEIVED. TRANSMIT COUNTS RANGE FROM 1 TO 104, ALSO
4293                                          ;*ODD AND EVEN TRANSMIT AND RECEIVE BA'S ARE USED. DATA
4294                                          ;*IS A BINARY COUNT PATTERN. THE RESUME FUNCTION IS CHECKED IN THIS TEST
4295                                          ;:************************************************************
4296
4297                                          ;  TEST 60
4298                                          ;--------------
4299  031432  012737  000060  001226  TST60:  MOV     #60,TSTNO
4300  031440  012737  003274  001216          MOV     #.EOP,NEXT
4301                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
4302  031446  104412                          MSTCLR                  ;MASTER CLEAR DMC11
4303  031450  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4304  031456  001406                          BEQ     .+16            ;BR IF YES
4305  031460  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4306  031466  001002                          BNE     .+6             ;BR IF YES
4307  031470  000137  032434                  JMP     ENDEX1          ;SKIP TEST
4308  031474  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4309  031502  001372                          BNE     .-12            ;BR IF NO
4310  031504  004737  035602                  JSR     PC,WROM         ;WRITE MICR-CODE
4311  031510  012737  000340  177776          MOV     #340,PS         ;LOCK OUT INTERRUPTS
4312  031516  013700  001366                  MOV     STAT1,R0        ;GET BR LEVEL
4313  031522  006200                          ASR     R0              ;SHIFT RIGHT 4 TIMES
4314  031524  006200                          ASR     R0
4315  031526  006200                          ASR     R0
4316  031530  006200                          ASR     R0
4317  031532  042700  177437                  BIC     #177437,R0      ;PUT BR LEVEL IN R0
4318  031536  012777  032534  147630          MOV     #IISR,@DMRVEC   ;LOAD INPUT VECTOR
4319  031544  010077  147626                  MOV     R0,@DMRLVL      ;LOAD LEVEL
4320  031550  012777  033040  147622          MOV     #OISR,@DMTVEC   ;LOAD OUTPUT VECTOR
4321  031556  010077  147620                  MOV     R0,@DMTLVL      ;LOAD LEVEL
4322
4323                                          ;INITIALIZE ALL BUFFER LISTS AND COUNT LISTS
4324
4325  031562  012737  000104  034706          MOV     #104,TFLAG      ;TFLAG CONTAINS COUNT
```

```
4326  031570  012700  033454                        MOV     #XMITBA+2,R0    ;R0 POINTS TO BA LIST
4327  031574  012703  033746                        MOV     #RBUFF,R3       ;R3 CONTAINS BUFFER ADDRESS
4328  031600  010320                        1$:     MOV     R3,(R0)+        ;LOAD BA LIST WITH REC BA
4329  031602  062703  000104                        ADD     #104,R3         ;UPDATE BUFFER ADDRESS
4330  031606  022700  033472                        CMP     #XMITBA+20,R0   ;END OF REC BUFFERS?
4331  031612  001372                                BNE     1$              ;NO LOAD NEXT ONE
4332  031614  012720  033510                2$:     MOV     #TBUFF,(R0)+    ;LOAD BA LIST WITH XMIT BA
4333  031620  022700  033510                        CMP     #XMITBA+36,R0   ;END OF XMIT BUFFERS?
4334  031624  001373                                BNE     2$              ;NO LOAD NEXT BUFFER
4335  031626  012700  033622                        MOV     #RCNTAB+2,R0    ;R0 POINTS TO COUNT LIST
4336  031632  013720  034706                3$:     MOV     TFLAG,(R0)+     ;LOAD COUNT OF 104
4337  031636  022700  033640                        CMP     #RCNTAB+20,R0   ;END OF REC COUNT LIST?
4338  031642  001373                                BNE     3$              ;BR IF NO
4339  031644  012737  000006  034704                MOV     #6,FLAG ;LOOP COUNT
4340  031652  012711  040000                        MOV     #BIT14,(R1)     ;SET MASTER CLEAR
4341  031656  032737  100000  001366                BIT     #BIT15,STAT1    ;IOP?
4342  031664  001402                                BEQ     .+6             ;BR IF NO
4343  031666  012711  100000                        MOV     #BIT15,(R1)     ;SET RUN ON IOP
4344  031672  012700  177777                        MOV     #-1,R0          ;R0 IS INPUT DONE COUNTER
4345  031676  005037  033450                CLRTAB: CLR     RESUME          ;CLEAR RESUME FLAG
4346  031702  012705  033656                        MOV     #RDNTAB,R5      ;GET READY TO CLEAR ALL RECEIVE
4347  031706  005025                        2$:     CLR     (R5)+           ;BUFFERS
4348  031710  022705  034702                        CMP     #RBUFFE,R5      ;END OF BUFFER?
4349  031714  001374                                BNE     2$              ;BR IF NO
4350  031716  005737  034704                        TST     FLAG            ;VARIABLE COUNTS?
4351  031722  100407                                BMI     5$              ;BR IF YES(DON'T CHANGE THEM)
4352  031724  012704  033640                        MOV     #XCNTAB,R4      ;R4 POINTS TO XMIT COUNT LIST
4353  031730  013724  034706                4$:     MOV     TFLAG,(R4)+     ;LOAD XMIT CHAR COUNT
4354  031734  022704  033656                        CMP     #XCNTAB+16,R4   ;DONE?
4355  031740  001373                                BNE     4$              ;BR IF NO
4356  031742  005002                        5$:     CLR     R2              ;R2 IS OUTPUT DONE COUNTER
4357  031744  005004                                CLR     R4              ;R4 IS USED AS INDEX IN OISR
4358  031746  005711                                TST     (R1)            ;IS RUN SET?
4359  031750  100376                                BPL     .-2             ;WAIT FOR RUN
4360  031752  152761  000100  000002                BISB    #BIT6,2(R1)     ;SET IEO
4361  031760  022737  000006  034704                CMP     #6,FLAG ;FIRST TIME?
4362  031766  001003                                BNE     1$              ;BR IF NOT
4363  031770  052711  004143                        BIS     #4143,(R1)      ;SET LU LOOP, IEI,RQI,BASE I
4364  031774  000402                                BR      3$              ;CONTINUE
4365  031776  052711  004144                1$:     BIS     #4144,(R1)      ;SET LU LOOP, IEI, RQI, REC BA/CC
4366  032002  005037  001416                3$:     CLR     TEMP            ;SET UP FOR DELAY COUNT
4367  032006  012737  000022  001250                MOV     #22,TEMP2       ;GET SET FOR DELAY
4368  032014  005037  177776                        CLR     PS              ;ALLOW INTERRUPTS
4369  032020  022737  000001  034704        SCAN:   CMP     #1,FLAG         ;1 BYTE MESS?
4370  032026  001002                                BNE     1$              ;BR IF NO
4371  032030  000137  032472                        JMP     ENDEX3          ;BR IF YES
4372  032034  022700  000020                1$:     CMP     #20,R0          ;INPUT DONE?
4373  032040  001402                                BEQ     SCAN2           ;BR IF YES
4374  032042  000137  032504                        JMP     SCAN1           ;BR IF NO
4375  032046  022702  000034                SCAN2:  CMP     #34,R2          ;XMIT DONE FOR ALL MESSAGES?
4376  032052  001402                                BEQ     8$              ;BR IF YES
4377  032054  000137  032504                        JMP     SCAN1           ;BR IF NO
4378  032060  022704  000034                8$:     CMP     #34,R4          ;REC DONE FOR ALL MESSAGES?
4379  032064  001402                                BEQ     9$              ;BR IF YES
4380  032066  000137  032504                        JMP     SCAN1           ;BR IF NO
4381  032072                                9$:
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4382  032072  012700  033656                    MOV   #RDNTAB,R0     ;GET FIRST REC BUFFER
4383  032076  012002                    5$:     MOV   (R0)+,R2       ;R2 POINTS TO BUFFER
4384  032100  005005                            CLR   R5             ;R5=EXPECTED
4385  032102  005003                            CLR   R3             ;R3 = COUNT
4386  032104  005737  034704                    TST   FLAG           ;CHECK FOR ODD XMIT BA'S
4387  032110  100012                            BPL   6$             ;ONLY FOR VARIABLE COUNTS
4388  032112  022710  000027                    CMP   #27,(R0)       ;IF 27 BUMP DATA BY 1 (ODD XMIT BA)
4389  032116  001406                            BEQ   7$             ;BR IF YES
4390  032120  022710  000042                    CMP   #42,(R0)       ;IF 42 THEN ODD XMIT BA ALSO
4391  032124  001403                            BEQ   7$             ;BR IF YES
4392  032126  022710  000103                    CMP   #103,(R0)      ;IF 103 THEN ODD XMIT BA ALSO
4393  032132  001001                            BNE   6$             ;SKIP IF NOT
4394  032134  005205                    7$:     INC   R5             ;START DATA AT 1 FOR ODD XMIT BA'S
4395  032136  010237  001252            6$:     MOV   R2,TEMP3       ;SAVE ADDRESS FOR TYPEOUT
4396  032142  112204                            MOVB  (R2)+,R4       ;GET RECEIVE DATA
4397  032144  120504                            CMPB  R5,R4          ;IS 1. CORRECT?
4398  032146  001401                            BEQ   .+4            ;BR IF YES
4399  032150  104013                            HLT   13             ;DATA ERROR
4400  032152  005205                            INC   R5             ;NEXT CHARACTER
4401  032154  005203                            INC   R3             ;INC COUNT
4402  032156  021003                            CMP   (R0),R3        ;DONE YET?
4403  032160  001366                            BNE   6$             ;BR IF NO
4404  032162  062700  000002                    ADD   #2,R0          ;GET NEXT REC BUFFER
4405  032166  022700  033712                    CMP   #RDNTAB+34,R0  ;DONE YET?
4406  032172  001341                            BNE   5$             ;BR IF NO
4407  032174  012700  000001                    MOV   #1,R0          ;SET R0 TO 1
4408  032200  005737  034704                    TST   FLAG           ;VARIABLE COUNTS?
4409  032204  100004                            BPL   4$             ;BR IF NO
4410  032206  005237  034704                    INC   FLAG           ;FLAG IS NEGITIVE
4411  032212  001231                            BNE   CLRTAB         ;BR IF NOT DONE
4412  032214  000447                            BR    ENDEX          ;ALL DONE
4413  032216  032737  000001  034704    4$:     BIT   #BIT0,FLAG     ;CHANGE CHAR COUNT FOR NEXT LOOP
4414  032224  001003                            BNE   1$             ;BR TO SUB 40
4415  032226  005337  034706                    DEC   TFLAG          ;DEC BY ONE
4416  032232  000403                            BR    2$             ;CONTINUE
4417  032234  162737  000040  034706    1$:     SUB   #40,TFLAG      ;SUBTRACT 40 FRON XMIT COUNT
4418  032242  005337  034704            2$:     DEC   FLAG           ;DEC LOOP COUNT
4419  032246  001213                            BNE   CLRTAB         ;GO DO IT AGAIN
4420  032250  005004                            CLR   R4             ;R4 CONTAINS OFFSET
4421  032252  012702  033642                    MOV   #XCNTAB+2,R2   ;R2 POINTS TO XMIT COUNT LIST
4422  032256  062704  000013            3$:     ADD   #13,R4         ;INCREASE R4 BY 13
4423  032262  060422                            ADD   R4,(R2)+       ;MAKE COUNTS VARIABLE
4424  032264  022702  033656                    CMP   #XCNTAB+16,R2  ;DONE ALL 7?
4425  032270  001372                            BNE   3$             ;BR IF NO
4426  032272  012702  033464                    MOV   #RECBA+12,R2   ;R2 POINTS TO REC BA LIST
4427  032276  005222                            INC   (R2)+          ;MAKE THIS REC BA ODD
4428  032300  005222                            INC   (R2)+          ;MAKE THIS REC BA ODD
4429  032302  005222                            INC   (R2)+          ;MAKE THIS REC BA ODD
4430  032304  062702  000004                    ADD   #4,R2          ;SKIP TO XMIT BA LIST
4431  032310  005222                            INC   (R2)+          ;MAKE THIS XMIT BA ODD
4432  032312  005222                            INC   (R2)+          ;MAKE THIS XMIT BA ODD
4433  032314  062702  000004                    ADD   #4,R2          ;SKIP TO NEXT ODD BA
4434  032320  005222                            INC   (R2)+          ;MAKE THIS XMIT BA ODD
4435  032322  012737  177772  034704            MOV   #-6,FLAG       ;MAKE FLAG NEGITIVE
4436  032330  000137  031676                    JMP   CLRTAB         ;LOOP WITH VARIABLE COUNTS
4437  032334  152711  000146            ENDEX:  BISB  #146,(R1)      ;SHUT DOWN DMC
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4438  032340  005737  034704              1$:   TST   FLAG          ;HAS INTERRUPT OCCURED?
4439  032344  001775                        BEQ   1$            ;BR IF NO
4440  032346  012700  000003                  MOV   #3,R0           ;BASE ADDRESS OFFSET
4441  032352  105760  035030              2$:   TSTB  BASE(R0)      ;CHECK ERROR COUNT
4442  032356  001027                        BNE   ENDEX2          ;BR IF ERROR .
4443  032360  005200                        INC   R0              ;BUMB INDEX
4444  032362  022700  000005                  CMP   #5,R0           ;5 = NAKS BAD CRC
4445  032366  001006                        BNE   3$              ;BR IF NOT 5
4446  032370  122760  000013  035030        CMPB  #13,BASE(R0)    ;SHOULD BE 13 ERRORS
4447  032376  001017                        BNE   ENDEX2          ;BECAUSE OF RESUME
4448  032400  005200                        INC   R0              ;BUMP INDEX
4449  032402  000763                        BR    2$              ;BR
4450  032404  022700  000011              3$:   CMP   #11,R0          ;DONE ALL ERROR COUNTERS YET?
4451  032410  001360                        BNE   2$              ;BR IF NO
4452  032412  122760  000013  035030        CMPB  #13,BASE(R0)    ;13 ERRORS BECAUSE OF RESUME
4453  032420  001006                        BNE   ENDEX2          ;BR IF NOT OK
4454  032422  005200                        INC   R0              ;NEXT BASE TABLE LOCATION
4455  032424  122760  000013  035030        CMPB  #13,BASE(R0)    ;13 ERRORS BECAUSE OF RESUME
4456  032432  001001                        BNE   ENDEX2          ;BR IF NOT OK
4457  032434  104400              ENDEX1:   SCOPE                 ;SCOPE THIS TEST
4458  032436  113737  035033  001250  ENDEX2:   MOVB  BASE+3,TEMP2    ;SAVE ALL ODD ADDRESSES
4459  032444  113737  035035  001252        MOVB  BASE+5,TEMP3    ;FOR TYPEOUT
4460  032452  113737  035037  001254        MOVB  BASE+7,TEMP4    ;
4461  032460  113737  035041  001256        MOVB  BASE+11,TEMP5
4462  032466  104017                        HLT   17              ;NON ZERO ERROR COUNT
4463  032470  000761                        BR    ENDEX1          ;GET OUT
4464  032472  022700  000017              ENDEX3:   CMP   #17,R0          ;ALL DONE INPUT?
4465  032476  001002                        BNE   SCAN1           ;BR IF NO
4466  032500  000137  032046                  JMP   SCAN2           ;BR IF YES
4467  032504  005337  001416              SCAN1:    DEC   TEMP          ;DECREMENT DELAY COUNTER
4468  032510  001402                        BEQ   1$              ;BR IF ZERO
4469  032512  000137  032020                  JMP   SCAN            ;BR IF NOT DONE DELAY
4470  032516  005337  001250              1$:   DEC   TEMP2         ;DEC DELAY COUNT
4471  032522  001402                        BEQ   2$              ;BR IF DONE DELAY
4472  032524  000137  032020                  JMP   SCAN            ;BR IF NOT DONE
4473  032530  104014              2$:   HLT   14              ;ERROR HUNG
4474  032532  000740                        BR    ENDEX1          ;GET OUT
4475
4476                                    ;INPUT INTERRUPT SERVICE ROUTINE
4477
4478  032534  022700  000017              IISR:     CMP   #17,R0          ;PROC. ERROR DONE?
4479  032540  001421                        BEQ   12$             ;BR IF YES
4480  032542  005737  033450                  TST   RESUME          ;IS THIS A RESUME INTERRUPT
4481  032546  001432                        BEQ   8$              ;BR IF NO
4482  032550  032711  000002                  BIT   #BIT1,(R1)      ;CNTL OR BASE?
4483  032554  001407                        BEQ   13$             ;BR IF CNTL I
4484  032556  012761  035030  000004        MOV   #BASE,4(R1)     ;LOAD BASE ADDRESS
4485  032564  012761  010000  000006        MOV   #BIT12,6(R1)    ;WITH RESUME BIT SET
4486  032572  000404                        BR    12$             ;CONTINUE
4487  032574  005061  000006              13$:  CLR   6(R1)           ;SELECT FULL DUPLEX
4488  032600  005037  033450                  CLR   RESUME          ;CLEAR RESUME FLAG
4489  032604  142711  000040              12$:  BICB  #40,(R1)      ;CLEAR RQI
4490  032610  105711                        TSTB  (R1)            ;IS RDI GONE?
4491  032612  100776                        BMI   .-2             ;BR IF NO
4492  032614  005737  033450                  TST   RESUME          ;BASE OR CNTL I?
4493  032620  001403                        BEQ   14$             ;BR IF IT WAS CNTL I
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4494  032622  152711  000041                      BISB    #41,(R1)        ;ASK FOR CNTL I
4495  032626  000002                              RTI                     ;RETURN
4496  032630  105011                      14$:    CLRB    (R1)            ;CLEAR BSEL 0
4497  032632  000002                              RTI                     ;RETURN
4498  032634  005700                      8$:     TST     R0              ;FIRST TIME HERE?
4499  032636  100006                              BPL     7$              ;LOAD BASE IF MINUS
4500  032640  012761  035030  000004              MOV     #BASE,4(R1)     ;SET UP BASE ADDRESS
4501  032646  005061  000006                      CLR     6(R1)           ;CLEAR COUNT
4502  032652  000434                              BR      3$              ;CONTINUE
4503  032654  001003                      7$:     BNE     1$              ;CNTL I FULL DUPLEX IF 0
4504  032656  005061  000006                      CLR     6(R1)           ;SELECT FULL DUPLEX
4505  032662  000430                              BR      3$              ;CONTINUE
4506  032664  032700  000010              1$:     BIT     #BIT3,R0        ;XMIT?
4507  032670  001013                              BNE     2$              ;BR IF YES
4508  032672  000241                              CLC                     ;CLEAR CARRY
4509  032674  006100                              ROL     R0              ;MAKE R0 EVEN
4510  032676  016061  033452  000004              MOV     RECBA(R0),4(R1) ;LOAD REC BUFFER
4511  032704  016061  033620  000006              MOV     RCNTAB(R0),6(R1);LOAD COUNT
4512  032712  000241                              CLC                     ;CLEAR CARRY
4513  032714  006000                              ROR     R0              ;GET R0 BACK
4514  032716  000412                              BR      3$              ;CONTINUE
4515  032720  000241                      2$:     CLC                     ;CLEAR CARRY
4516  032722  006100                              ROL     R0              ;MAKE IT EVEN
4517  032724  016061  033452  000004              MOV     XMITBA(R0),4(R1);LOAD XMIT BUFFER
4518  032732  016061  033620  000006              MOV     RCNTAB(R0),6(R1);LOAD COUNT
4519  032740  000241                              CLC                     ;CLEAR CARRY
4520  032742  006000                              ROR     R0              ;PUT IT BACK
4521  032744  142711  000040              3$:     BICB    #40,(R1)        ;CLEAR RQI
4522  032750  105711                              TSTB    (R1)            ;WAIT FOR
4523  032752  100776                              BMI     .-2             ;RDI TO GO AWAY
4524  032754  005200                              INC     R0              ;INC COUNT
4525  032756  001003                              BNE     6$              ;IF 0 ASK FOR CNTL I
4526  032760  152711  000041                      BISB    #41,(R1)        ;ASK FOR CNTL I
4527  032764  000002                              RTI                     ;RETURN
4528  032766  022700  000017              6$:     CMP     #17,R0          ;DONE YET?
4529  032772  001411                              BEQ     4$              ;BR IF YES
4530  032774  032700  000010                      BIT     #BIT3,R0        ;XMIT?
4531  033000  001003                              BNE     5$              ;BR IF YES
4532  033002  152711  000044                      BISB    #44,(R1)        ;ASK FOR REC BA/CC
4533  033006  000002                              RTI                     ;RETURN
4534  033010  152711  000040              5$:     BISB    #40,(R1)        ;ASK FOR XMIT BA/CC
4535  033014  000002                              RTI                     ;RETURN
4536  033016  022737  000001  034704      4$:     CMP     #1,FLAG         ;1 BYTE MESS?
4537  033024  001403                              BEQ     15$             ;BR IF YES
4538  033026  152711  000046                      BISB    #46,(R1)        ;FORCE PROC. ERROR
4539  033032  000002                              RTI                     ;RETURN
4540  033034  105011                      15$:    CLRB    (R1)            ;CLR SELO
4541  033036  000002                              RTI                     ;RETURN
4542
4543                                              ;OUTPUT INTERRUPT SERVICE ROUTINE
4544
4545  033040  032761  000001  000002      0ISR:   BIT     #BIT0,2(R1)     ;IS THIS AN ERROR?
4546  033046  001461                              BEQ     1$              ;BR IF NO
4547  033050  005737  034704                      TST     FLAG            ;IS THIS SHUT DOWN INTERRUPT?
4548  033054  001006                              BNE     9$              ;BR IF NO
4549  033056  005237  034704                      INC     FLAG            ;YES MAKE FLAG NON-ZERO
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4550  033062  022761  001000  000006                CMP     #BIT9,6(R1)     ;SHUT DOWN BIT SET?
4551  033070  001516                                BEQ     10$             ;YES ALL IS OK
4552  033072  022700  000017              9$:       CMP     #17,R0          ;RESUME INTERRUPT?
4553  033076  001033                                BNE     11$             ;BR IF NO
4554  033100  022761  001000  000006                CMP     #BIT9,6(R1)     ;PROC. ERROR BIT SET?
4555  033106  001027                                BNE     11$             ;BR IF NO
4556  033110  005200                                INC     R0              ;BUMP COUNTER (TO 20)
4557  033112  012711  040000                        MOV     #BIT14,(R1)     ;MASTER CLEAR DEVICE
4558  033116  032737  100000  001366                BIT     #BIT15,STAT1    ;DMC OR KMC?
4559  033124  001405                                BEQ     .+14            ;BR IF DMC
4560  033126  012711  100000                        MOV     #BIT15,(R1)     ;SET RUN ON KMC
4561  033132  105227  000000                        INCB    #0              ;DELAY ON KMC
4562  033136  001375                                BNE     .-4
4563  033140  012737  177777  033450                MOV     #-1,RESUME      ;SET RESUME FLAG
4564  033146  005711                                TST     (R1)            ;RUN SET?
4565  033150  100376                                BPL     .-2             ;BR IF NO
4566  033152  012761  000100  000002                MOV     #BIT6,2(R1)     ;SET IEO
4567  033160  052711  004143                        BIS     #4143,(R1)      ;ASK FOR PORT(BASE REQ)
4568  033164  000002                                RTI                     ;RETURN
4569  033166  016137  000004  001252      11$:      MOV     4(R1),TEMP3     ;SAVE FOR ERROR TYPEOUT
4570  033174  016137  000006  001254                MOV     6(R1),TEMP4     ;SAVE FOR ERROR TYPEOUT
4571  033202  104016                                HLT     16              ;CNTL O ERROR
4572  033204  022626                                CMP     (SP)+,(SP)+     ;ADJUST STACK
4573  033206  000137  032434                        JMP     ENDEX1          ;GET OUT
4574  033212  032761  000004  000002      1$:       BIT     #BIT2,2(R1)     ;RECEIVE?
4575  033220  001046                                BNE     2$              ;BR IF YES
4576  033222  022761  033511  000004                CMP     #TBUFF+1,4(R1)  ;XMIT BA CORRECT?
4577  033230  001405                                BEQ     4$              ;BR IF OK
4578  033232  022761  033510  000004                CMP     #TBUFF,4(R1)    ;XMIT BA CORRECT?
4579  033240  001401                                BEQ     4$              ;BR IF YES
4580  033242  104014                                HLT     14              ;XMIT BA ERROR
4581  033244  005005                      4$:       CLR     R5              ;R5 IS INDEX REG
4582  033246  026561  033640  000006      5$:       CMP     XCNTAB(R5),6(R1);IS CHAR COUNT OK?
4583  033254  001406                                BEQ     6$              ;BR IF YES
4584  033256  062705  000002                        ADD     #2,R5           ;INC INDEX
4585  033262  022705  000016                        CMP     #16,R5          ;DONE LIST YET?
4586  033266  001367                                BNE     5$              ;BR IF NO
4587  033270  104014                                HLT     14              ;XMIT COUNT ERROR
4588  033272  016162  000004  033712      6$:       MOV     4(R1),XDNTAB(R2);STORE XMIT DONE BA
4589  033300  062702  000002                        ADD     #2,R2           ;INC INDEX
4590  033304  016162  000006  033712                MOV     6(R1),XDNTAB(R2);STORE XMIT DONE CC
4591  033312  062702  000002                        ADD     #2,R2           ;INC INDEX
4592  033316  142761  000207  000002                BICB    #207,2(R1)      ;CLEAR RDO
4593  033324  000002                                RTI                     ;RETURN
4594  033326  105011                      10$:      CLRB    (R1)            ;CLEAR SEL0
4595  033330  105061  000002                        CLRB    2(R1)           ;CLEAR SEL2
4596  033334  000002                                RTI                     ;RETURN
4597  033336  012705  000002              2$:       MOV     #2,R5           ;SET UP R5 AS INDEX
4598  033342  026561  033452  000004                CMP     RECBA(R5),4(R1) ;COMPARE WITH LIST OF CORRECT BA'S
4599  033350  001406                                BEQ     3$              ;BR IF OK?
4600  033352  062705  000002                        ADD     #2,R5           ;INCREMENT R5
4601  033356  022705  000020                        CMP     #20,R5          ;END OF LIST?
4602  033362  001367                                BNE     2$+4            ;BR IF NO
4603  033364  104014                                HLT     14              ;REC BA ERROR
4604  033366  005005                      3$:       CLR     R5              ;R5 IS INDEX
4605  033370  026561  033640  000006      7$:       CMP     XCNTAB(R5),6(R1);CHECK FOR CORRECT REC COUNT
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4606  033376  001406                          BEQ     8$              ;BR IF YES
4607  033400  062705  000002                  ADD     #2,R5           ;INCREMENT R5
4608  033404  022705  000016                  CMP     #16,R5          ;END OF LIST?
4609  033410  001367                          BNE     7$              ;BR IF NOT
4610  033412  104014                          HLT     14              ;REC COUNT ERROR
4611  033414  016164  000004  033656  8$:     MOV     4(R1),RDNTAB(R4)  ;STORE REC BA
4612  033422  062704  000002                  ADD     #2,R4           ;INC INDEX
4613  033426  016164  000006  033656          MOV     6(R1),RDNTAB(R4);STORE REC DONE CC
4614  033434  062704  000002                  ADD     #2,R4           ;INC INDEX
4615  033440  142761  000207  000002          BICB    #207,2(R1)      ;CLEAR RDO
4616  033446  000002                          RTI                     ;RETURN
4617
4618
4619                                          ;BUFFERS
4620
4621  033450  000000                  RESUME: 0
4622  033452                          RECBA:
4623  033452  000017                  XMITBA: .BLKW   17      ;REC & XMIT BA LIST
4624
4625  033510                          TBUFF:                  ;TRANSMIT DATA
4626  033510      000     001     002 .BYTE   0,1,2,3,4,5,6,7
4627  033513      003     004     005
4628  033516      006     007
4629  033520      010     011     012 .BYTE   10,11,12,13,14,15,16,17
4630  033523      013     014     015
4631  033526      016     017
4632  033530      020     021     022 .BYTE   20,21,22,23,24,25,26,27
4633  033533      023     024     025
4634  033536      026     027
4635  033540      030     031     032 .BYTE   30,31,32,33,34,35,36,37
4636  033543      033     034     035
4637  033546      036     037
4638  033550      040     041     042 .BYTE   40,41,42,43,44,45,46,47
4639  033553      043     044     045
4640  033556      046     047
4641  033560      050     051     052 .BYTE   50,51,52,53,54,55,56,57
4642  033563      053     054     055
4643  033566      056     057
4644  033570      060     061     062 .BYTE   60,61,62,63,64,65,66,67
4645  033573      063     064     065
4646  033576      066     067
4647  033600      070     071     072 .BYTE   70,71,72,73,74,75,76,77
4648  033603      073     074     075
4649  033606      076     077
4650  033610      100     101     102 .BYTE.  100,101,102,103,104,105,106,107
4651  033613      103     104     105
4652  033616      106     107
4653
4654  033620  000010                  RCNTAB: .BLKW   10              ;RECEIVE COUNT TABLE
4655  033640  000007                  XCNTAB: .BLKW   7               ;TRANSMIT COUNT TABLE
4656
4657  033656  000016                  RDNTAB: .BLKW   16              ;RECEIVE DONE TABLE (BA/CC)
4658  033712  000016                  XDNTAB: .BLKW   16              ;XMIT DONE TABLE (BA/CC)
4659
4660  033746                          RBUFF:                  ;RECEIVER BUFFERS
4661  033746  000104                  RBUFF1:  .BLKB 104
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 4662  034052  000104                          RBUFF2:  .BLKB 104
 4663  034156  000104                          RBUFF3:  .BLKB 104
 4664  034262  000104                          RBUFF4:  .BLKB 104
 4665  034366  000104                          RBUFF5:  .BLKB 104
 4666  034472  000104                          RBUFF6:  .BLKB 104
 4667  034576  000104                          RBUFF7:  .BLKB 104
 4668  034702  000000                          RBUFFE: 0                       ;END OF RECEIVER BUFFERS
 4669                              06900
 4670                              07000
 4671                              07100
 4672                              07200          ;BUFFER AREA
 4673                              07300          ;-----------
 4674                              07400
 4675  034704  000000              07500  FLAG:   0
 4676  034706  000000              07600  TFLAG:  0
 4677  034710  000000              07700  RFLAG:  0
 4678  034712  000044              07800  TCOUNT: 44
 4679  034714  041101  042103  043105  07900  TBUF:   .ASCII/ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789/
 4680  034722  044107  045111  046113
 4681  034730  047115  050117  051121
 4682  034736  052123  053125  054127
 4683  034744  055131  030460  031462
 4684  034752  032464  033466  034470
 4685                              08000  .EVEN
 4686  034760  000044              08100  RCOUNT: 44
 4687  034762  035030              08200  RBUF:   .=.+46
 4688                              08300  .EVEN
 4689  035030  035430              08400  BASE:   .=.+256.
 4690                              00300
 4691                              00400
 4692                              00500  ;SUBROUTINES
 4693                              00600  ;-----------
 4694                              00700
 4695  035430                      00800  CLRALL:
 4696                              00900          ;THIS SUBROUTINE CLEARS THE C&Z BITS AND THE BR
 4697                              01000
 4698  035430  104414                             ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4699  035432  000400              01200          000400                  ;BR←0
 4700  035434  104414                             ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4701  035436  063220              01400          063220                  ;SP(0)←BR
 4702  035440  104414                             ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4703  035442  060400              01600          060400                  ;BR←SP(0)+BR
 4704  035444  000207              01700          RTS     PC
 4705                              01800
 4706                              01900
 4707  035446                      02000  SETBR0:
 4708                              02100          ;THIS SUBROUTINE SETS BR0 BIT
 4709                              02200
 4710  035446  104414                             ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4711  035450  000401              02400          000401                  ;BR←001
 4712  035452  000207              02500          RTS     PC
 4713                              02600
 4714                              02700
 4715  035454                      02800  SETBR1:
 4716                              02900          ;THIS SUBROUTINE SETS BR1 BIT
 4717                              03000
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 4718  035454  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4719  035456  000402          03200     000402                  ;BR←002
 4720  035460  000207          03300     RTS     PC
 4721                          03400
 4722                          03500
 4723  035462                  03600 SETBR4:
 4724                          03700     ;THIS SUBROUTINE SETS BR4 BIT
 4725                          03800
 4726  035462  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4727  035464  000420          04000     000420                  ;BR←020
 4728  035466  000207          04100     RTS     PC
 4729                          04200
 4730                          04300
 4731  035470                  04400 SETBR7:
 4732                          04500     ;THIS SUBROUTINE SETS BR7 BIT
 4733                          04600
 4734  035470  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4735  035472  000600          04800     000600                  ;BR←200
 4736  035474  000207          04900     RTS     PC
 4737                          05000
 4738                          05100
 4739  035476                  05200 SETC:
 4740                          05300     ;THIS SUBROUTINE SETS THE C BIT
 4741                          05400
 4742  035476  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4743  035500  000777          05600     000777                  ;BR←377
 4744  035502  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4745  035504  063220          05800     063220                  ;SP(0)←BR
 4746  035506  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4747  035510  060400          06000     060400                  ;BR←SP(0)+BR
 4748  035512  000207          06100     RTS     PC
 4749                          06200
 4750                          06300
 4751  035514                  06400 SETZ:
 4752                          06500     ;THIS SUBROUTINE SETS THE Z BIT
 4753                          06600
 4754  035514  104414                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4755  035516  000777          06800     000777                  ;BR←377
 4756  035520  000207          06900     RTS     PC
 4757                          07000
 4758                          07100
 4759  035522                  07200 ROMDAT:
 4760                          07300     ;THIS SUBROUTINE LOADS R5 WITH EXPECTED ROM CONTENTS
 4761                          07400     ;AND LOADS R4 WITH ACTUAL ROM CONTENTS
 4762                          07500
 4763  035522  017600  000000 07600     MOV     @(SP),R0        ;INDEX FOR COMPARE
 4764  035526  062716  000002 07700     ADD     #2,(SP)         ;ADJUST STACK
 4765  035532  012711  002000 07800     MOV     #BIT10,(R1)     ;SET ROM0
 4766  035536  016005  011766 07900     MOV     ROMMAP(R0),R5   ;PUT "EXPECTED" IN R5
 4767  035542  016104  000006 08000     MOV     6(R1),R4        ;PUT "FOUND" IN R4
 4768  035546  000207          08100     RTS     PC              ;RETURN
 4769                          08200
 4770  035550                  08300 RAMDAT:
 4771                          08400     ;THIS SUBROUTINE LOADS R4 WITH THE LOWEST
 4772                          08500     ;8 BITS OF THE CRAM PC.
 4773                          08600
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 4774  035550  017605  000000          08700          MOV     @(SP),R5        ;GOOD DATA
 4775  035554  062716  000002          08800          ADD     #2,(SP)         ;ADJUST STACK
 4776  035560  005011                  08900          CLR     (R1)            ;CLEAR BIT10
 4777  035562  052711  000400          09000          BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION IN CRAM THAT WAS
 4778                                  09100                                  ;JUMPED TO, IT LOADS BR WITH ROM PC
 4779  035566  005011                  09200          CLR     (R1)            ;CLR BIT8
 4780  035570  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4781  035572  061225                  09400          061225                  ;MOV BR TO PORT 5
 4782  035574  116104  000005          09500          MOVB    5(R1),R4        ;PUT "FOUND" IN R4
 4783  035600  000207                  09600          RTS     PC              ;RETURN
 4784                                  09700
 4785  035602                          09800  WROM:
 4786                                  09900          ;THIS SUBROUTINE WRITES THE ROMMAP INTO THE CRAM
 4787                                  10000
 4788  035602  032737  100000  001366  10100          BIT     #BIT15,STAT1    ;BE SURE DMC HAS CRAM
 4789  035610  001420                  10200          BEQ     2$              ;SKIP IF NO CRAM
 4790  035612  005000                  10300          CLR     R0              ;R0=CRAM ADDRESS
 4791  035614  012702  011766          10400          MOV     #ROMMAP,R2      ;R2 POINTS TO ROMMAP
 4792  035620  012711  002000          10500  1$:     MOV     #BIT10,(R1)     ;SET ROM0
 4793  035624  010061  000004          10600          MOV     R0,4(R1)        ;LOAD CRAM ADDRESS
 4794  035630  012261  000006          10700          MOV     (R2)+,6(R1)     ;LOAD WORD TO BE WRITTEN
 4795  035634  052711  020000          10800          BIS     #BIT13,(R1)     ;WRITE IT!
 4796  035640  005200                  10900          INC     R0              ;NEXT ADDRESS
 4797  035642  022700  002000          11000          CMP     #2000,R0        ;DONE YET?
 4798  035646  001364                  11100          BNE     1$              ;BR IF NO
 4799  035650  005011                  11200          CLR     (R1)            ;CLEAR SEL0
 4800  035652  000207                  11300  2$:     RTS     PC              ;RETURN
 4801                                  11400
 4802                                  11500
 4803  035654                          11600  MEMSET:
 4804                                  11700          ;THIS SUBROUTINE LOADS CRAM WITH SPECIAL INSTRUCTIONS
 4805                                  11800          ;FOR THE CRAM JUMP TEST. ALL CRAM LOCATIONS ARE LOADED
 4806                                  11900          ;WITH INSTRUCTIONS THAT MOVE A 37 TO THE BR, EXCEPT THE
 4807                                  12000          ;FOLLOWING CRAM ADDRESSES: 0,1,4,7,525,1777. THESE LOCATIONS
 4808                                  12100          ;CONTAIN INTRUCTIONS WHICH LOAD THE BR WITH THE LOWEST
 4809                                  12200          ;8 BITS OF THAT CRAM ADDRESS.
 4810                                  12300
 4811  035654  005000                  12400          CLR     R0              ;R0 = CRAM ADDRESS
 4812  035656  012711  002000          12500  1$:     MOV     #BIT10,(R1)     ;SET ROM0
 4813  035662  010061  000004          12600          MOV     R0,4(R1)        ;LOAD CRAM ADDRESS
 4814  035666  012761  000437  000006  12700          MOV     #437,6(R1)      ;LOAD INSTRUCTION
 4815  035674  052711  020000          12800          BIS     #BIT13,(R1)     ;WRITE INSTRUCTION IN CRAM
 4816  035700  005200                  12900          INC     R0              ;NEXT ADDRESS
 4817  035702  022700  002000          13000          CMP     #2000,R0        ;DONE YET?
 4818  035706  001363                  13100          BNE     1$              ;BR IF NO
 4819  035710  005000                  13200          CLR     R0              ;INDEX REGISTER
 4820  035712  012711  002000          13300  2$:     MOV     #BIT10,(R1)     ;SET ROM0
 4821  035716  016061  035752  000004  13400          MOV     CRAMA(R0),4(R1) ;LOAD CRAM ADDRESS IN SEL4
 4822  035724  016061  035766  000006  13500          MOV     INSTU(R0),6(R1) ;LOAD INSTRUCTIIN TO BE WRITTEN
 4823  035732  052711  020000          13600          BIS     #BIT13,(R1)     ;WRITE CRAM!
 4824  035736  005720                  13700          TST     (R0)+           ;NEXT
 4825  035740  022700  000014          13800          CMP     #14,R0          ;DONE YET?
 4826  035744  001362                  13900          BNE     2$              ;BR IF NO
 4827  035746  005011                  14000          CLR     (R1)            ;CLEAR ALL BITS
 4828  035750  000207                  14100          RTS     PC              ;RETURN
 4829                                  14200
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 4830  035752  000000  000001  000004  14300  CRAMA:  .WORD   0,1,4,7,1777,525
 4831  035760  000007  001777  000525
 4832  035766  000400                  14400  INSTU:  000400          ;BR←0
 4833  035770  000401                  14500          000401          ;BR←1
 4834  035772  000404                  14600          000404          ;BR←4
 4835  035774  000407                  14700          000407          ;BR←7
 4836  035776  000777                  14800          000777          ;BR←377
 4837  036000  000525                  14900          000525          ;BR←125
 4838                                   15000
 4839                                   15100
 4840  036002                          15200  BASELD:
 4841                                   15300          ;THIS SUBROUTINE LOADS THE DMC WITH A BASE ADDRESS
 4842                                   15400          ;AND PUTS DMC INTO FULL-DUPLEX MODE
 4843                                   15500
 4844  036002  012711  040000          15600          MOV     #BIT14,(R1)     ;MASTER CLEAR
 4845  036006  032737  100000  001366  15700          BIT     #BIT15,STAT1    ;CRAM?
 4846  036014  001402                  15800          BEQ     .+6             ;BR IF NO
 4847  036016  012711  100000          15900          MOV     #BIT15,(R1)     ;IF CRAM SET RUN
 4848  036022  105227  000000          16000          INCB    #0              ;DELAY
 4849  036026  001375                  16100          BNE     .-4             ;BR IF NOT DONE DELAY
 4850  036030  005711                  16200  1$:     TST     (R1)            ;IS RUN SET?
 4851  036032  100376                  16300          BPL     1$              ;BR IF NO
 4852  036034  052711  004000          16400          BIS     #BIT11,(R1)     ;SET LU LOOP
 4853  036040  152711  000043          16500          BISB    #43,(R1)        ;BASE REQUEST
 4854  036044  105711                  16600  2$:     TSTB    (R1)            ;RDY I SET?
 4855  036046  100376                  16700          BPL     2$              ;BR IF NO
 4856  036050  012761  035030  000004  16800          MOV     #BASE,4(R1)     ;LOAD BASE ADDRESS
 4857  036056  005061  000006          16900          CLR     6(R1)           ;CLEAR CC
 4858  036062  142711  000040          17000          BICB    #40,(R1)        ;CLEAR RQI
 4859  036066  105711                  17100  3$:     TSTB    (R1)            ;RDY I CLEAR?
 4860  036070  100776                  17200          BMI     3$              ;BR IF NO
 4861  036072  152711  000041                         BISB    #41,(R1)        ;ASK FOR CNTL I
 4862  036076  105711                          64$:    TSTB    (R1)            ;WAIT FOR RDI
 4863  036100  100376                          BPL     64$             ;BR IF NOT SETY
 4864  036102  005061  000006                  CLR     6(R1)           ;SET FULL DUPLEX
 4865  036106  142711  000040                  BICB    #40,(R1)        ;CLEAR RQI
 4866  036112  105711                  65$:    TSTB    (R1)            ;RDI UP?
 4867  036114  100776                          BMI     65$             ;BR IF YES
 4868  036116  000207                  17400   RTS     PC              ;RETURN
 4869                                   17500
 4870  036120                          17600  BASELH:
 4871                                   17700          ;THIS SUBROUTINE LOADS THE DMC WITH A BASE ADDRESS
 4872                                   17800          ;AND PUTS DMC INTO HALF-DUPLEX MODE
 4873                                   17900
 4874  036120  012711  040000          18000          MOV     #BIT14,(R1)     ;MASTER CLEAR
 4875  036124  032737  100000  001366  18100          BIT     #BIT15,STAT1    ;CRAM?
 4876  036132  001402                  18200          BEQ     .+6             ;BR IF NO
 4877  036134  012711  100000          18300          MOV     #BIT15,(R1)     ;IF CRAM SET RUN
 4878  036140  105227  000000          18400          INCB    #0              ;DELAY
 4879  036144  001375                  18500          BNE     .-4             ;BR IF NOT DONE DELAY
 4880  036146  005711                  18600  1$:     TST     (R1)            ;IS RUN SET?
 4881  036150  100376                  18700          BPL     1$              ;BR IF NO
 4882  036152  052711  004000          18800          BIS     #BIT11,(R1)     ;SET LU LOOP
 4883  036156  152711  000043          18900          BISB    #43,(R1)        ;BASE REQUEST
 4884  036162  105711                  19000  2$:     TSTB    (R1)            ;RDY I SET?
 4885  036164  100376                  19100          BPL     2$              ;BR IF NO
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 4886  036166  012761  035030  000004  19200          MOV     #BASE,4(R1)     ;LOAD BASE ADDRESS
 4887  036174  005061  000006          19300          CLR     6(R1)           ;CLEAR CC
 4888  036200  142711  000040          19400          BICB    #40,(R1)        ;CLEAR RQI
 4889  036204  105711                  19500  3$:     TSTB    (R1)            ;RDY I CLEAR?
 4890  036206  100776                  19600          BMI     3$              ;BR IF NO
 4891  036210  152711  000041                         BISB    #41,(R1)        ;ASK FOR CNTL I
 4892  036214  105711                          64$:    TSTB    (R1)            ;WAIT FOR RDI
 4893  036216  100376                          BPL     64$             ;BR IF NOT SETY
 4894  036220  012761  002000  000006                MOV     #BIT10,6(R1)    ;SET HALF DUPLEX
 4895  036226  142711  000040                         BICB    #40,(R1)        ;CLEAR RQI
 4896  036232  105711                          65$:    TSTB    (R1)            ;RDI UP?
 4897  036234  100776                          BMI     65$             ;BR IF YES
 4898  036236  000207                  19800          RTS     PC              ;RETURN
 4899                                  19900
 4900  036240                          20000  RFRELD:
 4901                                  20100          ;THIS SUBROUTINE LOADS THE DMC WITH A RECEIVE BA/CC
 4902                                  20200
 4903  036240  152711  000044          20300          BISB    #44,(R1)        ;REC BA/CC REQUEST
 4904  036244  105711                  20400  1$:     TSTB    (R1)            ;RDY I SET?
 4905  036246  100376                  20500          BPL     1$              ;BR IF NO
 4906  036250  012561  000004          20600          MOV     (R5)+,4(R1)     ;LOAD REC BA
 4907  036254  012561  000006          20700          MOV     (R5)+,6(R1)     ;LOAD REC CC
 4908  036260  142711  000040          20800          BICB    #40,(R1)        ;CLEAR RQI
 4909  036264  105711                  20900  2$:     TSTB    (R1)            ;IS RDY I CLEAR
 4910  036266  100776                  21000          BMI     2$              ;BR IF NO
 4911  036270  000205                  21100          RTS     R5              ;RETURN
 4912                                  21200
 4913  036272                          21300  XFRELD:
 4914                                  21400          ;THIS SUBROUTINE LOADS THE DMC WITH A TRANSMIT BA/CC
 4915                                  21500
 4916  036272  152711  000040          21600          BISB    #40,(R1)        ;XMIT BA/CC REQUEST
 4917  036276  105711                  21700  1$:     TSTB    (R1)            ;RDY I SET?
 4918  036300  100376                  21800          BPL     1$              ;BR IF NO
 4919  036302  012561  000004          21900          MOV     (R5)+,4(R1)     ;LOAD XMIT BA
 4920  036306  012561  000006          22000          MOV     (R5)+,6(R1)     ;LOAD XMIT CC
 4921  036312  142711  000040          22100          BICB    #40,(R1)        ;CLEAR RQI
 4922  036316  105711                  22200  2$:     TSTB    (R1)            ;IS RDY I CLEAR
 4923  036320  100776                  22300          BMI     2$              ;BR IF NO
 4924  036322  000205                  22400          RTS     R5              ;RETURN
 4925                                  00300
       036324  041777  040522  020115  00400  EM1:    .ASCIZ  <377>/CRAM DATA ERROR/
       036345     377  051103  046501  00500  EM2:    .ASCIZ  <377>/CRAM DUAL ADDRESSING ERROR/
       036401     377  051103  046517  00600  EM3:    .ASCIZ  <377>/CROM DATA ERROR/
       036422  045377  046525  020120  00700  EM4:    .ASCIZ  <377>/JUMP ERROR/
       036436  047777  052104  042440  00800  EM5:    .ASCIZ  <377>/ODT ERROR IN IBUS* REG10/
       036470  044777  050117  046440  00900  EM6:    .ASCIZ  <377>/IOP MAIN MEMORY TEST/
       036516  044777  050117  046440  01000  EM7:    .ASCIZ  <377>/IOP MAR TEST/
       036534  041377  020122  044522  01100  EM10:   .ASCIZ  <377>/BR RIGHT SHIFT TEST/
       036561     377  042522  042503  01200  EM11:   .ASCIZ  <377>/RECEIVE DATA ERROR/
       036605     377  051106  042505  01300  EM12:   .ASCIZ  <377>/FREE RUNNING ERROR/
       036631     377  047503  052116  01400  EM13:   .ASCIZ  <377>/CONTROL OUT ERROR/
       036654  044777  052116  051105  01500  EM14:   .ASCIZ  <377>/INTERNAL DDCMP ERROR COUNTS NON ZERO/
                                       01600
       036722  042777  050130  041505  01700  DH1:    .ASCIZ  <377>/EXPECTED  FOUND  ADDRESS/
       036754  042777  050130  041505  01800  DH2:    .ASCIZ  <377>/EXPECTED  FOUND/
       036775     377  051440  046105  01900  DH3:    .ASCIZ  <377>/ SEL4      SEL6/
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037016  041377  051501  025505  02000   DH4:    .ASCIZ  <377>/BASE+3 THRU BASE+12 /
                                02100           .EVEN
                                02200
037044  000003                  02300   DT1:    3
037046     006      004         02400           .BYTE   6,4
037050  001264                  02500           SAVR2
037052     006      004         02600           .BYTE   6,4
037054  001270                  02700           SAVR4
037056     004      002         02800           .BYTE   4,2
037060  001260                  02900           SAVR0
037062  000003                  03000   DT2:    3
037064     006      004         03100           .BYTE   6,4
037066  001272                  03200           SAVR5
037070     006      004         03300           .BYTE   6,4
037072  001270                  03400           SAVR4
037074     004      002         03500           .BYTE   4,2
037076  001264                  03600           SAVR2
037100  000003                  03700   DT3:    3
037102     006      004         03800           .BYTE   6,4
037104  001272                  03900           SAVR5
037106     006      004         04000           .BYTE   6,4
037110  001270                  04100           SAVR4
037112     004      002         04200           .BYTE   4,2
037114  001252                  04300           TEMP3
037116  000002                  04400   DT4:    2
037120     003      007         04500           .BYTE   3,7
037122  001272                  04600           SAVR5
037124     003      002         04700           .BYTE   3,2
037126  001270                  04800           SAVR4
037130  000002                  04900   DT5:    2
037132     006      004         05000           .BYTE   6,4
037134  001272                  05100           SAVR5
037136     006      002         05200           .BYTE   6,2
037140  001270                  05300           SAVR4
037142  000003                  05400   DT6:    3
037144     003      010         05500           .BYTE   3,10
037146  001272                  05600           SAVR5
037150     003      004         05700           .BYTE   3,4
037152  001270                  05800           SAVR4
037154     004      002         05900           .BYTE   4,2
037156  034704                  06000           FLAG
037160  000003                  06100   DT7:    3
037162     003      010         06200           .BYTE   3,10
037164  001272                  06300           SAVR5
037166     003      004         06400           .BYTE   3,4
037170  001270                  06500           SAVR4
037172     004      002         06600           .BYTE   4,2
037174  001264                  06700           SAVR2
037176  000003                  06800   DT10:   3
037200     003      007         06900           .BYTE   3,7
037202  001272                  07000           SAVR5
037204     003      004         07100           .BYTE   3,4
037206  001270                  07200           SAVR4
037210     006      002         07300           .BYTE   6,2
037212  001252                  07400           TEMP3
037214  000002                  07500   DT11:   2
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037216    006     004          07600            .BYTE   6,4
037220  001252                 07700            TEMP3
037222    006     002          07800            .BYTE   6,2
037224  001254                 07900            TEMP4
037226  000010                 08000    DT12:   10
037230    003     002          08100            .BYTE   3,2
037232  001250                 08200            TEMP2
037234    003     002          08300            .BYTE   3,2
037236  035034                 08400            BASE+4
037240    003     002          08500            .BYTE   3,2
037242  001252                 08600            TEMP3
037244    003     002          08700            .BYTE   3,2
037246  035036                 08800            BASE+6
037250    003     002          08900            .BYTE   3,2
037252  001254                 09000            TEMP4
037254    003     002          09100            .BYTE   3,2
037256  035040                 09200            BASE+10
037260    003     002          09300            .BYTE   3,2
037262  001256                 09400            TEMP5
037264    003     002          09500            .BYTE   3,2
037266  035042                 09600            BASE+12
                               09700
037270                         09800    .ERRTAB:
037270  000000                 09900            0
037272  000000                 10000            0
037274  000000                 10100            0
037276  036324                 10200    EM1
037300  036722                 10300    DH1     ;HLT    1
037302  037044                 10400    DT1
037304  036345                 10500    EM2
037306  036722                 10600    DH1     ;HLT    2
037310  037044                 10700    DT1
037312  036324                 10800    EM1
037314  036722                 10900    DH1     ;HLT    3
037316  037062                 11000    DT2
037320  036401                 11100    EM3
037322  036722                 11200    DH1     ;HLT    4
037324  037100                 11300    DT3
037326  036422                 11400    EM4
037330  036754                 11500    DH2     ;HLT    5
037332  037116                 11600    DT4
037334  036422                 11700    EM4
037336  036754                 11800    DH2     ;HLT    6
037340  037130                 11900    DT5
037342  036436                 12000    EM5
037344  036754                 12100    DH2     ;HLT    7
037346  037116                 12200    DT4
037350  036470                 12300    EM6
037352  036722                 12400    DH1     ;HLT    10
037354  037142                 12500    DT6
037356  036516                 12600    EM7
037360  036722                 12700    DH1     ;HLT    11
037362  037160                 12800    DT7
037364  036534                 12900    EM10
037366  036754                 13000    DH2     ;HLT    12
037370  037116                 13100    DT4
```

```
037372  036561
037374  036722
037376  037176
037400  036605
037402  000000
037404  000000
037406  036605
037410  036754
037412  037130
037414  036631
037416  036775
037420  037214
037422  036654
037424  037016
037426  037226

037430
        000001
```

```
13200   EM11
13300   DH1     ;HLT    13
13400   DT10
13500   EM12
13600   0       ;HLT    14
13700   0
13800   EM12
13900   DH2     ;HLT    15
14000   DT5
14100   EM13
14200   DH3     ;HLT    16
14300   DT11
14400   EM14
14500   DH4     ;HLT    17
14600   DT12
14700
14800
14900   CORMAX:
15400   .END
```

```
ADRCNT= 004301   858*   894*   903#
AUDONE  002734   566    639#
AUSTRT  002446   565#   596    643
AUTO.S  010252   528    1343#
BASE    035030   3841   4441   4446   4452   4455   4458   4459   4460   4461   4484   4500   4689#  4856
                 4886   4925
BASELD  036002   3980   4036   4085   4131   4180   4224   4840#
BASELH  036120   4268   4870#
BINWRD  004622   944*   947*   948    985#
BIT0  = 000001    95#   1133   1134   3804   3914   3929   3974   3995   4030   4053   4079   4099   4125
                 4148   4174   4192   4218   4236   4262   4305   4413   4545
BIT1  = 000002    94#    533   1127   1133   1134   1503   4482
BIT10 = 002000    85#   1475   1486   1682   1718   1754   1770   1804   2108   4765   4732   4812   4820
                 4894
BIT11 = 004000    84#   3833   4852   4882
BIT12 = 010000    83#   1427   1501   3807   3977   4033   4082   4128   4177   4221   4265   4308   4485
BIT13 = 020000    82#   1430   1478   1505   1685   1721   1757   4795   4815   4823
BIT14 = 040000    81#    761   1441   1443   1505   1516   3818   3831   4340   4557   4844   4874
BIT15 = 100000    80#    487    569    572   1414   1481   1677   1712   1750   1797   1832   1878   1927
                 1994   2036   2097   2146   2202   2255   2311   2367   2423   2479   2535   2592   2649
                 2706   2763   2820   2877   2938   3000   3059   3121   3183   3245   3307   3369   3431
                 3493   3555   3617   3679   3741   3802   3819   3821   3972   4028   4077   4123   4172
                 4216   4260   4303   4341   4343   4558   4560   4788   4845   4847   4875   4877
BIT2  = 000004    93#    533    692   1134   3908   3999   4574
BIT3  = 000010    92#   1507   1514   4506   4530
BIT4  = 000020    91#   1117   1140   1142   4057
BIT5  = 000040    90#   1618   2047
BIT6  = 000100    89#   1122   1123   1509   2062   4360   4566
BIT7  = 000200    88#   1123   1240   1618
BIT8  = 000400    87#   1485   1496   1498   1511   1513   1519   1522   1579   2045   4103   4152   4777
BIT9  = 001000    86#   1483   1485   1493   1519   1522   1577   1579   4196   4240   4550   4554
BM      006756  1165#   1455
BRLVL   011720  1574   1584   1592   1604#
BRW     003640   698    784#
BRX     003642   699    785#
CHRCNT  004620   942*   945    949    965*   983#   984
CKSWR   007362   514    759    790   1005   1190#
CKSWR1  007426  1200#  1212
CKSWR2  007440  1203#
CKSWR3  007444  1205#
CKSWR4  007450  1206#  1214   1221
CKSWR5  007554  1191   1195   1230#
CLKX    001242   171#
CLRALL  035430  2149   2162   2175   2595   2608   2621   2652   2665   2678   2709   2722   2735   2766
                 2779   2792   2823   2836   2849   2880   2893   2906   2942   2955   2968   3435   3448
                 3461   3497   3510   3523   3559   3572   3585   3621   3634   3647   3683   3696   3709
                 3745   3758   3771   4695#
CLRTAB  031676  4345*  4411   4419   4436
CNERR   007167   607   1165#
CNT.MA  001702   196    365#   486    488    490   1268
CNVRT = 104411   233#   604    718    720    722    724   1039   1041   1100   1203
CONERR  007125   602   1165#
CONN    007016  1165#  1432
CONTAB  002710   611    624#
CONVRT= 104410   231#   545    610   1055   1366
CORMAX  037430  4925#
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```
CRAM    006510          1165*  1405
CRAMA   035752          4821   4830*
CREAM   001320           195*   485*  1264*  1265   1267*  1271
CSR     006412          1165*  1370
CSRMAP  010254          1345*
CYCLE   007620           700    741    742   1255*
DATABP  005124          1028*  1031   1053   1056*
DATACL= 104415           241*
DATAHD  005112          1027*  1049   1052*
DELAY = 104413           237*
DEVADR  004276           856*   891    901*
DEVTAB  002722           580    629*
DH1     036722          4925*
DH2     036754          4925*
DH3     036775          4925*
DH4     037016          4925*
DISPLA  001200           142*   500*   506*   715*
DISPRE  000174           128*   506
DMACTV  001306           189*   523    656*   657   1255   1269   1351*  1534*  1540*  1541*  1545   1570
DMCM    007210           615   1165*
DMCR00  001500           280*
DMCR01  001510           285*
DMCR02  001520           290*
DMCR03  001530           295*
DMCR04  001540           300*
DMCR05  001550           305*
DMCR06  001560           310*
DMCR07  001570           315*
DMCR10  001600           320*
DMCR11  001610           325*
DMCR12  001620           330*
DMCR13  001630           335*
DMCR14  001640           340*
DMCR15  001650           345*
DMCR16  001660           350*
DMCR17  001670           355*
DMCSR   001404           263*   565*   591    628    745    782   1095   1141   1273*  1282   1331   1638
DMCSRH  001406           264*  1122*  1123*  1127*  1133*  1134*  1140*  1142*  1282*  1283*  1284
DMCTL   001410           265*  1284*  1285*  1286
DMNUM   001310           190*   481    731   1349*  1364*  1526*  1527   1535   1537
DMP04   001412           266*  1111*  1117   1154   1159   1286*  1287*  1288
DMP06   001414           267*  1128*  1288*  1289*
DMRLVL  001376           260*  1291*  1292*  1293   4319*
DMRVEC  001374           259*   748   1274*  1275*  1291   4318*
DMS100  001502           281*
DMS101  001512           286*
DMS102  001522           291*
DMS103  001532           296*
DMS104  001542           301*
DMS105  001552           306*
DMS106  001562           311*
DMS107  001572           316*
DMS110  001602           321*
DMS111  001612           326*
DMS112  001622           331*
DMS113  001632           336*
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DMS114  001642            341#
DMS115  001652            346#
DMS116  001662            351#
DMS117  001672            356#
DMS200  001504            282#
DMS201  001514            287#
DMS202  001524            292#
DMS203  001534            297#
DMS204  001544            302#
DMS205  001554            307#
DMS206  001564            312#
DMS207  001574            317#
DMS210  001604            322#
DMS211  001614            327#
DMS212  001624            332#
DMS213  001634            337#
DMS214  001644            342#
DMS215  001654            347#
DMS216  001664            352#
DMS217  001674            357#
DMS300  001506            283#
DMS301  001516            288#
DMS302  001526            293#
DMS303  001536            298#
DMS304  001546            303#
DMS305  001556            308#
DMS306  001566            313#
DMS307  001576            318#
DMS310  001606            323#
DMS311  001616            328#
DMS312  001626            333#
DMS313  001636            338#
DMS314  001646            343#
DMS315  001656            348#
DMS316  001666            353#
DMS317  001676            358#
DMTLVL  001402            262#  1295*  1296*  4321*
DMTVEC  001400            261#  1293*  1294*  1295   4320*
DM.END  001700            360#  1347
DM.MAP  001500            195    279#   485    538    548    642   1265   1267   1345   1350   1562
DT1     037044           4925#
DT10    037176           4925#
DT11    037214           4925#
DT12    037226           4925#
DT2     037062           4925#
DT3     037100           4925#
DT4     037116           4925#
DT5     037130           4925#
DT6     037142           4925#
DT7     037160           4925#
EM1     036324           4925#
EM10    036534           4925#
EM11    036561           4925#
EM12    036605           4925#
EM13    036631           4925#
EM14    036654           4925#
```

```
EM2     036345          4925#
EM3     036401          4925#
EM4     036422          4925#
EM5     036436          4925#
EM6     036470          4925#
EM7     036516          4925#
ENDEX   032334          4412    4437#
ENDEX1  032434          4307    4457#   4463    4474    4573
ENDEX2  032436          4442    4447    4453    4456    4458#
ENDEX3  032472          4371    4464#
ERCT00  001704           367#
ERCT01  001710           370#
ERCT02  001714           373#
ERCT03  001720           376#
ERCT04  001724           379#
ERCT05  001730           382#
ERCT06  001734           385#
ERCT07  001740           388#
ERCT10  001744           391#
ERCT11  001750           394#
ERCT12  001754           397#
ERCT13  001760           400#
ERCT14  001764           403#
ERCT15  001770           406#
ERCT16  001774           409#
ERCT17  002000           412#
ERR     002612           589     599#    603
ERRCNT  001232           163#    727     754     1066*   1280*
ERRFLG  001325           202#    483*    713*    775*    1016*   1029    1043*   1101*
ERRMSG  005100          1026*   1044    1047#
ERRPC   002702           605     621#
ERTABO  005224          1041    1075#
EXIT  = 000205            96#
EXITER  005160          1061    1066#
FLAG    034704          1834*   1838    1839    1860*   1861    1880*   1885    1886    1908*   1909    1929*   1930    1933
                        1934    1952*   1953    1956*   1957    1960    1961    1976*   1977    4339*   4350    4361    4369
                        4386    4408    4410*   4413    4418*   4435*   4438    4536    4547    4549*   4675#   4925
FLOAT   002536           582#    588
FY      002562           590#    594
HALTS   005130          1012    1058#
HILIM   004274           855*    882     900#
ICOUNT  001222           159#    773     778*
IISR    032534          4318    4478#
INBUF   007256           825     861    1180#
INCHAR  007560          1206    1234#
INIFLG  001324           201#    509     529     536*
INSTER= 104404           223#    876
INSTR = 104403           221#   1304    1356    1369    1378    1445    1454
INSTR2  004074           832     844#
INSTU   035766          4822    4832#
INTTY   011734          1389    1406    1417    1433    1612#
KMCM    007220           618    1165#
LIMITS  004222           871     882#
LINE    006720          1165#   1446
LOBITS  004300           857*    886     902#    903
LOCK    001220           158#    777*    793     795    1035    1675*   1709*   1747*   1768*   1794*   1829*   1875*   1924*
```

```
                    1955*  2033*  2059*  2094*  2143*  2160*  2173*  2199*  2215*  2227*  2252*  2269*  2282*
                    2308*  2325*  2338*  2364*  2381*  2394*  2420*  2437*  2450*  2476*  2493*  2506*  2532*
                    2549*  2562*  2589*  2606*  2619*  2646*  2663*  2676*  2703*  2720*  2733*  2760*  2777*
                    2790*  2817*  2834*  2847*  2874*  2891*  2904*  2935*  2953*  2966*  2997*  3014*  3026*
                    3056*  3074*  3087*  3118*  3136*  3149*  3180*  3198*  3211*  3242*  3260*  3273*  3304*
                    3322*  3335*  3366*  3384*  3397*  3428*  3446*  3459*  3490*  3508*  3521*  3552*  3570*
                    3583*  3614*  3632*  3645*  3676*  3694*  3707*  3738*  3756*  3769*
LOKFLG  001326       203#
LOLIM   004272       854*   884    899#
LPCNT   001224       160#   772*   773    776*
LSTERR  001234       164#   492*   712*   1013   1015*  1102*
MASKX   001244       172#
MASTEK  006044      1037   1165#
MCRLF   005574       810    933    1033   1034   1042   1165#  1303   1365
MCSRX   005774       717   1165#
MDATA   007320       963    973    1182#
MEMLIM  001304       188#   680*
MEMSET  035654      2940   3002   3061   3123   3185   3247   3309   3371   3433   3495   3557   3619   3681
                    3743   4803#
MEPASS  005635       716   1165#
MERRPC  006121      1040   1165#
MERRX   006021       723   1165#
MERR2   005662      1165#  1547
MERR3   005707       653   1165#
MILK    001322       196#   486*   725    1263*  1268*  1272
MLOCK   005745       694   1165#
MNEW    006046       648   1165#
MODU    006606      1165#  1416
MPASSX  006010       721   1165#
MPFAIL  005577      1099   1165#
MQM     005570       840   1165#  1327   1402   1412   1425   1439
MR      005657       703   1165#  1321
MRESET= 004000        96#
MSTCLR= 104412       235#  1104   1637   1711   1749   1796   1831   1877   1926   1993   2035   2096   2145
                    2201   2254   2310   2366   2422   2478   2534   2591   2648   2705   2762   2819   2876
                    2937   2999   3058   3120   3182   3244   3306   3368   3430   3492   3554   3616   3678
                    3740   3801   3971   4027   4076   4122   4171   4215   4259   4302
MTITLE  001000       136#   513
MTSTN   006032      1038   1165#  1305
MTSTPC  005733      1165#
MVECX   006002       719   1165#
NEXT    001216       157#   779    1071   1635*  1674*  1708*  1746*  1793*  1828*  1874*  1923*  1991*  2032*
                    2093*  2142*  2198*  2251*  2307*  2363*  2419*  2475*  2531*  2588*  2645*  2702*  2759*
                    2816*  2873*  2934*  2996*  3055*  3117*  3179*  3241*  3303*  3365*  3427*  3489*  3551*
                    3613*  3675*  3737*  3799*  3969*  4025*  4074*  4120*  4169*  4213*  4257*  4300*
NOACT   007056       525   1165#  1257
NODEV   002606       574    597#
NUM     006352      1165#  1357
OISR    033040      4320   4545#
OK      002600       570    573    592    595#   620
ONE     001302       187#
PACT00  001702       366#
PACT01  001706       369#
PACT02  001712       372#
PACT03  001716       375#
PACT04  001722       378#
```

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PACT05  001726          381#
PACT06  001732          384#
PACT07  001736          387#
PACT10  001742          390#
PACT11  001746          393#
PACT12  001752          396#
PACT13  001756          399#
PACT14  001762          402#
PACT15  001766          405#
PACT16  001772          408#
PACT17  001776          411#
PARAM = 104405          225#  1306  1358  1371  1380  1447  1456
PARAM1  004142          860#   877
PARBIT= 040000           96#
PARERR  004216          863    865   867   876#  883   885   887
PASCNT  001230          162#   714*  715   726   751   1279*
PERFOR= 004537           96#
PFTAB   005332         1100   1106#
POPRO = 012600           72#  1065
POP1SP= 005726           70#
POP2SP= 022626           74#   781
PRIO    006451         1165#  1388
PS    = 177776           63#   478*  691*  1574*  1584*  4311*  4368*
PUSHRO= 010046           71#  1062
PUSH1S= 005746           69#
PUSH2S= 024646           73#
QV.FLG  001327          204#   484*  730*  770
RAMDAT  035550         2947   2960  2973  3008  3020  3032  3068  3081  3094  3130  3143  3156  3192
                       3205   3218  3254  3267  3280  3316  3329  3342  3378  3391  3404  3440  3453
                       3466   3502  3515  3528  3564  3577  3590  3626  3639  3652  3688  3701  3714
                       3750   3763  3776  4770#
RBUF    034762         3812   3871  3932  3940  4038  4270  4687#
RBUFF   033746         4327   4660#
RBUFFE  034702         4348   4668#
RBUFF1  033746         4661#
RBUFF2  034052         4662#
RBUFF3  034156         4663#
RBUFF4  034262         4664#
RBUFF5  034366         4665#
RBUFF6  034472         4666#
RBUFF7  034576         4667#
RCNTAB  033620         4335   4337  4511  4518  4654#
RCOUNT  034760         3810   3872  3935  3938  4686#
RDNTAB  033656         4346   4382  4405  4611*  4613*  4657#
RECBA   033452         4426   4510  4598  4622#
RESREG  005126         1054   1057#
RESTAR  005252         1086   1092#
RESTRT  003444          729    733   741#
RESUME  033450         4345*  4480  4488*  4492  4563*  4621#
RESOS = 104407          229#  1057
RETURN  001214          156#   494*  700*  704   741*  779*  783  1071*  1073  1105  1320*  1330*  1332
RFLAG   034710         3817*  3925  3928*  3953  4677#
RFRELD  036240         4037   4132  4269  4900#
ROMCLK= 104414          239#  1112  1115  1152  1157  1642  1644  1646  1654  1656  1840  1842  1845
                       1847   1849  1887  1889  1892  1894  1896  1935  1937  1940  1942  1944  1962
                       1964   1966  1968  1997  2000  2006  2009  2039  2042  2054  2060  2068  2070
```

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                    2072    2106    2150    2152    2163    2165    2176    2178    2205    2207    2217    2219    2229
                    2231    2259    2261    2272    2274    2285    2287    2315    2317    2328    2330    2341    2343
                    2371    2373    2384    2386    2397    2399    2427    2429    2440    2442    2453    2455    2483
                    2485    2496    2498    2509    2511    2539    2541    2552    2554    2565    2567    2596    2598
                    2609    2611    2622    2624    2653    2655    2666    2668    2679    2681    2710    2712    2723
                    2725    2736    2738    2767    2769    2780    2782    2793    2795    2824    2826    2837    2839
                    2850    2852    2881    2883    2894    2896    2907    2909    2943    2945    2956    2958    2969
                    2971    3004    3006    3016    3018    3028    3030    3064    3066    3077    3079    3090    3092
                    3126    3128    3139    3141    3152    3154    3188    3190    3201    3203    3214    3216    3250
                    3252    3263    3265    3276    3278    3312    3314    3325    3327    3338    3340    3374    3376
                    3387    3389    3400    3402    3436    3438    3449    3451    3462    3464    3498    3500    3511
                    3513    3524    3526    3560    3562    3573    3575    3586    3588    3622    3624    3635    3637
                    3648    3650    3684    3686    3697    3699    3710    3712    3746    3748    3759    3761    3772
                    3774    4698    4700    4702    4710    4718    4726    4734    4742    4744    4746    4754    4780
ROMDAT  035522      2154    2167    2180    2209    2221    2233    2263    2276    2289    2319    2332    2345    2375
                    2388    2401    2431    2444    2457    2487    2500    2513    2543    2556    2569    2600    2613
                    2626    2657    2670    2683    2714    2727    2740    2771    2784    2797    2828    2841    2854
                    2885    2898    2911    4759#
ROMMAP  011766      1622#   1801    2100    4766    4791
RUN     001316       193#    487*   1261*   1262*   1269
SAVACT  001312       191#    651    1545*
SAVNUM  001314       192#    481*    728*    731*   1538*
SAVPC   001276       185#    603*    623     908*   1077
SAVR0   001260       178#    917*    922    4925
SAVR1   001262       179#    609*    626     916*    923
SAVR2   001264       180#    915*    924    4925
SAVR3   001266       181#    914*    925
SAVR4   001270       182#    913*    926    4925
SAVR5   001272       183#    912*    927    4925
SAVSP   001274       184#
SAVO5 = 104406       227#   1017
SCAN    032020      4369#   4469    4472
SCAN1   032504      4374    4377    4380    4465   4467#
SCAN2   032046      4373    4375#   4466
SCOPE = 104400       215#   1663    1697    1734    1780    1817    1863    1911    1979    2019    2080    2129    2186
                    2239    2295    2351    2407    2463    2519    2575    2632    2689    2746    2803    2860    2917
                    2979    3038    3100    3162    3224    3286    3348    3410    3472    3534    3596    3658    3720
                    3782    3957    4010    4062    4108    4157    4201    4245    4283    4457
SCOP1 = 104401       217#   1690    1726    1763    1776    1812    1856    1903    1951    1975    2053    2120    2159
                    2172    2185    2214    2226    2238    2268    2281    2294    2324    2337    2350    2380    2393
                    2406    2436    2449    2462    2492    2505    2518    2548    2561    2574    2605    2618    2631
                    2662    2675    2688    2719    2732    2745    2776    2789    2802    2833    2846    2859    2890
                    2903    2916    2952    2965    2978    3013    3025    3037    3073    3086    3099    3135    3148
                    3161    3197    3210    3223    3259    3272    3285    3321    3334    3347    3383    3396    3409
                    3445    3458    3471    3507    3520    3533    3569    3582    3595    3631    3644    3657    3693
                    3706    3719    3755    3768    3781
SETBR0  035446      2370    2383    2396    3187    3200    3213   4707#
SETBR1  035454      2426    2439    2452    3249    3262    3275   4715#
SETBR4  035462      2482    2495    2508    3311    3324    3337   4723#
SETBR7  035470      2538    2551    2564    3373    3386    3399   4731#
SETC    035476      2258    2271    2284    3063    3076    3089   4739#
SETZ    035514      2314    2327    2340    3125    3138    3151   4751#
SOFTSW  007612      1204    1243#
SPACNT= 004621       943*    967     970*    984#
STACK = 001200        64#    479     670    1072    1094
STAT    001240       170#
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STAT1   001366   252#  1276*  1677  1712  1750  1797  1832  1878  1927  1994  2036  2097  2146
                2202  2255  2311  2367  2423  2479  2535  2592  2649  2706  2763  2820  2877
                2938  3000  3059  3121  3183  3245  3307  3369  3431  3493  3555  3617  3679
                3741  3802  3807  3819  3831  3972  3977  4028  4033  4077  4082  4123  4128
                4172  4177  4216  4221  4260  4265  4303  4308  4312  4341  4558  4788  4845
                4875
STAT2   001370   253#  1277*
STAT3   001372   254#  1278*  3804  3974  4030  4079  4125  4174  4218  4262  4305
STRTSW  001236   169#   515*   518*   519   521   531   533   646   692   701  1298  1322*  1352
                1558
SVOS    004310   912#
SWFLG   007556   482*   804  1199*  1226*  1232#
SWMES   007107  1165#  1202
SWMES1  007117  1165#  1205
SWR     001202   143#   499*   501   505*   515   651   656   761   768   791   806  1006  1011
                1060  1067  1069  1130  1190  1225*
SWREG   000176   129#   505  1190  1245
SW00  = 000001    45#   519  1352  1558
SW01  = 000002    44#   701  1298  1322
SW02  = 000004    43#
SW03  = 000010    42#   646
SW04  = 000020    41#
SW05  = 000040    40#
SW06  = 000100    39#  1130
SW07  = 000200    38#
SW08  = 000400    37#  1067
SW09  = 001000    36#   791
SW10  = 002000    35#  1069
SW11  = 004000    34#   768
SW12  = 010000    33#   806  1006
SW13  = 020000    32#  1011
SW14  = 040000    31#
SW15  = 100000    30#
TBUF    034714  3887  3917  3939  3982  4041  4136  4273  4679#
TBUFF   033510  4332  4576  4578  4625#
TCOUNT  034712  3888  3920  4678#
TEMP    001416   272#   950  1096*  1097*  1138*  1143*  1149*  1161*  3824*  3827*  3835*  3838*  3844*
                3847*  3865*  3868*  3874*  3877*  3881*  3884*  3890*  3893*  3896*  3900*  3986*  3989*
                4007*  4012*  4044*  4047*  4090*  4093*  4139*  4142*  4185*  4188*  4229*  4232*  4276*
                4279*  4366*  4467*
TEMP1   001246   173#   539*  1167  1570*  1571*  3897*  3902*
TEMP2   001250   174#   540*  1169  3905*  4367*  4458*  4470*  4925
TEMP3   001252   175#   542*   563*   599   608*  1171  1361  1364  1464*  2113*  2115*  2116*  2117*
                2118*  3851*  3941*  4395*  4459*  4569*  4925
TEMP4   001254   176#   543*  1173  1374  1377  1383  1386  1450  1453  1459  1462  3852*  4460*
                4570*  4925
TEMP5   001256   177#   544*  1175  1355*  1368*  1556  4461*  4925
TFLAG   034706  3816*  3910  3913*  3955  4325*  4336  4353  4415*  4417*  4676#
TIMER = 104416   243#
TKCSR   001204   148#   764   827  1234  1612
TKDBR   001206   149#   766   829   835  1192  1194  1236  1614
TLAST = 031432  1325  4690#
TPCSR   001210   150#   811   833  1008  1237  1615
TPDBR   001212   151#   813*   835*  1010*  1239*  1617*
TRPOK   004636   996#
TSTNO   001226   161#   493*  1080  1108  1309  1316  1318  1634*  1673*  1707*  1745*  1792*  1827*
```

```
                    1873*  1922*  1990*  2031*  2092*  2141*  2197*  2250*  2306*  2362*  2418*  2474*  2530*
                    2587*  2644*  2701*  2758*  2815*  2872*  2933*  2995*  3054*  3116*  3178*  3240*  3302*
                    3364*  3426*  3488*  3550*  3612*  3674*  3736*  3798*  3968*  4024*  4073*  4119*  4168*
                    4212*  4256*  4299*
TST1     015766     1312   1330   1634#
TST10    017216     1874   1922#
TST11    017516     1923   1990#
TST12    017632     1991   2031#
TST13    020040     2032   2092#
TST14    020230     2093   2141#
TST15    020420     2142   2197#
TST16    020574     2198   2250#
TST17    020764     2251   2306#
TST2     016100     1635   1673#
TST20    021154     2307   2362#
TST21    021344     2363   2418#
TST22    021534     2419   2474#
TST23    021724     2475   2530#
TST24    022114     2531   2587#
TST25    022304     2588   2644#
TST26    022474     2645   2701#
TST27    022664     2702   2758#
TST3     016214     1674   1707#
TST30    023054     2759   2815#
TST31    023244     2816   2872#
TST32    023434     2873   2933#
TST33    023630     2934   2995#
TST34    024010     2996   3054#
TST35    024204     3055   3116#
TST36    024400     3117   3178#
TST37    024574     3179   3240#
TST4     016336     1708   1745#
TST40    024770     3241   3302#
TST41    025164     3303   3364#
TST42    025360     3365   3426#
TST43    025554     3427   3488#
TST44    025750     3489   3550#
TST45    026144     3551   3612#
TST46    026340     3613   3674#
TST47    026534     3675   3736#
TST5     016516     1746   1792#
TST50    026730     3737   3798#
TST51    027742     3799   3968#
TST52    030170     3969   4024#
TST53    030362     4025   4073#
TST54    030544     4074   4119#
TST55    030736     4120   4168#
TST56    031114     4169   4212#
TST57    031272     4213   4256#
TST6     016636     1793   1827#
TST60    031432     4257   4299#  4690
TST7     017024     1828   1873#
TTST     003522      695*   696*   698*   699*   762#
TWOSYN=  010000       96#
TYPDAT   005114     1032   1050   1053#
TYPE   = 104402      219#    513    525    537    601    606    614    617    648    653    694    703    716
```

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                          717     719     721     723     810     823     840     933     973    1033    1034    1037    1038
                         1040    1042    1046    1051    1099    1202    1205    1257    1303    1321    1327    1365    1387
                         1401    1404    1411    1415    1424    1431    1438    1547
TYPMSG  005014           1030    1033#
VEC     006430           1165#   1379
VECMAP  011456           1546    1558#
WHICH   011450           1367    1554#
WRDCNT  004616            941*    974*    982#
WRKO.F  005102           1045    1048#
WROM    035602           1800    3809    3979    4035    4084    4130    4179    4223    4267    4310    4785#
XBX     004706           1007    1009    1011#
XCNTAB  033640           4352    4354    4421    4424    4582    4605    4655#
XCSR    003456            718     743#
XDNTAB  033712           4588*   4590*   4658#
XERR    003500            724     752#
XFRELD  036272           3981    4040    4086    4135    4272    4913#
XHEAD   006126            537    1165#
XMITBA  033452           4326    4330    4333    4517    4623#
XPASS   003472            722     749#
XSTATQ  007230            546    1165#
XTSTN   005232           1039    1078#
XVEC    003464            720     746#
X0    = 000110           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#   4653#
X1    = 000101           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
X2    = 000102           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
X3    = 000103           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
X4    = 000104           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
X5    = 000105           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
X6    = 000106           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
X7    = 000107           4626#   4629#   4632#   4635#   4638#   4641#   4644#   4647#   4650#
ZERO    001300            186#
$COD  = ****** U           1
$CRAP = 177777             1#   1624#   1627    1630#   1664#   1667    1669#   1698#   1701    1703#   1735#   1738    1741#
                         1781#   1784    1788#   1818#   1821    1823#   1864#   1867    1869#   1912#   1915    1918#   1980#
                         1983    1986#   2020#   2023    2027#   2081#   2084    2088#   2130#   2133    2137#   2187#   2190
                         2193#   2240#   2243    2246#   2296#   2299    2302#   2352#   2355    2358#   2408#   2411    2414#
                         2464#   2467    2470#   2520#   2523    2526#   2576#   2579    2583#   2633#   2636    2640#   2690#
                         2693    2697#   2747#   2750    2754#   2804#   2807    2811#   2861#   2864    2868#   2918#   2921
                         2929#   2980#   2983    2991#   3039#   3042    3050#   3101#   3104    3112#   3163#   3166    3174#
                         3225#   3228    3236#   3287#   3290    3298#   3349#   3352    3360#   3411#   3414    3422#   3473#
                         3476    3484#   3535#   3538    3546#   3597#   3600    3608#   3659#   3662    3670#   3721#   3724
                         3732#   3783#   3786    3794#   3958#   3961    3964#   4014#   4017    4020#   4063#   4066    4069#
                         4109#   4112    4115#   4158#   4161    4164#   4202#   4205    4208#   4246#   4249    4252#   4286#
                         4289    4295#
$ENDAD  003432            123     511     735#   1058
$N    = 000060             1#   1624    1630    1632    1637#   1664    1669    1671    1677#   1698    1703    1705    1711
                         1712#   1735    1741    1743    1749    1750#   1781    1788    1790    1796    1797#   1818    1823
                         1825    1831    1832#   1864    1869    1871    1877    1878#   1912    1918    1920    1926    1927#
                         1980    1986    1988    1993    1994#   2020    2027    2029    2035    2036#   2081    2088    2090
                         2096    2097#   2130    2137    2139    2145    2146#   2187    2193    2195    2201    2202#   2240
                         2246    2248    2254    2255#   2296    2302    2304    2310    2311#   2352    2358    2360    2366
                         2367#   2408    2414    2416    2422    2423#   2464    2470    2472    2478    2479#   2520    2526
                         2528    2534    2535#   2576    2583    2585    2591    2592#   2633    2640    2642    2648    2649#
                         2690    2697    2699    2705    2706#   2747    2754    2756    2762    2763#   2804    2811    2813
                         2819    2820#   2861    2868    2870    2876    2877#   2918    2929    2931    2937    2938#   2980
                         2991    2993    2999    3000#   3039    3050    3052    3058    3059#   3101    3112    3114    3120
```

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                    3121#  3163   3174   3176   3182   3183#  3225   3236   3238   3244   3245#  3287   3298
                    3300   3306   3307#  3349   3360   3362   3368   3369#  3411   3422   3424   3430   3431#
                    3473   3484   3486   3492   3493#  3535   3546   3548   3554   3555#  3597   3608   3610
                    3616   3617#  3659   3670   3672   3678   3679#  3721   3732   3734   3740   3741#  3783
                    3794   3796   3801   3802#  3958   3964   3966   3971   3972#  4014   4020   4022   4027
                    4028#  4063   4069   4071   4076   4077#  4109   4115   4117   4122   4123#  4158   4164
                    4166   4171   4172#  4202   4208   4210   4215   4216#  4246   4252   4254   4259   4260#
                    4286   4295   4297   4302   4303#  4690#
$S      = 000062       1#  1635   1637#  1674   1677#  1708   1712#  1746   1750#  1793   1797#  1828   1832#
                    1874   1878#  1923   1927#  1991   1994#  2032   2036#  2093   2097#  2142   2146#  2198
                    2202#  2251   2255#  2307   2311#  2363   2367#  2419   2423#  2475   2479#  2531   2535#
                    2588   2592#  2645   2649#  2702   2706#  2759   2763#  2816   2820#  2873   2877#  2934
                    2938#  2996   3000#  3055   3059#  3117   3121#  3179   3183#  3241   3245#  3303   3307#
                    3365   3369#  3427   3431#  3489   3493#  3551   3555#  3613   3617#  3675   3679#  3737
                    3741#  3799   3802#  3969   3972#  4025   4028#  4074   4077#  4120   4123#  4169   4172#
                    4213   4216#  4257   4260#  4303#
$Y      = 000017       1#   207#   215    217#   219#   221#   223#   225#   227#   229#   231#   233#   235#
                     237#   239#   241#   243#   245#
.       = 037430     108#   109    112#   119#   124#   127#   131#   135#   137#   189#   190#   191#   192#
                     273#   278#   280#   281#   282#   283#   285#   286#   287#   288#   290#   291#   292#
                     293#   295#   296#   297#   298#   300#   301#   302#   303#   305#   306#   307#   308#
                     310#   311#   312#   313#   315#   316#   317#   318#   320#   321#   322#   323#   325#
                     326#   327#   328#   330#   331#   332#   333#   335#   336#   337#   338#   340#   341#
                     342#   343#   345#   346#   347#   348#   350#   351#   352#   353#   355#   356#   357#
                     358#   517    527    638#   655   1088   1098   1146#  1181#  1183#  1235   1238   1259
                    1353   1397   1500   1504   1550   1581   1613   1616   2046   2051   2066   2078   3803
                    3805   3808   3820   3823   3826   3832   3837   3867   3876   3883   3892   3906   3911
                    3915   3918   3921   3926   3930   3933   3936   3945   3950   3973   3975   3978   3988
                    4029   4031   4034   4046   4078   4080   4083   4092   4106   4124   4126   4129   4141
                    4155   4173   4175   4178   4183   4199   4217   4219   4222   4227   4231   4243   4261
                    4263   4266   4304   4306   4309   4342   4359   4398   4491   4523   4559   4562   4565
                    4623#  4654#  4655#  4657#  4658#  4661#  4662#  4663#  4664#  4665#  4666#  4667#  4687#
                    4689#  4846   4849   4876   4879
.BEGIN  003062       670#
.CNVRT  004400       234     934#
.CONVR  004374       232     933#
.DATAC  005454       242    1137#
.DELAY  005340       238    1110#
.EOP    003274       711#   4300
.ERRTA  037270      1025    4925#
.HLT    004656       115    1005#
.INSTE  004062       224     840#
.INSTR  003756       222     819#
.INST1  003776       823#    843
.MSG    004000       821*    824#
.MSTCL  005370       236    1121#
.PARAM  004102       226     851#
.PFAIL  005240       113     480   1085#  1093
.RESOS  004342       230     922#
.ROMCL  005406       240    1126#
.SAVOS  004302       228     908#
.SCOPE  003506       216     759#
.SCOP1  003644       218     790#
.START  002002       132     478#   494    1222
.TIMER  005520       244    1148#
.TRPSR  004624       117     993#
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.TRPTA  001330            214#    998
.TYPE   003674            220     801#
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DMEND        1#    705
DMFRNT       1#
HLT         75#   1652   1662   1689   1725   1762   1775   1809   1855   1902   1950   1974   2015   2052   2067
          2079   2119   2158   2171   2184   2213   2225   2237   2267   2280   2293   2323   2336   2349   2379
          2392   2405   2435   2448   2461   2491   2504   2517   2547   2560   2573   2604   2617   2630   2661
          2674   2687   2718   2731   2744   2775   2788   2801   2832   2845   2858   2889   2902   2915   2951
          2964   2977   3012   3024   3036   3072   3085   3098   3134   3147   3160   3196   3209   3222   3258
          3271   3284   3320   3333   3346   3382   3395   3408   3444   3457   3470   3506   3519   3532   3568
          3581   3594   3630   3643   3656   3692   3705   3718   3754   3767   3780   3829   3840   3853   3855
          3870   3879   3886   3895   3904   3907   3912   3916   3919   3922   3927   3931   3934   3937   3946
          3951   3993   3997   4005   4051   4055   4061   4097   4101   4107   4146   4150   4156   4190   4194
          4200   4234   4238   4244   4284   4399   4462   4473   4571   4580   4587   4603   4610
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$BRRSH       1#   1624
$BUFFE       1#   1177
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$CKDAT       1#   4382
$COMP        1#
$CRAM        1#   1664   1698
$CRAMD       1#   1735
$CYCLE       1#   1246
$DATAF       1#   3783
$EOP         1#    705
$EXER        1#   4286
$FD          1#   3857   4861
$FINI        1#   4690
$GETPA       1#
$HALF        1#   4246
$HD          1#   4891
$HEADE       1#
$IOPOD       1#   2020
$JUMP        1#   2130   2187   2240   2296   2352   2408   2464   2520   2576   2633   2690   2747   2804   2861
          2918   2980   3039   3101   3163   3225   3287   3349   3411   3473   3535   3597   3659   3721
$LSTDA       1#   4014
$MARHI       1#
$MEMFL       1#   1832   1878
$MEMO        1#   1864
$MEM1        1#   1818
$MEM2        1#   1912
$MEM3        1#   1980
$MOCK        1#
$MSG         1#   1165
$NONEX       1#   4063   4109
$ORUN        1#   3958
$PFAIL       1#   1081
$PROC        1#   4158
$PROC1       1#   4202
$QUEST       1#   1356   1369   1378   1445   1454
$RAMCL       1#   1109
$RCLK        1#   1112   1115   1152   1157   1642   1644   1646   1653   1656   1940   1842   1845   1847   1849
          1887   1889   1892   1894   1896   1935   1937   1940   1942   1944   1962   1964   1966   1968   1997
          2000   2006   2009   2039   2042   2054   2060   2068   2070   2072   2106   2150   2152   2163   2165
          2176   2178   2205   2207   2217   2219   2229   2231   2259   2261   2272   2274   2285   2287   2315
          2317   2328   2330   2341   2343   2371   2373   2384   2386   2397   2399   2427   2429   2440   2442
          2453   2455   2483   2485   2496   2498   2509   2511   2539   2541   2552   2554   2565   2567   2596
          2598   2609   2611   2622   2624   2653   2655   2666   2668   2679   2681   2710   2712   2723   2725
```

```
                2736    2738    2767    2769    2780    2782    2793    2795    2824    2826    2837    2839    2850    2852    2881
                2883    2894    2896    2907    2909    2943    2945    2956    2958    2969    2971    3004    3006    3016    3018
                3028    3030    3064    3066    3077    3079    3090    3092    3126    3128    3139    3141    3152    3154    3188
                3190    3201    3203    3214    3216    3250    3252    3263    3265    3276    3278    3312    3314    3325    3327
                3338    3340    3374    3376    3387    3389    3400    3402    3436    3438    3449    3451    3462    3464    3498
                3500    3511    3513    3524    3526    3560    3562    3573    3575    3586    3588    3622    3624    3635    3637
                3648    3650    3684    3686    3697    3699    3710    3712    3746    3748    3759    3761    3772    3774    4698
                4700    4702    4710    4718    4726    4734    4742    4744    4746    4754    4780
$RDROM             1#  1781
$ROMRD             1#  2081
$SCOPE             1#   755
$SETUP             1#  3972    4028    4077    4123
$SIMBC             1#
$SKIPT             1#  3802    3972    4028    4077    4123    4172    4216    4260    4303
$SOFTC             1#  1185
$TRPDE             1#   215     217     219     221     223     225     227     229     231     233     235     237     239     241
                 243
$TSTN              1#  1632    1671    1705    1743    1790    1825    1871    1920    1988    2029    2090    2139    2195    2248
                2304    2360    2416    2472    2528    2585    2642    2699    2756    2813    2870    2931    2993    3052    3114
                3176    3238    3300    3362    3424    3486    3548    3610    3672    3734    3796    3966    4022    4071    4117
                4166    4210    4254    4297
$VARIA             1#   134
$XZ                1#  1624    1630    1664    1669    1698    1703    1735    1741    1781    1788    1818    1823    1864    1869
                1912    1918    1980    1986    2020    2027    2081    2088    2130    2137    2187    2193    2240    2246    2296
                2302    2352    2358    2408    2414    2464    2470    2520    2526    2576    2583    2633    2640    2690    2697
                2747    2754    2804    2811    2861    2868    2918    2929    2980    2991    3039    3050    3101    3112    3163
                3174    3225    3236    3287    3298    3349    3360    3411    3422    3473    3484    3535    3546    3597    3608
                3659 *  3670    3721    3732    3783    3794    3958    3964    4014    4020    4063    4069    4109    4115    4158
                4164    4202    4208    4246    4252    4286    4295

. ABS.  037430     000

ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

DZDMH,DZDMH/SOL/CRF←IPLUTL,DZDMH
RUN-TIME: 51 72 5 SECONDS
RUN-TIME RATIO: 259/130=1.9
CORE USED:  29K  (57 PAGES)
```