DMC11

LOW SPD JUMP FREE/RUN

MD-11-DZDMG-B

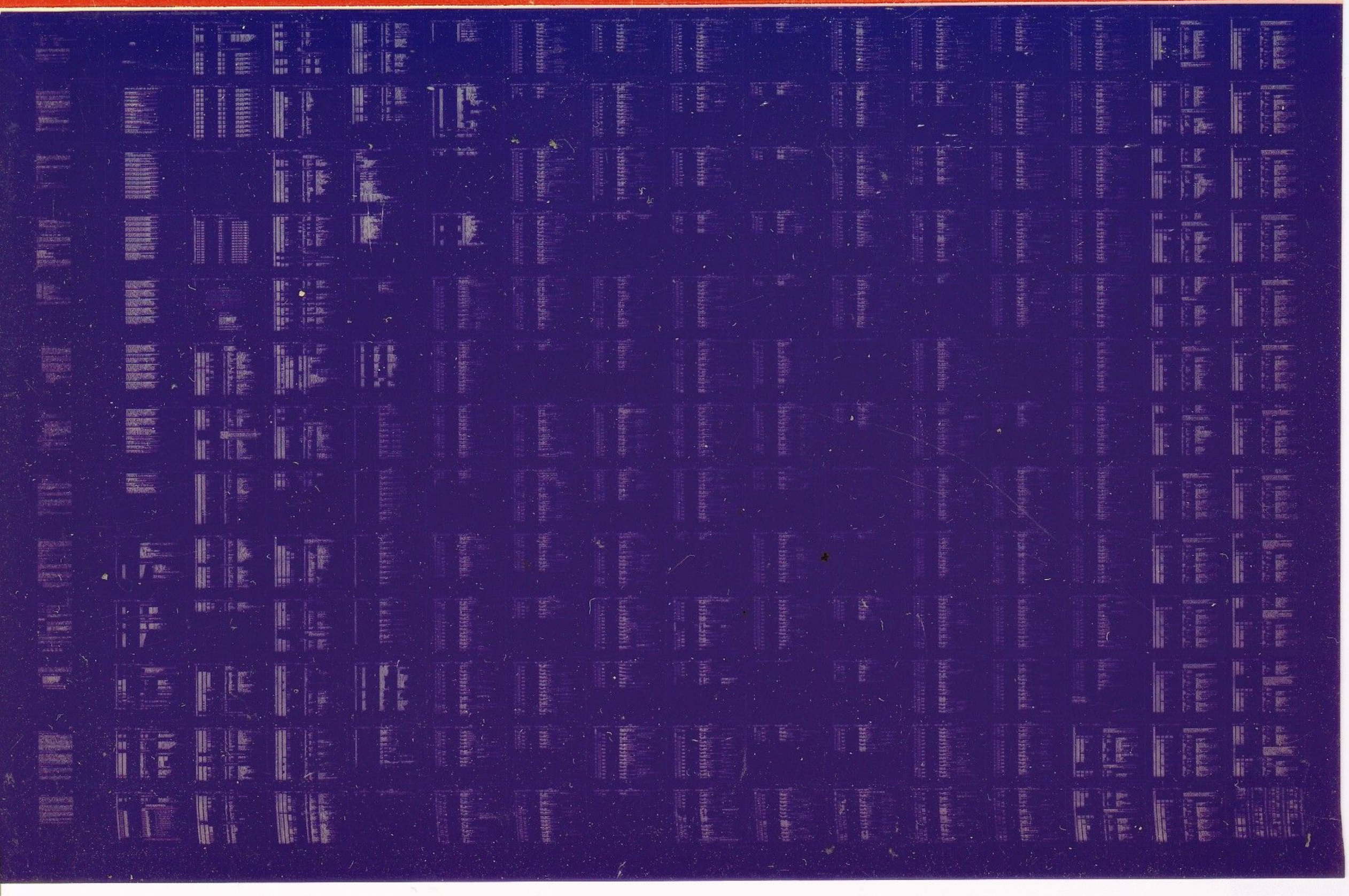
EP-DZDMG-B-DL-A

FICHE 1 OF 2

MAR 1977

digital

MADE IN USA



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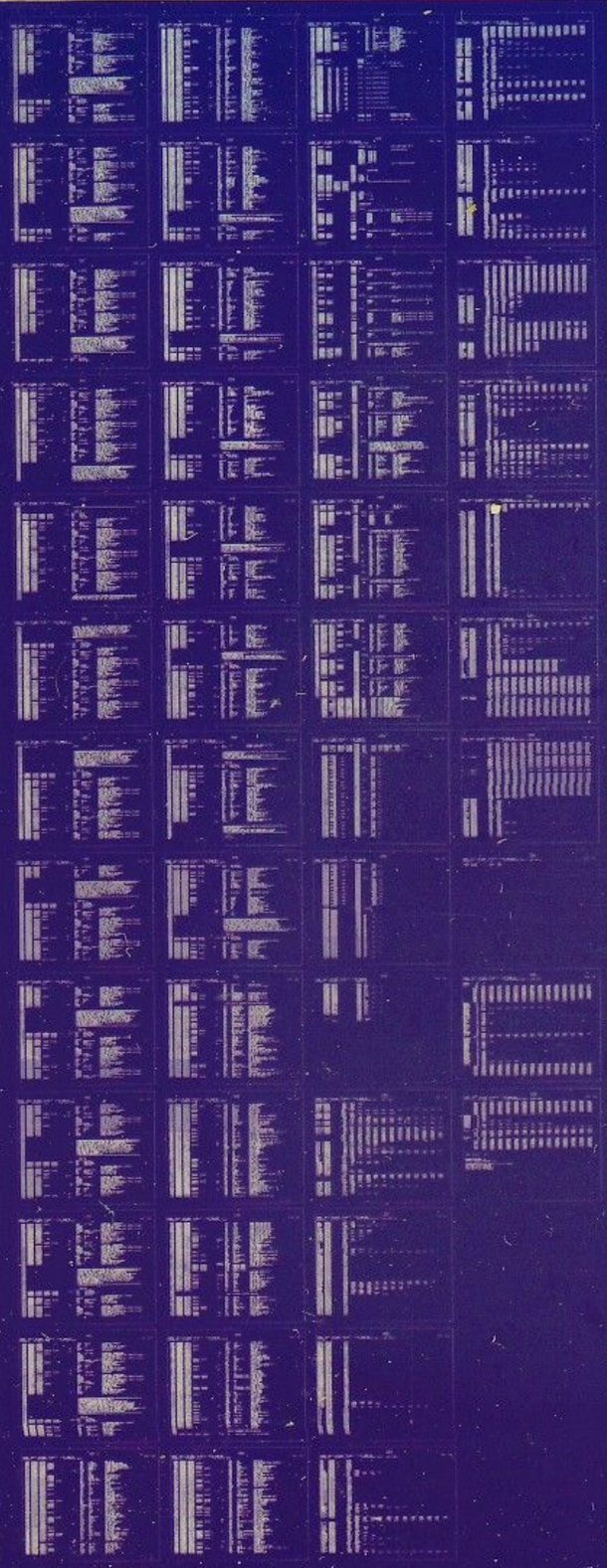


IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDMG-B-D

PRODUCT NAME: DMC11 LOW SPEED JUMP AND FREE RUNNING TESTS

DATE: DEC 1976

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.

DZDMG tests the DMC11-AR micro-processor (M8200-YA) with low speed crom, or the KMC11 micro-processor (M8204). It performs jump tests on the micro-processor, verifies the control ROM of the M8200-YA, and tests the CRAM and other unique functions of the M8204. If a DMC11-AR (M8200-YA) and line unit (M8201) are present, free-running tests are performed. These tests are skipped if a KMC (M8204) or no line-unit is present. The best test is with a line-unit installed. DZDMG 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-AR (M8200-YA) or an KMC11-A (M8204) with a DMC11-DA or a DMC11-FA

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 DZDMG 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 STATUS 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 DDEMP 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
****
DZDMGB SEQ
****

```
6       MAINDEC-11-DZDMG-B   DMC11 REMOTE 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
        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
        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,

3418    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
        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-DZDMG-B   DMC11 REMOTE 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
                        ;SW06=1  INPUT NEW DMC11 PARAMETERS
                        ;PRESS START
                        ;PROGRAM WILL TYPE "MAINDEC-11-DZDMG-B   DMC11 REMOTE CROM, JUMP, AND FREE RUNNI
                        ;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".
                                ;-----------------------------------------------------------------
                                ;:*****************************************************************

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

          000024                .=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
          000040                .=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
          000052                .=52
000052  000000                        0                       ;ACT-11 PROGRAM CHARACTERISTICS

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

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

          001000                .=1000
001000  005377  040515  047111 MTITLE: .ASCII  <377><12>/MAINDEC-11-DZDMG-B/<377>
(2) 001025     104   041515  030461         .ASCIZ  /DMC11 REMOTE CROM, JUMP, AND FREE RUNNING TESTS/<377>
(2)
          001200                .=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
```

```
                                DMCR05: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 05
                                DMS105: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 05
                                DMS205: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 05
                                DMS305: .BLKW   1               ;3RD STATUS WORD

                                DMCR06: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 06
                                DMS106: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 06
                                DMS206: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 06
                                DMS306: .BLKW   1               ;3RD STATUS WORD

                                DMCR07: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 07
                                DMS107: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 07
                                DMS207: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 07
                                DMS307: .BLKW   1               ;3RD STATUS WORD

                                DMCR10: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 10
                                DMS110: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 10
                                DMS210: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 10
                                DMS310: .BLKW   1               ;3RD STATUS WORD

                                DMCR11: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 11
                                DMS111: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 11
                                DMS211: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 11
                                DMS311: .BLKW   1               ;3RD STATUS WORD

                                DMCR12: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 12
                                DMS112: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 12
                                DMS212: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 12
                                DMS312: .BLKW   1               ;3RD STATUS WORD

                                DMCR13: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 13
                                DMS113: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 13
                                DMS213: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 13
                                DMS313: .BLKW   1               ;3RD STATUS WORD

                                DMCR14: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 14
                                DMS114: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 14
                                DMS214: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 14
                                DMS314: .BLKW   1               ;3RD STATUS WORD

                                DMCR15: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 15
                                DMS115: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 15
                                DMS215: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 15
                                DMS315: .BLKW   1               ;3RD STATUS WORD

                                DMCR16: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 16
                                DMS116: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 16
                                DMS216: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 16
                                DMS316: .BLKW   1               ;3RD STATUS WORD

                                DMCR17: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 17
                                DMS117: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 17
                                DMS217: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 17
                                DMS317: .BLKW   1               ;3RD STATUS WORD
```

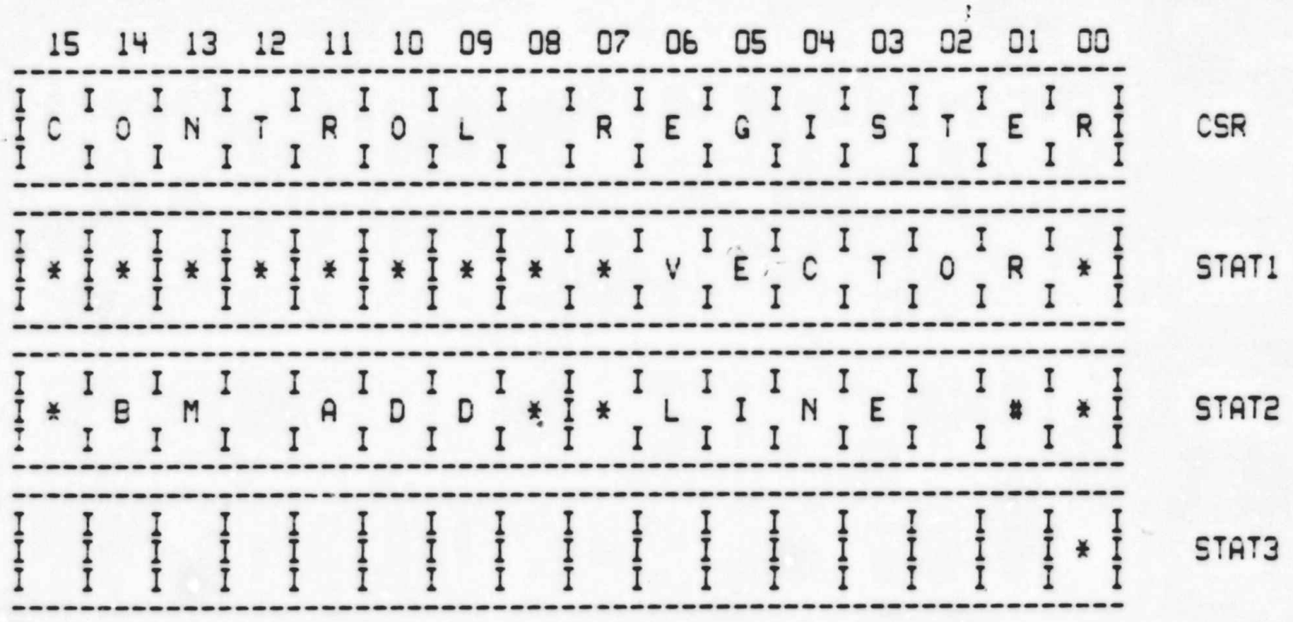
D03

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$:     MOV     R4,TEMP1        ;SET ADDRESS
                                                MOV     (R4)+,TEMP2     ;GET CSR
                                                BEQ     1$              ;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.
                                        ;;**************************************************************************

                                                MOV     @#4,-(SP)       ;SAVE LOC 4
                                                MOV     @#6,-(SP)       ;SAVE LOC 6
                                                CLR     @#6             ;CLEAR VEC+2
                                                CLR     TEMP3           ;CLEAR FLAG
                                                CLR     R5              ;R5=0=DMC, R5=-1=KMC
                                        AUSTRT: MOV     (R0),DMCSR      ;GET NEXT DMC CSR
                                                BEQ     AUDONE          ;BR IF DONE
                                                TST     R5              ;DMC OR KMC?
                                                BNE     1$              ;BR IF KMC
                                                BIT     #BIT15,2(R0)    ;CHECK FOR DMC CSR
                                                BNE     OK              ;SKIP IF NOT DMC
                                                BR      2$              ;ITS A DMC SO CONTINUE
                                        1$:     BIT     #BIT15,2(R0)    ;CHECK FOR KMC CSR
                                                BEQ     OK              ;SKIP IF NOT KMC
                                        2$:     MOV     #NODEV,@#4      ;SET UP FOR TIMEOUT
                                                TST     R5              ;DMC OR KMC?
                                                BNE     3$              ;BR IF KMC
                                                MOV     #6,R3           ;R3 IS COUNT OF DEVICES BEFORE DMC
                                                BR      4$              ;GO ON
                                        3$:     MOV     #10,R3          ;R3 IS COUNT OF DEVICES BEFORE KMC
                                        4$:     MOV     #DEVTAB,R2      ;R2 IS DEVICE TABLE PONTER
                                                MOV     #160010,R1      ;START WITH ADDRESS 160010
```

```
582  002536  005711                          FLOAT:  TST     (R1)            ;CHECK ADDRESS IN R1
583  002540  111204                                  MOVB    (R2),R4         ;IF NO TIMEOUT, GET NEXT ADDRESS
584  002542  060401                                  ADD     R4,R1           ;IN R1
585  002544  005201                                  INC     R1              ;
586  002546  040401                                  BIC     R4,R1           ;
587  002550  005703                                  TST     R3              ;ANY MORE DEVICES TO CHECK FOR?
588  002552  001371                                  BNE     FLOAT           ;BR IF YES
589  002554  012737  002612  000004                  MOV     #ERR,@#4        ;OK ONLY DMC'S ARE LEFT, SET UP FOR TIMEOUT
590  002562  005711                          FY:     TST     (R1)            ;CHECK DMC ADDRESS
591  002564  020137  001404                          CMP     R1,DMCSR        ;DOES IT MATCH
592  002570  001403                                  BEQ     OK              ;BR IF YES
593  002572  062701  000010                          ADD     #10,R1          ;GET NEXT DMC ADDRESS
594  002576  000771                                  BR      FY              ;DO IT AGAIN
595  002600  062700  000010                  OK:     ADD     #10,R0          ;SKIP TO NEXT DMC CSR
596  002604  000720                                  BR      AUSTRT          ;CONTINUE
597  002606  122243                          NODEV:  CMPB    (R2)+,-(R3)     ;ON TIMEOUT, INC R2, DEC R3
598  002610  000002                                  RTI                     ;RETURN
599  002612  005737  001252                  ERR:    TST     TEMP3           ;CHECK FLAG IF = 0 TYPE HEADER
600  002616  001014                                  BNE     1$              ;SKIP HEADER
601  002620  104402                                  TYPE                    ;TYPEOUT HEADER MESSAGE
602  002622  007125                                  CONERR                  ;CONFIGURATION ERROR!!!!
603  002624  012737  002612  001276                  MOV     #ERR,SAVPC      ;SAVE PC FOR TYPEOUT
604  002632  104411                                  CNVRT                   ;TYPE OUT ERROR PC
605  002634  002702                                  ERRPC                   ;
606  002636  104402                                  TYPE                    ;TYPE REST OF HEADER
607  002640  007167                                  CNERR                   ;
608  002642  012737  177777  001252                  MOV     #-1,TEMP3       ;SET FLAG SO IT ONLY GETS TYPED ONCE
609  002650  010137  001262                  1$:     MOV     R1,SAVR1        ;SAVE R1 FOR TYPEOUT
610  002654  104410                                  CONVRT                  ;
611  002656  002710                                  CONTAB                  ;TYPE CSR VALUES
612  002660  005705                                  TST     R5              ;DMC OR KMC ?
613  002662  001003                                  BNE     3$              ;BR IF KMC
614  002664  104402                                  TYPE                    ;
615  002666  007210                                  DMCM                    ;
616  002670  000402                                  BR      4$              ;CONTINUE
617  002672  104402                          3$:     TYPE                    ;
618  002674  007220                                  KMCM                    ;
619  002676  022626                          4$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
620  002700  000737                                  BR      OK              ;BR TO GET OUT
621  002702  000001                          ERRPC:  1
622  002704     006     002                          .BYTE   6,2             ;
623  002706  001276                                  SAVPC                   ;
624  002710  000002                          CONTAB: 2
625  002712     006     004                          .BYTE   6,4             ;
626  002714  001262                                  SAVR1                   ;
627  002716     006     002                          .BYTE   6,2             ;
628  002720  001404                                  DMCSR                   ;
629  002722     007                          DEVTAB: .BYTE   7               ;DJ
630  002723     017                                  .BYTE   17              ;DH
631  002724     007                                  .BYTE   7               ;DQ
632  002725     007                                  .BYTE   7               ;DU
633  002726     007                                  .BYTE   7               ;DUP
634  002727     007                                  .BYTE   7               ;LK
635  002730     007                                  .BYTE   7               ;DMC
636  002731     007                                  .BYTE   7               ;DZ
637  002732     007                                  .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.
                                        ;TEST START AND RESTART
                                        ;----------------------
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     RES             ;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  010046                                    MOV     R0,(SP)         ;SAVE R0 ON THE STACK
```

```
                                                BIT     #BIT14,@SWR     ;"LOOP ON THIS TEST"?
                                        TTST:   BEQ     1$              ;BR IF NO.  (IF LOCK SW01=1; THIS LOC =240)
                                                BR      3$              ;GOTO 3$    (IF LOCK SW01=1; THIS LOC =240)
                                                TSTB    @TKCSR          ;KEYBOAD DONE?
                                                BPL     3$              ;BR IF NO. (LOCK: HIT KEY TO GOTO NEXT TEST)
                                                MOV     @TKDBR,R0       ;CLEAR DONE BIT
                                                BR      2$              ;CONTINUE
                                        1$:     BIT     #SW11,@SWR      ;DELETE ITERATION?  (QUICK PASS)
                                                BNE     2$              ;BR IF YES
                                                TSTB    QV.FLG          ;HAVE PASSES BEECOMPLETED?
                                                BEQ     2$              ;BR IF QUICK PASS.
                                                INC     LPCNT           ;UPDATE ITERATION COUNTER
                                                CMP     LPCNT,ICOUNT    ;ARE ALL ITERATIONS DONE??
                                                BLOS    3$              ;BR IF NOT YET
                                        2$:     CLRB    ERRFLG          ;PREPARE FOR NEW TEST
                                                CLR     LPCNT           ;START ICOUNTER AT 0
                                                CLR     LOCK
                                                MOV     #20,ICOUNT      ;RESET ITERATIONS
                                                MOV     NEXT,RETURN     ;GET NEXT TEST
                                        3$:     MOV     (SP),R0         ;POP R0 OFF OF THE STACK
                                                POP2SP                  ;FAKE AN "RTI"
                                                MOV     DMCSR,R1        ;R1 CONTAINS BASE DMC ADDRESS
                                                JMP     @RETURN         ;GO DO THE TEST
                                        BRW:    1407
                                        BRX:    437

                                                ;CHECK FOR FREEZE ON CURRENT DATA
                                                ;--------------------------------

                                        .SCOP1: JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
                                                BIT     #SW09,@SWR      ;IS SW09=1(SET)?
                                                BEQ     1$              ;BR IF NOT SET.
                                                TST     LOCK
                                                BEQ     1$
                                                MOV     LOCK,(SP)       ;GOTO THE ADDRESS IN LOCK.
                                        1$:     RTI                     ;GO BACK.

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

                                        .TYPE:  MOV     R5,-(SP)        ;SAVE R5 ON THE STACK.
                                                MOV     @2(SP),R5       ;GET ADDRESS OF MESSAGE.
                                                ADD     #2,2(SP)        ;POP OVER ADDRESS.
                                        4$:     TST     SWFLG           ;SOFT SWR MESSAGE?
                                                BNE     1$              ;IF YES TYPE IT OUT REGARDLESS OF SW12
                                                BIT     #SW12,@SWR      ;INHIBIT ALL PRINT OUT??
                                                BNE     3$              ;BR IF NO PRINT OUT WANTED (SW12=1)
                                        1$:     TSTB    (R5)            ;IS NUMBER MINUS? (MSB=1(BIT7))
                                                BPL     2$              ;BR IF NUMBER IS PLUS
                                                TYPE    ,MCRLF          ;TYPE A CR/LF!
                                        2$:     TSTB    @TPCSR          ;TTY READY?
                                                BPL     2$              ;BR IF NO.
                                                MOVB    (R5)+,@TPDBR    ;PRINT CURRENT CHAR.
                                                BNE     4$              ;IF NOT ZERO KEEP PRINTING!
                                        3$:     MOV     (SP)+,R5        ;END OF OUTPUT. RESTORE R5
                                                RTI                     ;GO HOME
```

```
                                        ;-------------------------
                                .INSTR: MOV     R3,-(SP)        ;SAVE R3 ON STACK
                                        MOV     R4,-(SP)        ;SAVE R4 ON STACK
003756  010346
003760  010446
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
                                        ;--------------------------------------

004222  020537  004274                LIMITS: CMP     R5,HILIM
004226  101373                                BHI     PARERR
004230  020537  004272                        CMP     R5,LOLIM
004234  103770                                BLO     PARERR
004236  133705  004300                        BITB    LOBITS,R5
004242  001365                                BNE     PARERR

                                        ;STORE NUMBER AT SPECIFIED ADDRESS

004244  013704  004276                        MOV     DEVADR,R4
004250  010524                        1$:     MOV     R5,(R4)+
004252  062705  000002                        ADD     #2,R5
004256  105337  004301                        DECB    ADRCNT
004262  001372                                BNE     1$
004264  012604                                MOV     (SP)+,R4
004266  012605                                MOV     (SP)+,R5
004270  000002                                RTI
004272  000000                        LOLIM:  0
004274  000000                        HILIM:  0
004276  000000                        DEVADR: 0
004300  000000                        LOBITS: 0
        004301                        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

004310  010537  001272                SV05:   MOV     R5,SAVR5        ;SAVE R5
004314  010437  001270                        MOV     R4,SAVR4        ;SAVE R4
004320  010337  001266                        MOV     R3,SAVR3        ;SAVE R3
004324  010237  001264                        MOV     R2,SAVR2        ;SAVE R2
004330  010137  001262                        MOV     R1,SAVR1        ;SAVE R1
004334  010037  001260                        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$:   SAV05                   ;SAVE ALL PROC REGISTERS
 1018  004736  011605                              MOV     (SP),R5         ;GET THE PC OF ERROR
 1019  004740  162705  000002                      SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
 1020  004744  011504                              MOV     (R5),R4         ;GET HLT INSTRUCTION
 1021  004746  006304                              ASL     R4              ;MULT BY TWO
 1022  004750  061504                              ADD     (R5),R4         ;DOUBLE IT
 1023  004752  006304                              ASL     R4              ;MULT AGAIN
 1024  004754  042704  177001                      BIC     #177001,R4      ;CLEAR JUNK
 1025  004760  062704  037250                      ADD     #.ERRTAB,R4     ;GET POINTER
 1026  004764  012437  005100                      MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
 1027  004770  012437  005112                      MOV     (R4)+,DATAHD    ;GET DATA HEADRER
 1028  004774  011437  005124                      MOV     (R4),DATABP     ;GET DATA TABLE
 1029  005000  105737  001325                      TSTB    ERRFLG          ;TYPE HEADREER
 1030  005004  001403                              BEQ     TYPMSG          ;BR IF YES
 1031  005006  005737  005124                      TST     DATABP          ;DOES DATA TABLE EXIST?
 1032  005012  001040                              BNE     TYPDAT          ;BR IF YES.
 1033  005014  104402  005574        TYPMSG: TYPE    ,MCRLF
 1034  005020  104402  005574                TYPE    ,MCRLF
 1035  005024  005737  001220                TST     LOCK
 1036  005030  001402                        BEQ     1$
 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.
```

```
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:     RESO5                   ;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$:         PUSHRO                  ;SAVE RO
1063  005150  016600  000002                        MOV     2(SP),RO        ;SHOW ERROR PC IN DATA LIGHTS
1064  005154  000000                                HALT                    ;HALT
1065  005156  012600                                POPRO                   ;GET RO
1066  005160  005237  001232                EXITER: INC     ERRCNT          ;UPDATE ERROR COUNT
1067  005164  032777  000400  174010                BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
1068  005172  001007                                BNE     1$              ;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
```

```
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$:     BISB    #BIT1!BIT0,@DMCSRH ;CLOCK INSTRUCTION
1134  005444  142777  000007  173734                  BICB    #BIT2!BIT1!BIT0,@DMCSRH  ;CLEAR ROMO, ROMI, STEP
1135  005452  000002                                  RTI
1136
1137  005454                                  .DATACLK:
1138  005454  013637  001416                          MOV     @(SP)+,TEMP     ;PUT TICK COUNT IN TEMP
1139  005460  062746  000002                          ADD     #2,-(SP)        ;ADJUST STACK
1140  005464  152777  000020  173714          1$:     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$:
1157  005544  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1158  005546  021364                                  021364                  ;PORT4←IBUS* REG11
1159  005550  032777  000002  173634                  BIT     #2,@DMP04       ;IS PGM CLOCK BIT SET?
1160  005556  001372                                  BNE     2$              ;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 DZDMG  /
  (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 M8201 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,
```

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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                                                    ;
1249                                                    ;ROUTINE USED TO "CYCLE" THROUGH UP TO 16 DMC11'S
1250                                                    ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
1251                                                    ;AND RUNS THE SPECIFIED DMC11'S.   THIS ROUTINE *MUST*
1252                                                    ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
1253                                                    ;SETUP NECESSARY.
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
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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$:    BIS     #BIT13,(R2)     ;SET BIT 13 IN STAT2 IF M8202
1431  010620  104402                  30$:    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
```

```
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:
```

```
                        .LIST   ME

                        .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
                       PAGE1=4000
                       PAGE2=10000
                       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 ALWAYS ADDRES    ;JUMP ALWAYS
                        MICPC=MICPC+1
                        <JUMP!ALCOND!<ADDRES-INIT&3000*4>!<ADDRES-INIT&777/2>>

                        .ENDM
                ;
                        .MACRO  $ZERO
                        MICPC=MICPC+1
                        000000

                        .ENDM   $ZERO
                ;
                        .MACRO  BR0 ADDRES      ;JUMP IF BR0 SET
                        MICPC=MICPC+1
                        <JUMP!BR0CON!<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
```

```
                        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
                ;
```

```
                        .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
000000                          $LOW=0
```

```
                        .TITLE DMC11 DDCMP PROTOCOL IMPLEMENTATION
                        .IDENT  /V0001/
                        .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          OCTOBER 13, 1976
                        .SBTTL  THIS VERSION WAS USED TO BLAST THE FIRST
                        .SBTTL  RELEASE ON OCTOBER 13, 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                          LRC=ERC+1                   ;LAST POINTER RECD
000025                          RCL1=LRC+1                  ;RECEIVE LINK #1
000032                          RCL2=RCL1+5                 ;   "       "   #2
000037                          RCL3=RCL2+5                 ;   "       "   #3
000044                          RCL4=RCL3+5
000051                          RCL5=RCL4+5
000056                          RCL6=RCL5+5
000063                          RCL7=RCL6+5
000070                          STC=RCL7+5                  ;START OF OUTPUT CHAIN---NEXT TMT DONE
000071                          LTC=STC+1                   ;LAST TRANSMITTED
000072                          ETC=LTC+1                   ;END OF TRANSMIT CHAIN
000073                          TML1=ETC+1                  ;TRANSMIT LINK #1
000101                          TML2=TML1+6                 ;   "       "   #2
000107                          TML3=TML2+6                 ;   "       "   #3
000115                          TML4=TML3+6
000123                          TML5=TML4+6
000131                          TML6=TML5+6
000137                          TML7=TML6+6
000145                          TML8=TML7+6
000153                          T=TML8+6                    ;TYPE FIELD
000154                          ST=T+1              ;SUBTYPE FIELD
000155                          ISP17=ST+1          ;MSG ACKED IMAGE
000156                          IMG10=ISP17+1               ;IMAGE OF BIT 1 OF SP10
000157                          IMG11=IMG10+1               ;IMAGE OF SP11
000160                          IMG12=IMG11+1               ;IMAGE OF SP12
000161                          IMG17=IMG12+1               ;IMAGE OF SP17
000162                          PRTST=IMG17+1               ;PORT STATE
000163                          TYPTAB=PRTST+1      ;TYPE TABLE---
                                                    ;72 TYPE TABLE REP
                                                    ;73   "      "   NAK
000165                          TYPSTT=TYPTAB+2     ;74   "      "   START
                                                    ;75   "      "   STACK
                                                    ;
                                                    ;
000170                          OSTATE=TYPSTT+3     ;OLD STATE POINTER
000171                          ISP11=OSTATE+1      ;SP11 IMAGE
000172                          ISP12=ISP11+1       ;SP12 IMAGE
000173                          INCONS=ISP12+1      ;IN CONTROL CSR IMAGE
```

```
   463          000174                  RTHRS=INCONS+1  ;RECV THRESHOLD LINK
   464          000240                  NXTINT=240      ;NEXT INTERRUPT POSITION
   465          000241                  NXTSP=NXTINT+1  ;END OF INTERUPT CHAIN
   466          000242                  INTSTK=NXTSP+1  ;STACK OF INTERUPTS
   467          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!0INCON>        ;ZERO THE IN CONTROL CSR
(1)     000003                  MICPC=MICPC+1
(1)     011774  061200          <MOVE!WROUTX!BR!<SELA!0INCON>>
(1)
011776                          OUT     BR,<SELA!00CON>         ;ZERO THE OUT CONTROL CSR
(1)     000004                  MICPC=MICPC+1
(1)     011776  061202          <MOVE!WROUTX!BR!<SELA!00CON>>
(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                    MICPC=MICPC+1
(1)  012014   003401                    <MOVE!SPBRX!IMM!1!SP1>
(1)
527  012016                             SP      BR,SELB,SP11            ;WRITE A 1 TO SP11
(1)           000014                    MICPC=MICPC+1
(1)  012016   063231                    <MOVE!SPX!BR!SELB!SP11>
(1)
528  012020                             SP      BR,SELB,SP12            ;WRITE A 1 TO SP12
(1)           000015                    MICPC=MICPC+1
(1)  012020   063232                    <MOVE!SPX!BR!SELB!SP12>
(1)
529  012022                             LDMA    IMM,PRTST               ;POINT MAR TO UNNUM MSG SKELETON
(1)           000016                    MICPC=MICPC+1
(1)             001                     .IF IDN IMM,IMM
(1)  012022   010162                    <MOVE!LDMAR!IMM!<PRTST&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<PRTST>>
(1)             000                     .ENDC
(1)
530  012024                             PSTATI  NIDLE2                  ;WRITE PORT IDLE STATE
(1)  012024                             MEMINC  IMM,<<NIDLE2-INIT&777/2>>
(2)           000017                    MICPC=MICPC+1
(2)  012024   016520                    <MOVE!WRMEM!INCMAR!IMM!<<NIDLE2-INIT&777/2>>>
(2)
531  012026                             BRWRTE  IMM,226                 ;WRITE SYNC TO MEMORY
(1)           000020                    MICPC=MICPC+1
(1)  012026   000626                    <MOVE!WRTEBR!IMM!<226>>
(1)
532  012030                             OUTPUT  BR,SELB!SYNC    ;LOAD THE SYNC REGISTER
(1)           000021                    MICPC=MICPC+1
(1)  012030   062234                    <MOVE!WROUT!BR!<SELB!SYNC>>
(1)
533  012032                             MEMINC  IMM,3                   ;REP
(1)           000022                    MICPC=MICPC+1
(1)  012032   016403                    <MOVE!WRMEM!INCMAR!IMM!<3>>
(1)
534  012034                             MEM     IMM,2                   ;NAK
(1)           000023                    MICPC=MICPC+1
(1)  012034   002402                    <MOVE!WRMEM!IMM!<2>>
(1)
535  012036                             SP      MEMX!INCMAR,SELB,SP15           ;SET STARTING COUNT
(1)           000024                    MICPC=MICPC+1
(1)  012036   057235                    <MOVE!SPX!MEMX!INCMAR!SELB!SP15>
(1)
536  012040                             MEMINC  IMM,6                   ;START
(1)           000025                    MICPC=MICPC+1
(1)  012040   016406                    <MOVE!WRMEM!INCMAR!IMM!<6>>
(1)
537  012042                             MEMINC  IMM,7                   ;STACK
(1)           000026                    MICPC=MICPC+1
(1)  012042   016407                    <MOVE!WRMEM!INCMAR!IMM!<7>>
(1)
538  012044                             MEMINC  IMM,1                   ;ACK
(1)           000027                    MICPC=MICPC+1
(1)  012044   016401                    <MOVE!WRMEM!INCMAR!IMM!<1>>
(1)
```

```
539  012046                          LDMA    IMM,STC                 ;LOAD ADDRESS OF LAST TMT CHAIN
(1)          000030                  MICPC=MICPC+1
(1)             001                  .IF IDN IMM,IMM
(1)  012046  010070                  <MOVE!LDMAR!IMM!<STC&377>>
(1)                                  .IFF
(1)                                  <MOVE!LDMAR!IMM!<STC>>
(1)             000                  .ENDC
(1)
540  012050                          MEMINC  IMM,TML1                ;STORE ADDRESS OF FIRST TMT LINK
(1)          000031                  MICPC=MICPC+1
(1)  012050  016473                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
(1)
541  012052                          MEMINC  IMM,TML1
(1)          000032                  MICPC=MICPC+1
(1)  012052  016473                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
(1)
542  012054                          MEMINC  IMM,TML1
(1)          000033                  MICPC=MICPC+1
(1)  012054  016473                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
(1)
543  012056                          LDMA    IMM,SRC                 ;LOAD ADDRESS OF LAST RECV CHAIN
(1)          000034                  MICPC=MICPC+1
(1)             001                  .IF IDN IMM,IMM
(1)  012056  010022                  <MOVE!LDMAR!IMM!<SRC&377>>
(1)                                  .IFF
(1)                                  <MOVE!LDMAR!IMM!<SRC>>
(1)             000                  .ENDC
(1)
544  012060                          MEMINC  IMM,RCL1                ;SET UP ADDRESS OF FIRST RECV LINK
(1)          000035                  MICPC=MICPC+1
(1)  012060  016425                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
(1)
545  012062                          MEMINC  IMM,RCL1
(1)          000036                  MICPC=MICPC+1
(1)  012062  016425                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
(1)
546  012064                          MEMINC  IMM,RCL1
(1)          000037                  MICPC=MICPC+1
(1)  012064  016425                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
(1)
547  012066                          LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER TO MAR
(1)          000040                  MICPC=MICPC+1
(1)             001                  .IF IDN IMM,IMM
(1)  012066  010240                  <MOVE!LDMAR!IMM!<NXTINT&377>>
(1)                                  .IFF
(1)                                  <MOVE!LDMAR!IMM!<NXTINT>>
(1)             000                  .ENDC
(1)
548  012070                          MEMINC  IMM,INTSTK                      ;INITIALIZE NEXT INTERRUPT POINTER
(1)          000041                  MICPC=MICPC+1
(1)  012070  016642                  <MOVE!WRMEM!INCMAR!IMM!<INTSTK>>
(1)
549  012072                          MEM     IMM,INTSTK                      ;INITIALIZE INSERTION POINTER
(1)          000042                  MICPC=MICPC+1
(1)  012072  002642                  <MOVE!WRMEM!IMM!<INTSTK>>
(1)
```

```
   550  012074
   (1)          000043
   (1)  012074  000600
   (1)
   551  012076
   (1)          000044
   (1)  012076  061221
   (1)
   552
   553               001
   554
   555
   556
   557               000
```

```
                BRWRTE  IMM,200                 ;WRITE THE RUN BIT TO THE BR
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<200>>

                OUT     BR,<SELB!OMAIN>         ;WRITE  THE RUN BIT TO MAINT CSR
                MICPC=MICPC+1
                <MOVE!WROUTX!BR!<SELB!OMAIN>>

                                                ;FALL INTO IDLE LOOP
                .IF NDF LOW
                ALWAYS  IDLE
                .
REXIT:          SP      BR,SELB,SP3
                .ENDC
```

```
                                        .SBTTL  IDLE--PROGRAM IDLE LOOP
                                        ;PROGRAM IDLE LOOP
                                        ;DISPATCHES TO APPROPRIATE SERVICE ROUTINES
                                        ;USES STATE POINTERS FOR TMT,RCV,CSR ACTIVITY
                                        ;
012100                          IDLE:   BRWRTE  BR,<SELA!SP10>          ;READ TRANSMIT STATUS WORD FROM SP10 TO BR
(1)     000045                          MICPC=MICPC+1
(1)  012100  060610                     <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
012102                                  BR1     TMTDA                   ;IF DATA TO SEND-- BRANCH
(1)     000046                          MICPC=MICPC+1
(1)  012102  112400                     <JUMP!BR1CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
(1)
012104                                  BR0     TMTDA                   ;IF DATA TO SEND-- BRANCH
(1)     000047                          MICPC=MICPC+1
(1)  012104  112000                     <JUMP!BR0CON!<TMTDA-INIT&2000*4>!<TMTDA-INIT&777/2>>
(1)
012106                                  ALWAYS  I1
(1)     000050                          MICPC=MICPC+1
(1)  012106  100452                     <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
(1)
                                        ;
012110                          XEXIT:  SP      BR,SELB,SP2
(1)     000051                          MICPC=MICPC+1
(1)  012110  063222                     <MOVE!SPX!BR!SELB!SP2>
(1)
012112                          I1:     BRWRTE  IBUS,RCVCON             ;READ LINE UNIT RECEIVE CONTROL WORD
(1)     000052                          MICPC=MICPC+1
(1)  012112  020640                     <MOVE!WRTEBR!IBUS!<RCVCON>>
(1)
012114                                  .BR4    BR,SELA,SP3!PAGE1       ;BRANCH BASED UPON RECV STATE
(1)     000053                          MICPC=MICPC+1
(1)  012114  167203                     <JUMP! BR4CON!BR!SELA!SP3!PAGE1>
(1)
012116                          I2:     LDMA    IMM,PRTST               ;ADDRESS PORT STATE
(1)     000054                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)  012116  010162                     <MOVE!LDMAR!IMM!<PRTST&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<PRTST>>
(1)        000                          .ENDC
(1)
012120                                  .ALWAY  MEMX,SELB,0             ;INDEX
(1)     000055                          MICPC=MICPC+1
(1)  012120  140620                     <JUMP!ALCOND!MEMX!SELB!0>
(1)
```

```
                                        .SBTTL  BASSRV---- BASE SERVICE ROUTINE
012122                          BASSRV: PSTATE  NIDLE2
012122                                  MEM     IMM,<<NIDLE2-INIT&777/2>>
                                        MICPC=MICPC+1
000056
012122  002520                          <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
                                        
012124                                  LDMA    IMM,BASE                        ;CLEAR TO MAR SO IT POINTS TO BASE POINT
000057                                  MICPC=MICPC+1
   001                                  .IF IDN IMM,IMM
012124  010017                          <MOVE!LDMAR!IMM!<BASE&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<BASE>>
   000                                  .ENDC

012126                                  MEMINC  IBUS,PORT1              ;READ CSR4
000060                                  MICPC=MICPC+1
012126  136500                          <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>

012130                                  MEMINC  IBUS,PORT2              ;READ CSR5
000061                                  MICPC=MICPC+1
012130  136520                          <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>

012132                                  MEM     IBUS,PORT4
000062                                  MICPC=MICPC+1
012132  122560                          <MOVE!WRMEM!IBUS!<PORT4>>

012134                                  SP      IBUS,INCON,SPO          ;READ INPUT CONTROL CSR
000063                                  MICPC=MICPC+1
012134  123000                          <MOVE!SPX!IBUS!INCON!SPO>

012136                                  BRWRTE  IMM,100                 ;CLEAR THE BR
000064                                  MICPC=MICPC+1
012136  000500                          <MOVE!WRTEBR!IMM!<100>>

012140                                  OUT     BR,<AANDB!0INCON>       ;CLEAR THE INCONTROL CSR
000065                                  MICPC=MICPC+1
012140  061260                          <MOVE!WROUTX!BR!<AANDB!0INCON>>

012142                                  BRWRTE  IMM,120                 ; MASK FOR HDX AND DTR
000066                                  MICPC=MICPC+1
012142  000520                          <MOVE!WRTEBR!IMM!<120>>

012144                                  OUTPUT  BR,<SELB!0MODEM>
000067                                  MICPC=MICPC+1
012144  062233                          <MOVE!WROUT!BR!<SELB!0MODEM>>

012146                                  BRWRTE  MEMX,SELB               ;READ SEL6
000070                                  MICPC=MICPC+1
012146  040620                          <MOVE!WRTEBR!MEMX!<SELB>>

012150                                  BR4     RESUME                  ;IF SET RESUME
000071                                  MICPC=MICPC+1
012150  103100                          <JUMP!BR4CON!<RESUME-INIT&3000*4>!<RESUME-INIT&777/2>>

012152                                  LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
000072                                  MICPC=MICPC+1
```

```
(1)                 001
(1)  012152  010153                 .IF IDN IMM,IMM
(1)                                 <MOVE!LDMAR!IMM!<T&377>>
(1)                                 .IFF
(1)                                 <MOVE!LDMAR!IMM!<T>>
(1)                 000             .ENDC
(1)
589  012154                         MEMINC  IMM,6                   ;WRITE START TYPE TO MEMORY
(1)         000073                  MICPC=MICPC+1
(1)  012154  016406                 <MOVE!WRMEM!INCMAR!IMM!<6>>
(1)
590  012156                         MEM     IMM,300                 ;WRITE SELECT AND FINAL TO MEMORY
(1)         000074                  MICPC=MICPC+1
(1)  012156  002700                 <MOVE!WRMEM!IMM!<300>>
(1)
591  012160                         SP      BR,DECA,SP1     ;TURN OFF INIT MODE
(1)         000075                  MICPC=MICPC+1
(1)  012160  063161                 <MOVE!SPX!BR!DECA!SP1>
(1)
592  012162             BS1:        BRWRTE  IMM,241         ;SET OK TO SEND,STARTMODE AND UNNUM PENDING
(1)         000076                  MICPC=MICPC+1
(1)  012162  000641                 <MOVE!WRTEBR!IMM!<241>>
(1)
593  012164                         ALWAYS  SA3
(1)         000077                  MICPC=MICPC+1
(1)  012164  110733                 <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>
(1)
594  012166             RESUME:     SP      IMM,SP4,4               ;SET UP SP4 FOR COUNTING NPRS
(1)         000100                  MICPC=MICPC+1
(1)  012166  003004                 <MOVE!SPX!IMM!SP4!4>
(1)
595  012170                         SP      BR,INCA,SP10            ;SET UNNUMB MESSAGE PENDING TO
(1)         000101                  MICPC=MICPC+1
(1)  012170  063070                 <MOVE!SPX!BR!INCA!SP10>
(1)
596                                                                 ;TRICK TRANSMITTER CODE
597  012172                         LDMA    IMM,BASE                ;ADDRESS BASE TABLE ADDRESS
(1)         000102                  MICPC=MICPC+1
(1)            001                  .IF IDN IMM,IMM
(1)  012172  010017                 <MOVE!LDMAR!IMM!<BASE&377>>
(1)                                 .IFF
(1)                                 <MOVE!LDMAR!IMM!<BASE>>
(1)                 000             .ENDC
(1)
598  012174                         STATE   FUDGE                   ;SET TMTR STATE TO ENTER TABLE UPDATE
(1)         000103                  MICPC=MICPC+1
(1)  012174  000736                 <MOVE!WRTEBR!IMM!<FUDGE-INIT&777/2>>
599  012176                         ALWAYS  TBO                     ;GO SET UP MXT BITS AND ADRESS OF BASE FOR NPRS
(1)         000104                  MICPC=MICPC+1
(1)  012176  110462                 <JUMP!ALCOND!<TBO-INIT&3000*4>!<TBO-INIT&777/2>>
(1)
600  012200             BS2:        LDMA    IMM,IMG10
(1)         000105                  MICPC=MICPC+1
(1)            001                  .IF IDN IMM,IMM
(1)  012200  010156                 <MOVE!LDMAR!IMM!<IMG10&377>>
(1)                                 .IFF
(1)                                 <MOVE!LDMAR!IMM!<IMG10>>
```

```
(1)                 000
(1)
601  012202
(1)                 000106
(1)  012202  043310
(1)
602  012204
(1)                 000107
(1)  012204  057231
(1)
603  012206
(1)                 000110
(1)  012206  057232
(1)
604  012210
(1)                 000111
(1)  012210  043237
(1)
605  012212
(1)                 000112
(1)  012212  063170
(1)
606
607  012214
(1)                 000113
(1)  012214  000520
608  012216
(1)                 000114
(1)  012216  063233
(1)
609
610  012220
(1)                 000115
(1)  012220  063161
(1)
611  012222
(1)                 000116
(1)  012222  000600
(1)
612  012224
(1)                 000117
(1)  012224  110733
(1)
```

```
        .ENDC

        SP      MEMX,AORB,SP10          ;RESTORE BIT 1 OF SP10
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!AORB!SP10>

        SP      MEMX!INCMAR,SELB,SP11           ;RESTORE SP11
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!INCMAR!SELB!SP11>

        SP      MEMX!INCMAR,SELB,SP12           ;RESTORE SP12
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!INCMAR!SELB!SP12>

        SP      MEMX,SELB,SP17          ;RESTORE        SP17
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!SELB!SP17>

        SP      BR,DECA,SP10            ;TURN OFF UNNUM MESSAGE PENDING AND
        MICPC=MICPC+1
        <MOVE!SPX!BR!DECA!SP10>

                                        ;ZERO THE BRG
        STATE   NIDLE2                  ;PORT STATUS
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<NIDLE2-INIT&777/2>>
        SP      BR,SELB,SP13            ;SAVE IN SP13 - NOTE THAT STATUS READ INTO
        MICPC=MICPC+1
        <MOVE!SPX!BR!SELB!SP13>

                                        ;RAM WAS TABLE UPDATE WHICH SAVED STATUS IN SP13
        SP      BR,DECA,SP1             ;CLEAR INIT MODE
        MICPC=MICPC+1
        <MOVE!SPX!BR!DECA!SP1>

        BRWRTE  IMM,200                 ;SET OK TO SEND
        MICPC=MICPC+1
        <MOVE!WRTEBR!IMM!<200>>

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

```
                        .SBTTL  NIDLE2---NO CSR ACTIVITY STATE
012226                  NIDLE2: BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
(1)     000120                  MICPC=MICPC+1
(1)     012226  060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
001                             .IF NDF $LOW
                                BR4     NIDLE5                  ;INTERRUPT PENDING?---BRANCH
000                             .ENDC
001                             .IF DF  $LOW
012230                          BR4     OUTINT
(1)     000121                  MICPC=MICPC+1
(1)     012230  103220          <JUMP!BR4CON!<OUTINT-INIT&3000*4>!<OUTINT-INIT&777/2>>
(1)
000                             .ENDC
012232                          SPBR    IBUS,INCON,SPO          ;READ INPUT CONTROL CSR
(1)     000122                  MICPC=MICPC+1
(1)     012232  123400          <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
012234                          BRSHFT                          ;SHIFT IT RIGHT
(1)     000123                  MICPC=MICPC+1
(1)     012234  001620          <MOVE!SHFTBR!WRTEBR!SELB>
(1)
012236                          BR4     INWAT1                  ;IF RQI SET -- BRANCH
(1)     000124                  MICPC=MICPC+1
(1)     012236  103155          <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
012240                  NIDLE6: BRWRTE  BR,SELA!SP1             ;READ PORT STATUS
(1)     000125                  MICPC=MICPC+1
(1)     012240  060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
001                             .IF NDF $LOW
                                BRO     IDLE
000                             .ENDC
001                             .IF DF  $LOW
012242                          BRO     10$
(1)     000126                  MICPC=MICPC+1
(1)     012242  102131          <JUMP!BROCON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
000                             .ENDC
012244                          SPBR    IBUS,UBBR,SPO           ;TIMER EXPIRES?
(1)     000127                  MICPC=MICPC+1
(1)     012244  123620          <MOVE!SPBRX!IBUS!UBBR!SPO>
(1)
012246                          BR4     TIMSRV
(1)     000130                  MICPC=MICPC+1
(1)     012246  113245          <JUMP!BR4CON!<TIMSRV-INIT&3000*4>!<TIMSRV-INIT&777/2>>
(1)
001                             .IF NDF $LOW
                                ALWAYS  IDLE
000                             .ENDC
001                             .IF DF  $LOW
012250                  10$:    SPBR    IBUS,MODEM,SPO          ;READ MODEM CONTROL CSR
(1)     000131                  MICPC=MICPC+1
(1)     012250  023660          <MOVE!SPBRX!IBUS!MODEM!SPO>
```

```
(1)
641  012252                          BRWRTE  BR,AA!SP0               ;SHIFT IT LEFT
(1)       000132                     MICPC=MICPC+1
(1)  012252  060520                  <MOVE!WRTEBR!BR!<AA!SP0>>
(1)
642  012254                          BR4     SETDSR                   ;IF DSR SET, CLEAR FLAG
(1)       000133                     MICPC=MICPC+1
(1)  012254  103150                  <JUMP!BR4CON!<SETDSR-INIT&3000*4>!<SETDSR-INIT&777/2>>
(1)
643  012256                          BRWRTE  BR,SELA!SP10             ;READ LINE STATUS WORD
(1)       000134                     MICPC=MICPC+1
(1)  012256  060610                  <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
644  012260                          BRSHFT
(1)       000135                     MICPC=MICPC+1
(1)  012260  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
645  012262                          BR4     IDLE                     ;START MODE
(1)       000136                     MICPC=MICPC+1
(1)  012262  103045                  <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
646  012264                          BRWRTE  BR,AA!SP1                ;READ PORT STATUS WORD
(1)       000137                     MICPC=MICPC+1
(1)  012264  060521                  <MOVE!WRTEBR!BR!<AA!SP1>>
(1)
647  012266                          BR1     IDLE                     ;INIT MODE
(1)       000140                     MICPC=MICPC+1
(1)  012266  102445                  <JUMP!BR1CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
648  012270                          BR7     IDLE                     ;DISCONNECT ERROR ALREADY SENT
(1)       000141                     MICPC=MICPC+1
(1)  012270  103445                  <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
649  012272                          SPBR    IBUS,MAIN,SP0    ;READ THE MAINT REGISTER
(1)       000142                     MICPC=MICPC+1
(1)  012272  123420                  <MOVE!SPBRX!IBUS!MAIN!SP0>
(1)
650  012274                          BRWRTE  BR,ADD!SP0               ;SHIFT LEFT
(1)       000143                     MICPC=MICPC+1
(1)  012274  060400                  <MOVE!WRTEBR!BR!<ADD!SP0>>
(1)
651  012276                          BR4     IDLE                     ;LU LOOP -- EXIT
(1)       000144                     MICPC=MICPC+1
(1)  012276  103045                  <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
652  012300                          BRWRTE  IMM,100                  ;WRITE DISCONNECT ERROR
(1)       000145                     MICPC=MICPC+1
(1)  012300  000500                  <MOVE!WRTEBR!IMM!<100>>
(1)
653  012302                          SP      BR,AORB,SP1              ;FLAG ERROR RECORDED
(1)       000146                     MICPC=MICPC+1
(1)  012302  063301                  <MOVE!SPX!BR!AORB!SP1>
(1)
654  012304                          ALWAYS  ERRXX                    ;MAKE A CONTROL OUT
(1)       000147                     MICPC=MICPC+1
(1)  012304  114671                  <JUMP!ALCOND!<ERRXX-INIT&3000*4>!<ERRXX-INIT&777/2>>
```

```
    (1)
655  012306                     SETDSR: BRWRTE  IMM,277                 ;CLEAR DISCONNECT ERROR FLAG
    (1)          000150                 MICPC=MICPC+1
    (1)  012306  000677                 <MOVE!WRTEBR!IMM!<277>>
    (1)
656  012310                             ALWAYS  CLRIDL
    (1)          000151                 MICPC=MICPC+1
    (1)  012310  100652                 <JUMP!ALCOND!<CLRIDL-INIT&3000*4>!<CLRIDL-INIT&777/2>>
    (1)
657               000                    .ENDC
658               001                    .IF NDF $LOW
659                              NIDLE5: PSTATE  OUTINT                  ;SET STATE FOR INTERRUPT PROCESSING
660                                      ALWAYS  IDLE
661               000                    .ENDC
```

```
                                        .SBTTL INWAIT---WAIT FOR RQI TO CLEAR
012312                          INWAIT: SPBR    IBUS,INCON,SPO          ;READ INPUT CONTROL CSR
(1)     000152                          MICPC=MICPC+1
(1)     012312  123400                  <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
012314                                  BRWRTE  BR,<AA!SPO>             ;SHIFT IT LEFT
(1)     000153                          MICPC=MICPC+1
(1)     012314  060520                  <MOVE!WRTEBR!BR!<AA!SPO>>
(1)
012316                                  BR7     NIDLE3                  ;INTERRUPT ENABLE HAS BEEN SET
(1)     000154                          MICPC=MICPC+1
(1)     012316  103557                  <JUMP!BR7CON!<NIDLE3-INIT&3000*4>!<NIDLE3-INIT&777/2>>
(1)
                                
012320                          INWAT1: SPBR    IBUS,INCON,SPO          ;READ THE INPUT CONTROL CSR
(1)     000155                          MICPC=MICPC+1
(1)     012320  123400                  <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
012322                                  BR7     INWAT2                  ;READY IN STILL SET
(1)     000156                          MICPC=MICPC+1
(1)     012322  103566                  <JUMP!BR7CON!<INWAT2-INIT&3000*4>!<INWAT2-INIT&777/2>>
(1)
012324                          NIDLE3: PSTATE  INWAT1                  ;UPDATE STATE TO INPUT
(1)     012324                          MEM     IMM,<<INWAT1-INIT&777/2>>
(2)     000157                          MICPC=MICPC+1
(2)     012324  002555                  <MOVE!WRMEM!IMM!<<INWAT1-INIT&777/2>>>
(2)
012326                                  BRWRTE  BR,AA!SPO               ;SHIFT CSR LEFT
(1)     000160                          MICPC=MICPC+1
(1)     012326  060520                  <MOVE!WRTEBR!BR!<AA!SPO>>
(1)
012330                                  BR7     ININT
(1)     000161                          MICPC=MICPC+1
(1)     012330  117454                  <JUMP!BR7CON!<ININT-INIT&3000*4>!<ININT-INIT&777/2>>
(1)
012332                                  PSTATE  INWAIT                  ;UPDATE STATE POINTER TO NO INTERRUPT GENERATED
(1)     012332                          MEM     IMM,<<INWAIT-INIT&777/2>>
(2)     000162                          MICPC=MICPC+1
(2)     012332  002552                  <MOVE!WRMEM!IMM!<<INWAIT-INIT&777/2>>>
(2)
012334                          NIDLE4: BRWRTE  IMM,200
(1)     000163                          MICPC=MICPC+1
(1)     012334  000600                  <MOVE!WRTEBR!IMM!<200>>
(1)
012336                                  OUT     BR,AORB!OINCON          ;SET THE RDYI
(1)     000164                          MICPC=MICPC+1
(1)     012336  061300                  <MOVE!WROUTX!BR!<AORB!OINCON>>
(1)
012340                                  ALWAYS  IDLE
(1)     000165                          MICPC=MICPC+1
(1)     012340  100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
                                
012342                          INWAT2: BRSHFT                          ;SHIFT THE BR RIGHT
(1)     000166                          MICPC=MICPC+1
(1)     012342  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
```

```
(1)
679  012344                          BR4     NIDLE6                  ;RQI SET--- GO AWAY
(1)            000167                MICPC=MICPC+1
(1)  012344    103125                <JUMP!BR4CON!<NIDLE6-INIT&3000*4>!<NIDLE6-INIT&777/2>>
(1)
680               001                .IF NDF $LOW
681                                  PSTATE  INSRV                   ;SET NEXT STATE TO INPUT SERVICE
682                                  ALWAYS  IDLE
683               000                .ENDC
684  012346                          INSRV:  SPBR    IBUS,INCON,SPO          ;READ THE INPUT CONTROL CSR
(1)            000170                MICPC=MICPC+1
(1)  012346    123400                <MOVE!SPBRX!IBUS!INCON!SPO>
(1)
685  012350                                  BR1     30$                     ;--SENSE OR BASE
(1)            000171                MICPC=MICPC+1
(1)  012350    102605                <JUMP!BR1CON!<30$-INIT&3000*4>!<30$-INIT&777/2>>
(1)
686  012352                                  BR0     10$                     ;CNTL 'I
(1)            000172                MICPC=MICPC+1
(1)  012352    102177                <JUMP!BR0CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
687  012354                                  BRSHFT                          ;MUST BE BA/CC-SHIFT FOR IN OR OUT
(1)            000173                MICPC=MICPC+1
(1)  012354    001620                <MOVE!SHFTBR!WRTEBR!SELB>
(1)
688  012356                                  BR1     15$
(1)            000174                MICPC=MICPC+1
(1)  012356    102601                <JUMP!BR1CON!<15$-INIT&3000*4>!<15$-INIT&777/2>>
(1)
689  012360                                  PSTATE  TBASRV                  ;TRANSMITTER
(1)  012360                                  MEM     IMM,<<TBASRV-INIT&777/2>>
(2)            000175                MICPC=MICPC+1
(2)  012360    002703                <MOVE!WRMEM!IMM!<<TBASRV-INIT&777/2>>>
(2)
690  012362                                  ALWAYS  20$
(1)            000176                MICPC=MICPC+1
(1)  012362    100602                <JUMP!ALCOND!<20$-7''T&3000*4>!<20$-INIT&777/2>>
(1)
691  012364                          10$:    PSTATE  CTLSRV
(1)  012364                                  MEM     IMM,<<CTLSRV-INIT&777/2>>
(2)            000177                MICPC=MICPC+1
(2)  012364    002661                <MOVE!WRMEM!IMM!<<CTLSRV-INIT&777/2>>>
(2)
692  012366                                  ALWAYS  20$
(1)            000200                MICPC=MICPC+1
(1)  012366    100602                <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
(1)
693  012370                          15$:    PSTATE  RBASRV
(1)  012370                                  MEM     IMM,<<RBASRV-INIT&777/2>>
(2)            000201                MICPC=MICPC+1
(2)  012370    002726                <MOVE!WRMEM!IMM!<<RBASRV-INIT&777/2>>>
(2)
694  012372                          20$:    BRWRTE  BR,SELA!SP1             ;INIT MODE
(1)            000202                MICPC=MICPC+1
(1)  012372    060601                <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
```

```
   695  012374                          BRO     PROCER                  ;IF INIT MODE--ERROR
   (1)          000203                  MICPC=MICPC+1
   (1)  012374  102211                  <JUMP!BROCON!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
   (1)
   696  012376                          ALWAYS  IDLE
   (1)          000204                  MICPC=MICPC+1
   (1)  012376  100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
   (1)
   697             001                  .IF NDF $LOW
   698                          30$:    PSTATE  BASSRV
   699                                  BRO     35$                     ;IF BASE -PROCESS
   700                                  ALWAYS  PROCER
   701                          35$:    BRWRTE  BR,SELA!SP1                     ;INIT MODE
   702                                  BRO     IDLE
   703             000                  .ENDC
   704             001                  .IF DF  $LOW
   705  012400                  30$:    BRO     35$                             ;IF BASE---PROCESS
   (1)          000205                  MICPC=MICPC+1
   (1)  012400  102207                  <JUMP!BROCON!<35$-INIT&3000*4>!<35$-INIT&777/2>>
   (1)
   706  012402                          ALWAYS  PROCER
   (1)          000206                  MICPC=MICPC+1
   (1)  012402  100611                  <JUMP!ALCOND!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
   (1)
   707  012404                  35$:    BRWRTE  BR,SELA!SP1                     ;INIT MODE?
   (1)          000207                  MICPC=MICPC+1
   (1)  012404  060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
   (1)
   708  012406                          BRO     BASSRV
   (1)          000210                  MICPC=MICPC+1
   (1)  012406  102056                  <JUMP!BROCON!<BASSRV-INIT&3000*4>!<BASSRV-INIT&777/2>>
   (1)
   709             000                  .ENDC
   710  012410                  PROCER: BRWRTE  IMM,100                 ;CLEAR INPUT CONTROL CSR
   (1)          000211                  MICPC=MICPC+1
   (1)  012410  000500                  <MOVE!WRTEBR!IMM!<100>>
   (1)
   711  012412                          OUT     BR,AANDB!OINCON         ;:
   (1)          000212                  MICPC=MICPC+1
   (1)  012412  061260                  <MOVE!WROUTX!BR!<AANDB!OINCON>>
   (1)
   712  012414                          LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LIN
   (1)          000213                  MICPC=MICPC+1
   (1)             001                  .IF IDN IMM,IMM
   (1)  012414  010177                  <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
   (1)
   (1)                                  .IFF
   (1)                                  <MOVE!LDMAR!IMM!<<RTHRS+3>>>
   (1)             000                  .ENDC
   (1)
   713  012416                          MEMINC  IMM,2
   (1)          000214                  MICPC=MICPC+1
   (1)  012416  016402                  <MOVE!WRMEM!INCMAR!IMM!<2>>
   (1)
   714  012420                          MEM     IMM,0
   (1)          000215                  MICPC=MICPC+1
   (1)  012420  002400                  <MOVE!WRMEM!IMM!<0>>
```

```
(1)
715  012422                    OUTPUT  MEMX,SELB!OMODEM        ;CLEAR DATA TERMINAL READY
(1)                            MICPC=MICPC+1
(1)  012422  042233            <MOVE!WROUT!MEMX!<SELB!OMODEM>>
(1)
716  012424                    ALWAYS  RCEXX                   ;POST THE ERROR - FATAL
(1)                            MICPC=MICPC+1
(1)  012424  114527            <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
(1)
```

```
                                        .SBTTL  OUTINT---SET UP OUTPUT INTERRUPT [RDYO]
012426                          OUTINT:
                                        .IF NDF $LOW
                                        PSTATE  PINT2
                                        .ENDC
                                        .IF DF  $LOW
012426                                  PSTATE  OUTWAIT         ;PORT STATUS TO WAITING FOR OUT
(1) 012426                              MEM     IMM,<<OUTWAIT-INIT&777/2>>
(2)         000220                      MICPC=MICPC+1
(2) 012426  002654                      <MOVE!WRMEM!IMM!<<OUTWAIT-INIT&777/2>>>
(2)
                                        .ENDC
                                                                ;COMPLETION
012430                                  LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER
(1)         000221                      MICPC=MICPC+1
(1)            001                      .IF IDN IMM,IMM
(1) 012430  010240                      <MOVE!LDMAR!IMM!<NXTINT&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<NXTINT>>
(1)                                     .ENDC
(1)
012432                                  LDMA    MEMX,SELB               ;NEXT INTERRUPT
(1)         000222                      MICPC=MICPC+1
(1)            001                      .IF IDN MEMX,IMM
(1)                                     <MOVE!LDMAR!IMM!<SELB&377>>
(1)                                     .IFF
(1) 012432  050220                      <MOVE!LDMAR!MEMX!<SELB>>
(1)            000                      .ENDC
(1)
012434                                  SP      IBUS,OCON,SPO           ;READ THE OUTPUT CONTROL CSR
(1)         000223                      MICPC=MICPC+1
(1) 012434  123040                      <MOVE!SPX!IBUS!OCON!SPO>
(1)
012436                                  OUT     <MEMX!INCMAR>,<AORB!OOCON>      ;WRITE THE OUT CONTROL CSR
(1)         000224                      MICPC=MICPC+1
(1) 012436  055302                      <MOVE!WROUTX!MEMX!INCMAR!<AORB!OOCON>>
(1)
012440                                  LDMA    MEMX,SELB                       ;ADDRESS LINK
(1)         000225                      MICPC=MICPC+1
(1)            001                      .IF IDN MEMX,IMM
(1)                                     <MOVE!LDMAR!IMM!<SELB&377>>
(1)                                     .IFF
(1) 012440  050220                      <MOVE!LDMAR!MEMX!<SELB>>
(1)            000                      .ENDC
(1)
012442                                  BRWRTE  <BR!INCMAR>,<AA!SPO>            ;KICK PAST LINK STATUS BYTE
(1)         000226                      MICPC=MICPC+1
(1) 012442  074520                      <MOVE!WRTEBR!BR!INCMAR!<AA!SPO>>
(1)
                                                                ;SHIFT CSRO IMAGE LEFT
                                                        ;***DO NOT CHANGE BR UNTIL BR7***
012444                                  OUT     <MEMX!INCMAR>,<SELB!OPORT1>     ;WRITE LOW BYTE OF BA TO CSR
(1)         000227                      MICPC=MICPC+1
(1) 012444  055224                      <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT1>>
(1)
012446                                  OUT     <MEMX!INCMAR>,<SELB!OPORT2>     ;WRITE HIGH BYTE OF BA TO CSR
```

```
(1)             000230          MICPC=MICPC+1
(1)  012446     055225          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT2>>
(1)
737  012450                     OUT     <MEMX!INCMAR>,<SELB!OPORT4>     ;WRITE HIGH BYTE OF COUNT TO CSR
(1)             000231          MICPC=MICPC+1
(1)  012450     055227          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT4>>
(1)
738  012452                     OUT     <MEMX!INCMAR>,<SELB!OPORT3>     ;WRITE THE LOW BYTE OF COUNT
(1)             000232          MICPC=MICPC+1
(1)  012452     055226          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT3>>
(1)
739                                                     ;***HERE IS BR7***
740  012454                     BR7     PE1             ;INTERRUPT ENABLE IS SET
(1)             000233          MICPC=MICPC+1
(1)  012454     103760          <JUMP!BR7CON!<PE1-INIT&3000*4>!<PE1-INIT&777/2>>
(1)
741                                                     ;GENERATE AN INTERRUPT
742                 001         .IF NDF $LOW
743                             ALWAYS  IDLE
744                     PINT2:  PSTATE  OUTWAIT
745                 000         .ENDC
746                 001         .IF DF  $LOW
747  012456             PINT2:
748                 000         .ENDC
749  012456                     LDMA    IMM,NXTINT              ;ADDRESS NEXT INTERRUPT QUEUE
(1)             000234          MICPC=MICPC+1
(1)                 001         .IF IDN IMM,IMM
(1)  012456     010240          <MOVE!LDMAR!IMM!<NXTINT&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<NXTINT>>
(1)                 000         .ENDC
(1)
750  012460                     SP      MEMX,SELB,SPO           ;COPY ADDRESS FOR NEXT INT TO SPO
(1)             000235          MICPC=MICPC+1
(1)  012460     043220          <MOVE!SPX!MEMX!SELB!SPO>
(1)
751  012462                     MEM     IMM,INTSTK              ;ASSUME WRAP AROUND CASE
(1)             000236          MICPC=MICPC+1
(1)  012462     002642          <MOVE!WRMEM!IMM!<INTSTK>>
(1)
752  012464                     BRWRTE  IMM,<<MMEND-2>>         ;ADDRESS OF LAST INT IN STACK
(1)             000237          MICPC=MICPC+1
(1)  012464     000776          <MOVE!WRTEBR!IMM!<<MMEND-2>>>
(1)
753  012466                     CMP     BR,SPO                  ;SHOULD WE WRAP
(1)             000240          MICPC=MICPC+1
(1)  012466     060360          <SUBTC!BR!SPO>
(1)
754  012470                     Z       5$                      ;YES--BRANCH
(1)             000241          MICPC=MICPC+1
(1)  012470     101644          <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
755  012472                     BRWRTE  IMM,2                   ;OFFSET FOR NEXT POINTER
(1)             000242          MICPC=MICPC+1
(1)  012472     000402          <MOVE!WRTEBR!IMM!<2>>
(1)
```

OUTINT---SET UP OUTPUT INTERRUPT [RDYO]

```
756  012474                          MEM     BR,ADD!SPO              ;UPDATE POINTER
(1)            000243                MICPC=MICPC+1
(1)  012474    062400                <MOVE!WRMEM!BR!<ADD!SPO>>
(1)
757  012476                          5$:     SP      MEMX,SELB,SPO   ;COPY POINTER TO SPO
(1)            000244                MICPC=MICPC+1
(1)  012476    043220                <MOVE!SPX!MEMX!SELB!SPO>
(1)
758  012500                                  LDMA    IMM,NXTSP       ;PICK UP START OF IN QUEUE
(1)            000245                MICPC=MICPC+1
(1)               001                .IF IDN IMM,IMM
(1)  012500    010241                <MOVE!LDMAR!IMM!<NXTSP&377>>
(1)                                  .IFF
(1)                                  <MOVE!LDMAR!IMM!<NXTSP>>
(1)                                  .ENDC
(1)               000
(1)
759  012502                                  CMP     MEMX,SPO        ;COMPARE TO END
(1)            000246                MICPC=MICPC+1
(1)  012502    040360                <SUBTC!MEMX!SPO>
(1)
760  012504                                  Z       10$             ;IF EQUAL--CLEAR INT PENDING
(1)            000247                MICPC=MICPC+1
(1)  012504    101651                <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
761  012506                                  ALWAYS  IDLE
(1)            000250                MICPC=MICPC+1
(1)  012506    100445                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
762  012510                          10$:    BRWRTE  IMM,357         ;MASK TO CLEAR INT PENDING
(1)            000251                MICPC=MICPC+1
(1)  012510    000757                <MOVE!WRTEBR!IMM!<357>>
(1)
763  012512                          CLRIDL: SP      BR,AANDB,SP1
(1)            000252                MICPC=MICPC+1
(1)  012512    063261                <MOVE!SPX!BR!AANDB!SP1>
(1)
764  012514                                  ALWAYS  IDLE
(1)            000253                MICPC=MICPC+1
(1)  012514    100445                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
```

```
                                        .SBTTL  OUTWAI--WAIT FOR RDYO TO GO AWAY
012516                          OUTWAI: SPBR    IBUS,OCON,SPO           ;READ OUTPUT CONTROL CSR
(1)     000254                          MICPC=MICPC+1
(1)     012516  123440                  <MOVE!SPBRX!IBUS!OCON!SPO>
(1)
012520                                  BR7     NIDLE6                  ;RDYO SET --GET OUT
(1)     000255                          MICPC=MICPC+1
(1)     012520  103525                  <JUMP!BR7CON!<NIDLE6-INIT&3000*4>!<NIDLE6-INIT&777/2>>
(1)
012522                                  BRWRTE  IMM,100         ;CLEAR CONTROL BITS
(1)     000256                          MICPC=MICPC+1
(1)     012522  000500                  <MOVE!WRTEBR!IMM!<100>>
(1)
012524                                  OUT     BR,OOCON!AANDB
(1)     000257                          MICPC=MICPC+1
(1)     012524  061262                  <MOVE!WROUTX!BR!<OOCON!AANDB>>
(1)
012526                                  ALWAYS  INS13
(1)     000260                          MICPC=MICPC+1
(1)     012526  100674                  <JUMP!ALCOND!<INS13-INIT&3000*4>!<INS13-INIT&777/2>>
(1)
```

```
                                .SBTTL  CTLSRV--CNTL I SERVICE
012530                  CTLSRV: SPBR    IBUS,PORT4,SPO                  ;TO SPO
        000261                  MICPC=MICPC+1
012530  123560                  <MOVE!SPBRX!IBUS!PORT4!SPO>

012532                          BRSHFT
        000262                  MICPC=MICPC+1
012532  001620                  <MOVE!SHFTBR!WRTEBR!SELB>

012534                          BR1     HDSEL                           ;IF SET IS HALF DUPLEX
        000263                  MICPC=MICPC+1
012534  102755                  <JUMP!BR1CON!<HDSEL-INIT&3000*4>!<HDSEL-INIT&777/2>>

012536                          BRWRTE  IMM,100                         ;MASK FOR DTR
        000264                  MICPC=MICPC+1
012536  000500                  <MOVE!WRTEBR!IMM!<100>>

012540                          OUTPUT  BR,SELB!OMODEM                  ;TURN OFF HALF-DUPLEX
        000265                  MICPC=MICPC+1
012540  062233                  <MOVE!WROUT!BR!<SELB!OMODEM>>

012542                  INS11:  BRWRTE  DP,<SELA!SPO>                   ;RESTORE THE CNTL WORD
        000266                  MICPC=MICPC+1
012542  060600                  <MOVE!WRTEBR!DP!<SELA!SPO>>

012544                          BR0     CBOOT                           ;IF SET IS BOOT
        000267                  MICPC=MICPC+1
012544  102276                  <JUMP!BR0CON!<CBOOT-INIT&3000*4>!<CBOOT-INIT&777/2>>

012546                  INS12:  SP      IBUS,INCON,SPO                  ;READ THE INPUT CONTROL CSR
        000270                  MICPC=MICPC+1
012546  123000                  <MOVE!SPX!IBUS!INCON!SPO>

012550                          BRWRTE  IMM,100                         ;ZERO THE BR REGISTER EXCEPT INT ENABLE
        000271                  MICPC=MICPC+1
012550  000500                  <MOVE!WRTEBR!IMM!<100>>

012552                          OUT     BR,<AANDB!OINCON>               ;CLEAR IN CONTROL CSR
        000272                  MICPC=MICPC+1
012552  061260                  <MOVE!WROUTX!BR!<AANDB!OINCON>>

012554                          LDMA    IMM,PRTST                       ;ADDRESS PORT STATE
        000273                  MICPC=MICPC+1
           001                  .IF IDN IMM,IMM
012554  010162                  <MOVE!LDMAR!IMM!<PRTST&377>>
                                .IFF
                                <MOVE!LDMAR!IMM!<PRTST>>
           000                  .ENDC

012556                  INS13:  PSTATE  NIDLE2
012556                          MEM     IMM,<<NIDLE2-INIT&777/2>>
        000274                  MICPC=MICPC+1
012556  002520                  <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>

012560                          ALWAYS  IDLE
        000275                  MICPC=MICPC+1
```

```
(1)  012560  100445                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
787
788  012562                     CBOOT:  BRWRTE  IMM,200                 ;MASK FOR BOOT MODE
(1)            000276                  MICPC=MICPC+1
(1)  012562  000600                    <MOVE!WRTEBR!IMM!<200>>
(1)
789  012564                             SP      BR,AORB,SP1              ;IN PORT STATUS WORD
(1)            000277                  MICPC=MICPC+1
(1)  012564  063301                    <MOVE!SPX!BR!AORB!SP1>
(1)
790  012566                             BRWRTE  IMM,204                  ;MASK FOR OK TO SEND AND LINE IDLE
(1)            000300                  MICPC=MICPC+1
(1)  012566  000604                    <MOVE!WRTEBR!IMM!<204>>
(1)
791  012570                             SP      BR,SELB,SP10             ;IN LINE STATUS
(1)            000301                  MICPC=MICPC+1
(1)  012570  063230                    <MOVE!SPX!BR!SELB!SP10>
(1)
792  012572                             ALWAYS  INS12
(1)            000302                  MICPC=MICPC+1
(1)  012572  100670                    <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
(1)
```

```
                                .SBTTL  TBASRV--TRANSMITTER BUFFER ADDRESS SERVICE
012574                  TBASRV: LDMA    IMM,ETC                         ;GET POINTER TO END OF TMT CHAIN
(1)     000303                  MICPC=MICPC+1
(1)        001                  .IF IDN IMM,IMM
(1)     012574  010072          <MOVE!LDMAR!IMM!<ETC&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<ETC>>
(1)        000                  .ENDC
(1)
012576                          LDMA    MEMX,<SELB!SPX!SPO>             ;FIND THE LINK
(1)     000304                  MICPC=MICPC+1
(1)        001                  .IF IDN MEMX,IMM
(1)                             <MOVE!LDMAR!IMM!<SELB!SPX!SPO&377>>
(1)                             .IFF
(1)     012576  053220          <MOVE!LDMAR!MEMX!<SELB!SPX!SPO>>
(1)        000                  .ENDC
(1)
012600                          MEMINC  IMM,1                           ;BUFFER ASSIGNED IN IN LINK FLAGS
(1)     000305                  MICPC=MICPC+1
(1)     012600  016401          <MOVE!WRMEM!INCMAR!IMM!<1>>
(1)
012602                          BRWRTE  <IMM!INCMAR>,6                  ;POINT PAST NUMBER FIELD
(1)     000306                  MICPC=MICPC+1
(1)     012602  014406          <MOVE!WRTEBR!IMM!INCMAR!<6>>
(1)
                                                                        ;SET BR FOR ADDITION TO SPO
012604                          MEMINC  IBUS,PORT1
(1)     000307                  MICPC=MICPC+1
(1)     012604  136500          <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
(1)
012606                          MEMINC  IBUS,PORT2
(1)     000310                  MICPC=MICPC+1
(1)     012606  136520          <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
(1)
012610                          MEMINC  IBUS,PORT4
(1)     000311                  MICPC=MICPC+1
(1)     012610  136560          <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
(1)
012612                          MEMINC  IBUS,PORT3
(1)     000312                  MICPC=MICPC+1
(1)     012612  136540          <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
(1)
012614                          SP      BR,ADD,SPO                      ;OFFSET TO NEXT TRANSMIT LINK
(1)     000313                  MICPC=MICPC+1
(1)     012614  063000          <MOVE!SPX!BR!ADD!SPO>
(1)
012616                          BRWRTE  IMM,T                           ;LOAD BR WITH ADDRESS OF CHAIN END
(1)     000314                  MICPC=MICPC+1
(1)     012616  000553          <MOVE!WRTEBR!IMM!<T>>
(1)
012620                          LDMA    IMM,ETC
(1)     000315                  MICPC=MICPC+1
(1)        001                  .IF IDN IMM,IMM
(1)     012620  010072          <MOVE!LDMAR!IMM!<ETC&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<ETC>>
```

```
(1)                 000
(1)
807  012622
(1)            000316
(1)  012622    060360
(1)
808  012624
(1)            000317
(1)  012624    101724
(1)
809  012626
(1)            000320
(1)  012626    062600
(1)
810  012630
(1)            000321
(1)  012630    000402
(1)
811  012632
(1)            000322
(1)  012632    063310
(1)
812  012634
(1)            000323
(1)  012634    100670
(1)
813  012636
(1)            000324
(1)  012636    002473
(1)
814  012640
(1)            000325
(1)  012640    100721
(1)
```

```
        .ENDC

        CMP     BR,SPO                          ;END OF CHAIN?
        MICPC=MICPC+1
        <SUBTC!BR!SPO>

        Z       20$                             ;IF YES--BRANCH
        MICPC=MICPC+1
        <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>

        MEM     BR,SELA!SPO                     ;UPDATE THE END POINTER IN MEMORY
        MICPC=MICPC+1
        <MOVE!WRMEM!BR!<SELA!SPO>>

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

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

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

20$:    MEM     IMM,TML1                        ;WRAP IT AROUND
        MICPC=MICPC+1
        <MOVE!WRMEM!IMM!<TML1>>

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

```
  816
  817  012642                          RBASRV: LDMA    IMM,ERC                         ;ADDRES END OF RECEIVE CHAIN
  (1)            000326                        MICPC=MICPC+1
  (1)               001                        .IF IDN IMM,IMM
  (1)  012642  010023                          <MOVE!LDMAR!IMM!<ERC&377>>
  (1)                                          .IFF
  (1)                                          <MOVE!LDMAR!IMM!<ERC>>
  (1)               000                        .ENDC
  (1)
  818  012644                                  LDMA    MEMX,<SELB!SPX!SPO>             ;GET THE POINTER TO LINK
  (1)            000327                        MICPC=MICPC+1
  (1)               001                        .IF IDN MEMX,IMM
  (1)                                          <MOVE!LDMAR!IMM!<SELB!SPX!SPO&377>>
  (1)                                          .IFF
  (1)  012644  053220                          <MOVE!LDMAR!MEMX!<SELB!SPX!SPO>>
  (1)               000                        .ENDC
  (1)
  819  012646                                  MEMINC  IMM,1
  (1)            000330                        MICPC=MICPC+1
  (1)  012646  016401                          <MOVE!WRMEM!INCMAR!IMM!<1>>
  (1)
  820  012650                                  MEMINC  IBUS,PORT1
  (1)            000331                        MICPC=MICPC+1
  (1)  012650  136500                          <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
  (1)
  821  012652                                  MEMINC  IBUS,PORT2
  (1)            000332                        MICPC=MICPC+1
  (1)  012652  136520                          <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
  (1)
  822  012654                                  MEMINC  IBUS,PORT4
  (1)            000333                        MICPC=MICPC+1
  (1)  012654  136560                          <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
  (1)
  823  012656                                  MEMINC  IBUS,PORT3
  (1)            000334                        MICPC=MICPC+1
  (1)  012656  136540                          <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
  (1)
  824                                          ;;;;NOTE INVERTED ORDER OF PORT 3 AND PORT4
  825  012660                                  LDMA    IMM,ERC
  (1)            000335                        MICPC=MICPC+1
  (1)               001                        .IF IDN IMM,IMM
  (1)  012660  010023                          <MOVE!LDMAR!IMM!<ERC&377>>
  (1)                                          .IFF
  (1)                                          <MOVE!LDMAR!IMM!<ERC>>
  (1)               000                        .ENDC
  (1)
  826  012662                                  MEM     IMM,RCL1                ;ASSUME WRAP AROUND CASE
  (1)            000336                        MICPC=MICPC+1
  (1)  012662  002425                          <MOVE!WRMEM!IMM!<RCL1>>
  (1)
  827  012664                                  BRWRTE  IMM,RCL7                ;GET ADDRESS OF END OF CAHIN AREA
  (1)            000337                        MICPC=MICPC+1
  (1)  012664  000463                          <MOVE!WRTEBR!IMM!<RCL7>>
  (1)
  828  012666                                  CMP     BR,SPO                          ;CHECK FOR END
  (1)            000340                        MICPC=MICPC+1
```

```
                                        <SUBTC!BR!SP0>
                                        ;
829  012670                             Z       INS12                       ;IF EQUAL BRANCH
(1)             000341                  MICPC=MICPC+1
(1)  012670     101670                  <JUMP!ZCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
(1)
830  012672                             BRWRTE  IMM,5                       ;CALCULATE ADDRESS OF NEXT LINK
(1)             000342                  MICPC=MICPC+1
(1)  012672     000405                  <MOVE!WRTEBR!IMM!<5>>
(1)
831  012674                             MEM     BR,ADD!SP0                  ;..
(1)             000343                  MICPC=MICPC+1
(1)  012674     062400                  <MOVE!WRMEM!BR!<ADD!SP0>>
(1)
832  012676                             ALWAYS  INS12                       ;EXIT
(1)             000344                  MICPC=MICPC+1
(1)  012676     100670                  <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
(1)
833  012700                        RA1: BRWRTE  IMM,317                     ;MASK TO CLEAR START MODE AND CLR ACTIVE
(1)             000345                  MICPC=MICPC+1
(1)  012700     000717                  <MOVE!WRTEBR!IMM!<317>>
(1)
834  012702                             SPBR    BR,AANDB,SP10               ;CLEAR BIT IN LINE STATUS WORD
(1)             000346                  MICPC=MICPC+1
(1)  012702     063670                  <MOVE!SPBRX!BR!AANDB!SP10>
(1)
835  012704                        RA3: BRWRTE  IMM,0                       ;CLEAR BR
(1)             000347                  MICPC=MICPC+1
(1)  012704     000400                  <MOVE!WRTEBR!IMM!<0>>
(1)
836  012706                             SP      BR,SELB,SP13                ;SET NUMB MESSAGE TYPE IN SP13
(1)             000350                  MICPC=MICPC+1
(1)  012706     063233                  <MOVE!SPX!BR!SELB!SP13>
(1)
837  012710                             STATE   RCVB                        ;CHANGE RECEIVE STATE POINTER TO STATE B
(1)             000351                  MICPC=MICPC+1
(1)  012710     000424                  <MOVE!WRTEBR!IMM!<RCVB-INIT&777/2>>
838  012712                             ALWAYS  REXIT
(1)             000352                  MICPC=MICPC+1
(1)  012712     104422                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
(1)
839                                     ;
840  012714                   RTHRES:   BRWRTE  IMM,2
(1)             000353                  MICPC=MICPC+1
(1)  012714     000402                  <MOVE!WRTEBR!IMM!<2>>
(1)
841  012716                             ALWAYS  ERRXX
(1)             000354                  MICPC=MICPC+1
(1)  012716     114671                  <JUMP!ALCOND!<ERRXX-INIT&3000*4>!<ERRXX-INIT&777/2>>
(1)
842                                     ;
843                 001                 .IF NDF LOW
844                              RCVCK:  SPBR    IBUS,RCVCON,SP0                 ;READ RCVR CONTROL CSR
845                                      BRWRTE  BR,ADD!SP0                      ;SHIFT LEFT
846                                      BR7     I1
847                                      ALWAYS  TA1
```

```
    848                                 ACK:    BRWRTE  BR,AA!SP10             ;READ LINE STATUS SHIFTING LEFT
    849                                         BR4     5$                      ;IF START RECD--CLEAR START MODE
    850                                         ALWAYS  IDLE
    851                                 5$:     BRWRTE  IMM,327                         ;CLEAR START MODE
    852                                         SP      BR,AANDB,SP10                   ;IN LINE STATUS
    853                                         ALWAYS  IDLE
    854                 000                     .ENDC
```

```
   856  012720                  HDSEL:  BRWRTE  IMM,100                         ;HD MASK TO BR
   (1)          000355                  MICPC=MICPC+1
   (1)  012720  000500                  <MOVE!WRTEBR!IMM!<100>>
   (1)
   857  012722                          SP      BR,AORB,SP10                    ;UPDATE PORT STATUS WORD
   (1)          000356                  MICPC=MICPC+1
   (1)  012722  063310                  <MOVE!SPX!BR!AORB!SP10>
   (1)
   858  012724                          ALWAYS  INS11
   (1)          000357                  MICPC=MICPC+1
   (1)  012724  100666                  <JUMP!ALCOND!<INS11-INIT&3000*4>!<INS11-INIT&777/2>>
   (1)
   859                                  ;
   860  012726                  PE1:    BRWRTE  IMM,300                 ;MASK FOR INTERUPT AND VECTOR THROUGH X04
   (1)          000360                  MICPC=MICPC+1
   (1)  012726  000700                  <MOVE!WRTEBR!IMM!<300>>
   (1)
   861  012730                          SP      IBUS,UBBR,SP0           ;READ BR CONTROL REG
   (1)          000361                  MICPC=MICPC+1
   (1)  012730  123220                  <MOVE!SPX!IBUS!UBBR!SP0>
   (1)
   862  012732                          OUT     BR,<AORB!OBR>           ;INTERRUPT
   (1)          000362                  MICPC=MICPC+1
   (1)  012732  061311                  <MOVE!WROUTX!BR!<AORB!OBR>>
   (1)
   863             001                  .IF NDF $LOW
   864                                  ALWAYS  IDLE
   865             000                  .ENDC
   866             001                  .IF DF  $LOW
   867  012734                          ALWAYS  PINT2
   (1)          000363                  MICPC=MICPC+1
   (1)  012734  100634                  <JUMP!ALCOND!<PINT2-INIT&3000*4>!<PINT2-INIT&777/2>>
   (1)
   868             000                  .ENDC
   869                                  ;
   870  012736                  HALTED: MEMADR  EM6
   (1)          000364                  MICPC=MICPC+1
   (1)             001                  .IF B
   (1)  012736  002730                  <MOVE!WRMEM!<EM6-INIT&777/2>>
   (1)                                  .IFF
   (1)                                  <MOVE!WRMEM!!<EM6-INIT&777/2>>
   (1)             000                  .ENDC
   871                                                          ;FALL INTO ACLOW
   872  012740                  ACLOW:  BRWRTE  IMM,2                   ;CAUSE AN AC LOW
   (1)          000365                  MICPC=MICPC+1
   (1)  012740  000402                  <MOVE!WRTEBR!IMM!<2>>
   (1)
   873  012742                          OUT     BR,<SELB!OBR>
   (1)          000366                  MICPC=MICPC+1
   (1)  012742  061231                  <MOVE!WROUTX!BR!<SELB!OBR>>
   (1)
   874  012744                  5$:     BRWRTE  IBUS,UBBR               ;WAIT FOR IT TO COMPLETE
   (1)          000367                  MICPC=MICPC+1
   (1)  012744  120620                  <MOVE!WRTEBR!IBUS!<UBBR>>
   (1)
   875  012746                          BR1     5$
```

```
                    000370                          MICPC=MICPC+1
(1)   012746  102767                                <JUMP!BR1CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
876   012750                                        .ALWAY  MEMX,SELB,PAGE3
(1)                 000371                          MICPC=MICPC+1
(1)   012750  154620                                <JUMP!ALCOND!MEMX!SELB!PAGE3>
(1)
877   012752                                CKTIME: BRWRTE  IBUS,UBBR               ;READ BR CONTROL REG
(1)                 000372                          MICPC=MICPC+1
(1)   012752  120620                                <MOVE!WRTEBR!IBUS!<UBBR>>
(1)
878   012754                                        BR4     HALTED
(1)                 000373                          MICPC=MICPC+1
(1)   012754  103364                                <JUMP!BR4CON!<HALTED-INIT&3000*4>!<HALTED-INIT&777/2>>
(1)
879   012756                                        ALWAYS  EM1
(1)                 000374                          MICPC=MICPC+1
(1)   012756  114733                                <JUMP!ALCOND!<EM1-INIT&3000*4>!<EM1-INIT&777/2>>
(1)
880
881   012760                                TBU1:   BRWRTE  IBUS,NPR
(1)                 000375                          MICPC=MICPC+1
(1)   012760  120600                                <MOVE!WRTEBR!IBUS!<NPR>>
(1)
882   012762                                        BR0     IDLE
(1)                 000376                          MICPC=MICPC+1
(1)   012762  102045                                <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
883   012764                                        ALWAYS  EC2
(1)                 000377                          MICPC=MICPC+1
(1)   012764  114760                                <JUMP!ALCOND!<EC2-INIT&3000*4>!<EC2-INIT&777/2>>
(1)
884
```

```
                        012766                  .=INIT+1000
                        000377                  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 CHARACTE  R 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  101745                  <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  105421                  <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  105762                    <JUMP!ZCOND!<BOOT-INIT&3000*4>!<BOOT-INIT&777/2>>
   (1)
   905  013020                    FLUSH:  OUTPUT  IMM,<200!ORCVC0>        ;FLUSH THE INPUT SILO
   (1)          000415                    MICPC=MICPC+1
   (1)  013020  002212                    <MOVE!WROUT!IMM!<200!ORCVC0>>
   (1)
   906  013022                            BRWRTE  IMM,357                 ;MASK TO CLEAR--CLEAR ACTIVE
   (1)          000416                    MICPC=MICPC+1
   (1)  013022  000757                    <MOVE!WRTEBR!IMM!<357>>
   (1)
   907  013024                            SP      BR,AANDB,SP10           ;IN LINE STATUS WORD
   (1)          000417                    MICPC=MICPC+1
   (1)  013024  063270                    <MOVE!SPX!BR!AANDB!SP10>
   (1)
   908  013026                            ALWAYS  RM1                     ;SET STATE TO RCVA AND RETURN TO IDLE
   (1)          000420                    MICPC=MICPC+1
   (1)  013026  114662                    <JUMP!ALCOND!<RM1-INIT&3000*4>!<RM1-INIT&777/2>>
   (1)
   909  013030                    RA2:    STATE   RCVI                    ;CHANGE RECEIVE STATE TO I
   (1)          000421                    MICPC=MICPC+1
   (1)  013030  000700                    <MOVE!WRTEBR!IMM!<RCVI-INIT&777/2>>
   910             001                    .IF NDF LOW
   911                                    ALWAYS  REXIT
   912             000                    .ENDC
   913             001                    .IF DF  LOW
   914  013032                    REXIT:  SP      BR,SELB,SP3
   (1)          000422                    MICPC=MICPC+1
   (1)  013032  063223                    <MOVE!SPX!BR!SELB!SP3>
   (1)
   915  013034                            ALWAYS  IDLE
   (1)          000423                    MICPC=MICPC+1
   (1)  013034  100445                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
   (1)
   916             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    IMM,LRC                         ;LOAD ADDRESS OF START OF RECV  CHAIN
(1)     000425                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)     013040  010024                  <MOVE!LDMAR!IMM!<LRC&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<LRC>>
(1)        000                          .ENDC
(1)
013042                                  SP      MEMX!LDMAR,SELB,SP14            ;COPY POINTER TO SP14
(1)     000426                          MICPC=MICPC+1
(1)     013042  053234                  <MOVE!SPX!MEMX!LDMAR!SELB!SP14>
(1)
                                                                        ;AND LOAD MAR WITH ADDRESS OF CURRENT BA
013044                                  BRWRTE  MEMX,INCMAR!SELB                ;READ FLAGS BYTE
(1)     000427                          MICPC=MICPC+1
(1)     013044  054620                  <MOVE!WRTEBR!MEMX!<INCMAR!SELB>>
(1)
013046                                  BRO     RB1                             ;RECV BUFFER ASSIGNED---CONTINUE
(1)     000430                          MICPC=MICPC+1
(1)     013046  106042                  <JUMP!BROCON!<RB1-INIT&3000*4>!<RB1-INIT&777/2>>
(1)
013050                                  BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
(1)     000431                          MICPC=MICPC+1
(1)     013050  060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
013052                                  BR7     RB3                             ;MAINT MODE
(1)     000432                          MICPC=MICPC+1
(1)     013052  107440                  <JUMP!BR7CON!<RB3-INIT&3000*4>!<RB3-INIT&777/2>>
(1)
013054                                  LDMA    IMM,T                   ;ERROR--LOAD TYPE FIELD ADDRESS IN MAR
(1)     000433                          MICPC=MICPC+1
(1)        001                          .IF IDN IMM,IMM
(1)     013054  010153                  <MOVE!LDMAR!IMM!<T&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<T>>
(1)        000                          .ENDC
(1)
013056                                  MEMINC  IMM,2                   ;LOAD NAK TYPE
(1)     000434                          MICPC=MICPC+1
(1)     013056  016402                  <MOVE!WRMEM!INCMAR!IMM!<2>>
(1)
013060                                  MEM     IMM,310                 ;LOAD SUB-TYPE NO BUFFERS
(1)     000435                          MICPC=MICPC+1
(1)     013060  002710                  <MOVE!WRMEM!IMM!<310>>
(1)
013062                                  LDMA    IMM,NTLS
(1)     000436                          MICPC=MICPC+1
```

```
(1)                 001
(1)  013062  010012
(1)
(1)
(1)                 000
(1)
935  013064
(1)            000437
(1)  013064  104557
(1)
936  013066
(1)            000440
(1)  013066  000404
(1)
937  013070
(1)            000441
(1)  013070  063301
(1)
938  013072
(1)            000442
(1)  013072  000462
939  013074
(1)            000443
(1)  013074  063223
(1)
940  013076
(1)            000444
(1)  013076  056226
(1)
941  013100
(1)            000445
(1)  013100  056227
(1)
942  013102
(1)            000446
(1)  013102  123220
(1)
943  013104
(1)            000447
(1)  013104  000501
(1)
944  013106
(1)            000450
(1)  013106  063260
(1)
945  013110
(1)            000451
(1)  013110  003305
(1)
946
947
948  013112
(1)            000452
(1)  013112  040665
(1)
949  013114
```

```
                .IF IDN IMM,IMM
                <MOVE!LDMAR!IMM!<NTLS&377>>
                .IFF
                <MOVE!LDMAR!IMM!<NTLS>>
                .ENDC

                ALWAYS  RH5                     ;BRANCH TO SEND NAK ROUTINE
                MICPC=MICPC+1
                <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>

RB3:            BRWRTE  IMM,4                   ;MASK FOR NO BUFFER AVAILABLE
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<4>>

                SP      BR,AORB,SP1             ;SET THE FLAG
                MICPC=MICPC+1
                <MOVE!SPX!BR!AORB!SP1>

RB1:            STATE   RCVC
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<RCVC-INIT&777/2>>
RB0:            SP      BR,SELB,SP3
                MICPC=MICPC+1
                <MOVE!SPX!BR!SELB!SP3>

                OUTPUT  <MEMX!INCMAR>,<SELB!OBA1>       ;OUTPUT LOW ORDER BYTE OF ADDRESS
                MICPC=MICPC+1
                <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA1>>

                OUTPUT  MEMX!INCMAR,<SELB!OBA2> ;OUTPUT HIGH BYTE OF ADDRESS
                MICPC=MICPC+1
                <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA2>>

                SP      IBUS,UBBR,SP0           ;READ THE BUS REQ REGISTER
                MICPC=MICPC+1
                <MOVE!SPX!IBUS!UBBR!SP0>

                BRWRTE  IMM,101                 ;MASK OFF ALL BUT NXM AND VEC4 BITS
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<101>>

                SP      BR,AANDB,SP0            ;AND SAVE IN SP0
                MICPC=MICPC+1
                <MOVE!SPX!BR!AANDB!SP0>

                SP      IMM,300,SP5             ;MASK TO ISOLATE EX. MEM BITS
                MICPC=MICPC+1
                <MOVE!SPX!IMM!300!SP5>

                                                ;NOTE THIS REALLY WRITES A 305 BUT THE
                                                ;5 GETS SHIFTED OUT
                BRWRTE  MEMX,AANDB!SP5          ;MASK ALL BUT EX. MEM BITS
                MICPC=MICPC+1
                <MOVE!WRTEBR!MEMX!<AANDB!SP5>>

                BRSHFT                          ;SHIFT THEM INTO THE CORRECT POSITION
```

```
(1)             000453                  MICPC=MICPC+1
(1)  013114     001620                  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
950  013116                             BRSHFT
(1)             000454                  MICPC=MICPC+1
(1)  013116     001620                  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
951  013120                             BRSHFT
(1)             000455                  MICPC=MICPC+1
(1)  013120     001620                  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
952  013122                             BRSHFT
(1)             000456                  MICPC=MICPC+1
(1)  013122     001620                  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
953  013124                             OUT     BR,AORB!OBR                     ;WRITE EX MEM BITS OUT
(1)             000457                  MICPC=MICPC+1
(1)  013124     061311                  <MOVE!WROUTX!BR!<AORB!OBR>>
(1)
954  013126                             ALWAYS  IDLE
(1)             000460                  MICPC=MICPC+1
(1)  013126     100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
955  013130                        RB2: ALWAYS  I2
(1)             000461                  MICPC=MICPC+1
(1)  013130     100454                  <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
                                        ;
013132                          RCVC:   ALWAYS  SELQSY                  ;"CALL" SELECT/QSYNC SUBROUTINE
(1)     000462                          MICPC=MICPC+1
(1)  013132  114470                     <JUMP!ALCOND!<SELQSY-INIT&3000*4>!<SELQSY-INIT&777/2>>
(1)
013134                                  LDMA    BR,<SELA!SP14>          ;LOAD ADDRESS OF CURRENT COUNT
(1)     000463                          MICPC=MICPC+1
(1)        001                          .IF IDN BR,IMM
(1)                                     <MOVE!LDMAR!IMM!<SELA!SP14&377>>
(1)                                     .IFF
(1)  013134  070214                     <MOVE!LDMAR!BR!<SELA!SP14>>
(1)        000                          .ENDC
(1)
013136                                  BRWRTE  BR!INCMAR,SELA!SP1      ;READ STATUS BYTE
(1)     000464                          MICPC=MICPC+1
(1)  013136  074601                     <MOVE!WRTEBR!BR!INCMAR!<SELA!SP1>>
(1)
013140                                  BRWRTE  SHFTBR!INCMAR,SELB      ;SHIFT IT RIGHT
(1)     000465                          MICPC=MICPC+1
(1)  013140  015620                     <MOVE!WRTEBR!SHFTBR!INCMAR!<SELB>>
(1)
013142                                  BR1     RC5                     ;NO BUFFER ASSIGNED IN MAINT MODE
(1)     000466                          MICPC=MICPC+1
(1)  013142  106475                     <JUMP!BR1CON!<RC5-INIT&3000*4>!<RC5-INIT&777/2>>
(1)
013144                                  BRWRTE  IMM!INCMAR,77           ;MASK FOR COUNT BITS
(1)     000467                          MICPC=MICPC+1
(1)  013144  014477                     <MOVE!WRTEBR!IMM!INCMAR!<77>>
(1)
013146                                  SP      MEMX!INCMAR,SELB,SPO    ;COPY HIGH BYTE OF COUNT TO SPO
(1)     000470                          MICPC=MICPC+1
(1)  013146  057220                     <MOVE!SPX!MEMX!INCMAR!SELB!SPO>
(1)
013150                                  BRWRTE  BR,AANDB!SPO            ;MASK TO BR
(1)     000471                          MICPC=MICPC+1
(1)  013150  060660                     <MOVE!WRTEBR!BR!<AANDB!SPO>>
(1)
013152                                  CMP     BR,SP5          ;COMPARE HIGH ORDER BITS OF COUNT
(1)     000472                          MICPC=MICPC+1
(1)  013152  060365                     <SUBTC!BR!SP5>
(1)
013154                                  C       RCFATL                  ;IF CARRY--TOO BIG ERROR
(1)     000473                          MICPC=MICPC+1
(1)  013154  115116                     <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
(1)
013156                                  Z       RCLOW                   ;IF EQUAL COMPARE LOW ORDER BITS OF COUNT
(1)     000474                          MICPC=MICPC+1
(1)  013156  115513                     <JUMP!ZCOND!<RCLOW-INIT&3000*4>!<RCLOW-INIT&777/2>>
(1)
013160                          RC5:    STATE   RCVD                    ;SET NEXT STATE TO D
(1)     000475                          MICPC=MICPC+1
(1)  013160  000477                     <MOVE!WRTEBR!IMM!<RCVD-INIT&777/2>>
```

```
   974  013162                          ALWAYS  REXIT
   (1)          000476                 MICPC=MICPC+1
   (1)  013162  104422                 <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
   (1)
```

```
                        .SBTTL  RCVD--ROUTINE TO HANDLE RESPONSE FIELD FOR NUMBERED MESSAGES
                        ;
RCVD:   SP      BR,DECA,SP4             ;DECREMENTLOW BYTE OF COUNT
                MICPC=MICPC+1
                <MOVE!SPX!BR!DECA!SP4>

        C       RD3                     ;NO OVERFLOW
                MICPC=MICPC+1
                <JUMP!CCOND!<RD3-INIT&3000*4>!<RD3-INIT&777/2>>

        SP      BR,DECA,SP5             ;OVERFLOW - DECREMENT HIGH BYTE
                MICPC=MICPC+1
                <MOVE!SPX!BR!DECA!SP5>

RD3:    STATE   RCVE
                MICPC=MICPC+1
                <MOVE!WRTEBR!IMM!<RCVE-INIT&777/2>>
RD2:    SP      BR,SELB,SP3             ;SAVE THE STATE
                MICPC=MICPC+1
                <MOVE!SPX!BR!SELB!SP3>

        SPBR    IBUS,RCVDAT,SP0         ;INPUT THE CHARACTER
                MICPC=MICPC+1
                <MOVE!SPBRX!IBUS!RCVDAT!SP0>

        BRWRTE  BR,SUB!SP17             ;COMPARE NEW R TO LAST R
                MICPC=MICPC+1
                <MOVE!WRTEBR!BR!<SUB!SP17>>

        BR7     10$                     ;IF NEW IS GREATER---PROCESS
                MICPC=MICPC+1
                <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>

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

10$:    BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
                MICPC=MICPC+1
                <MOVE!WRTEBR!BR!<SELA!SP1>>

        BR7     IDLE                    ;MAINT. MODE - GET OUT
                MICPC=MICPC+1
                <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>

        BRWRTE  BR,SELA!SP10
                MICPC=MICPC+1
                <MOVE!WRTEBR!BR!<SELA!SP10>>

        BRSHFT
                MICPC=MICPC+1
                <MOVE!SHFTBR!WRTEBR!SELB>

        BR4     IDLE
                MICPC=MICPC+1
                <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

```
(1)
992  013220                          LDMA    IMM,ISP17               ;ADDRESS LAST ACKED IMAGE
(1)            000515                MICPC=MICPC+1
(1)               001                .IF IDN IMM,IMM
(1)  013220    010155                <MOVE!LDMAR!IMM!<ISP17&377>>
(1)                                  .IFF
(1)                                  <MOVE!LDMAR!IMM!<ISP17>>
(1)                 000              .ENDC
(1)
993  013222                          MEM     BR,SELA!SPO             ;COPY THE CHAR
(1)            000516                MICPC=MICPC+1
(1)  013222    062600                <MOVE!WRMEM!BR!<SELA!SPO>>
(1)
994  013224                    RD5:  BRWRTE  IMM,REPST!LDMAR         ;SET UP COUNT FOR TIMER
(1)            000517                MICPC=MICPC+1
(1)  013224    010403                <MOVE!WRTEBR!IMM!<REPST!LDMAR>>
(1)
995                                                                  ;****DEPENDENT ON REPST = 2
996  013226                          MEM     IMM,1                   ;RESET REP THRESHOLD
(1)            000520                MICPC=MICPC+1
(1)  013226    002401                <MOVE!WRMEM!IMM!<1>>
(1)
997  013230                          SP      BR,SELB,SP15            ;RESET THE COUNT
(1)            000521                MICPC=MICPC+1
(1)  013230    063235                <MOVE!SPX!BR!SELB!SP15>
(1)
998  013232                          ALWAYS  IDLE
(1)            000522                MICPC=MICPC+1
(1)  013232    100445                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
```

```
                        .SBTTL  RCVE--ROUTINE TO HANDLE N FIELD OF NUMBERED MESSAGE
                        ;
013234          RCVE:   BRWRTE  BR,SELA!SP1             ;READ THE STATUS BYTE
(1)     000523          MICPC=MICPC+1
(1)     013234  060601  <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
013236                  BR7     RCVQ
(1)     000524          MICPC=MICPC+1
(1)     013236  107713  <JUMP!BR7CON!<RCVQ-INIT&3000*4>!<RCVQ-INIT&777/2>>
(1)
013240                  BRWRTE  IBUS,RCVDAT             ;INPUT THE CHARACTER
(1)     000525          MICPC=MICPC+1
(1)     013240  020600  <MOVE!WRTEBR!IBUS!<RCVDAT>>
(1)
013242                  CMP     BR,SP11
(1)     000526          MICPC=MICPC+1
(1)     013242  060371  <SUBTC!BR!SP11>
(1)
013244                  Z       5$
(1)     000527          MICPC=MICPC+1
(1)     013244  105532  <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
(1)
013246                  SP      BR,DECA,SP13            ;FORCE MSG TYPE TO -1
(1)     000530          MICPC=MICPC+1
(1)     013246  063173  <MOVE!SPX!BR!DECA!SP13>
(1)
013250                  ALWAYS  RE2
(1)     000531          MICPC=MICPC+1
(1)     013250  104533  <JUMP!ALCOND!<RE2-INIT&3000*4>!<RE2-INIT&777/2>>
(1)
013252          5$:     SP      BR,INCA,SP11            ;UPDATE R FIELD
(1)     000532          MICPC=MICPC+1
(1)     013252  063071  <MOVE!SPX!BR!INCA!SP11>
(1)
013254          RE2:    STATE   RCVF                    ;NEXT RECEIVE STATE IS F
(1)     000533          MICPC=MICPC+1
(1)     013254  000535  <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
013256                  ALWAYS  REXIT
(1)     000534          MICPC=MICPC+1
(1)     013256  104422  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
(1)
```

```
 1013
 1014  013260                        .SBTTL  RCVF--ROUTINE TO IGNORE ADDRESS
013260  000535  RCVF:   STATE   RCVG
                       MICPC=MICPC+1
013260  000540         <MOVE!WRTEBR!IMM!<RCVG-INIT&777/2>>
 1015  013262  RCVF1:  NOP     IBUS,RCVDAT,0           ;INPUT CHARACTER - AND DISCARD
013262  020200         MICPC=MICPC+1
                       <IBUS!RCVDAT!0>

 1016  013264         ALWAYS  REXIT
013264  000537         MICPC=MICPC+1
013264  104422         <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>

 1017                  ;
 1018                  .SBTTL  RCVG--ROUTINE TO IGNORE CRC1
 1019                  ;
 1020  013266  RCVG:   STATE   RCVH                    ;NEXT STATE IS RCVH
013266  000540         MICPC=MICPC+1
013266  000542         <MOVE!WRTEBR!IMM!<RCVH-INIT&777/2>>
 1021  013270         ALWAYS  RCVF1
013270  000541         MICPC=MICPC+1
013270  104536         <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
```

```
1023
1024
1025  013272
1026  013272
 (1)            000542
 (1)  013272    023200
 (1)
1027  013274
 (1)            000543
 (1)  013274    020640
 (1)
1028  013276
 (1)            000544
 (1)  013276    116167
 (1)
1029  013300
 (1)            000545
 (1)  013300    060601
 (1)
1030  013302
 (1)            000546
 (1)  013302    107751
 (1)
1031  013304
 (1)            000547
 (1)  013304    060610
 (1)
1032  013306
 (1)            000550
 (1)  013306    001620
 (1)
1033  013310
 (1)            000551
 (1)  013310    117315
 (1)
1034  013312
 (1)            000552
 (1)               001
 (1)  013312    010153
 (1)
 (1)
 (1)               000
 (1)
1035  013314
 (1)            000553
 (1)  013314    016402
 (1)
1036  013316
 (1)            000554
 (1)  013316    016701
 (1)
1037  013320
 (1)            000555
 (1)  013320    062617
 (1)
1038  013322
```

```
        .SBTTL  RCVH--ROUTINE TO HANDLE CRC2 AND TO DISPATCH NUMBERED AND UNNUMBERED TYP
        ;
RCVH:
        SP      IBUS,RCVDAT,SPO                 ;GET CHAR IN SPO
        MICPC=MICPC+1
        <MOVE!SPX!IBUS!RCVDAT!SPO>

        BRWRTE  IBUS,RCVCON                     ;READ RECVR CONTROL REGISTER
        MICPC=MICPC+1
        <MOVE!WRTEBR!IBUS!<RCVCON>>

        BRO     TDON1                           ;IF BCC MATCH SET CRC IS GOOD
        MICPC=MICPC+1
        <JUMP!BROCON!<TDON1-INIT&3000*4>!<TDON1-INIT&777/2>>

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

        BR7     RHX                             ;MAINT MODE
        MICPC=MICPC+1
        <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>

        BRWRTE  DP,<SELA!SP10>          ;READ PORT STATUS WORD TO BR
        MICPC=MICPC+1
        <MOVE!WRTEBR!DP!<SELA!SP10>>

        BRSHFT
        MICPC=MICPC+1
        <MOVE!SHFTBR!WRTEBR!SELB>

        BR4     SNAK1                   ;IF START MODE--PROCEED TO RESEND START
        MICPC=MICPC+1
        <JUMP!BR4CON!<SNAK1-INIT&3000*4>!<SNAK1-INIT&777/2>>

        LDMA    IMM,T                           ;ELSE BCC ERROR--LOAD ADDRESS OF TYPE FI
        MICPC=MICPC+1
        .IF IDN IMM,IMM
        <MOVE!LDMAR!IMM!<T&377>>
        .IFF
        <MOVE!LDMAR!IMM!<T>>
        .ENDC

        MEMINC  IMM,2                           ;WRITE NAK TYPE
        MICPC=MICPC+1
        <MOVE!WRMEM!INCMAR!IMM!<2>>

        MEMINC  IMM,301                         ;WRITE HEADER BCC ERROR SUBTYPE
        MICPC=MICPC+1
        <MOVE!WRMEM!INCMAR!IMM!<301>>

        MEM     BR,SELA!SP17            ;RESTORE LAST ACKED  IMAGE
        MICPC=MICPC+1
        <MOVE!WRMEM!BR!<SELA!SP17>>

        LDMA    IMM,NHDS                ;ADDRESS CUM ERROR COUNTER
```

```
                                        MICPC=MICPC+1
                                        .IF IDN IMM,IMM
(1)  013322  010013                     <MOVE!LDMAR!IMM!<NHDS&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<NHDS>>
(1)  000                                .ENDC

1039 013324                     RH5:    SP      MEMX,SELB,SPD           ;WRITE IT TO SPD
(1)  000557                             MICPC=MICPC+1
(1)  013324  043220                     <MOVE!SPX!MEMX!SELB!SPD>

1040 013326                             MEM     BR,INCA!SPD             ;INCREMENT IT
(1)  000560                             MICPC=MICPC+1
(1)  013326  062460                     <MOVE!WRMEM!BR!<INCA!SPD>>

1041 013330                             LDMA    IMM,NAKST               ;ADDRESS NAKS TMTED DYNAMIC
(1)  000561                             MICPC=MICPC+1
                                        .IF IDN IMM,IMM
(1)  013330  010001                     <MOVE!LDMAR!IMM!<NAKST&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<NAKST>>
(1)  000                                .ENDC

1042 013332                             BRWRTE  MEMX,SELB               ;WRITE IT TO BR
(1)  000562                             MICPC=MICPC+1
(1)  013332  040620                     <MOVE!WRTEBR!MEMX!<SELB>>

1043 013334                             BSHFTB                          ;SHIFT IT RIGHT
(1)  000563                             MICPC=MICPC+1
(1)  013334  061620                     <MOVE!SHFTBR!SELB!BR>

1044 013336                             MEM     BR,SELB                 ;UPDATE IT
(1)  000564                             MICPC=MICPC+1
(1)  013336  062620                     <MOVE!WRMEM!BR!<SELB>>

1045 013340                             BRO     NTHRES                  ;BRANCH IF THRESHOLD EXCEEDED
(1)  000565                             MICPC=MICPC+1
(1)  013340  116264                     <JUMP!BROCON!<NTHRES-INIT&3000*4>!<NTHRES-INIT&777/2>>

1046 013342                             ALWAYS  SNAK
(1)  000566                             MICPC=MICPC+1
(1)  013342  114712                     <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>

1047 013344                     RH3:    BRWRTE  DP,<DECA!SP13>          ;LOAD TYPE RECEIVED--DECREMENTING
(1)  000567                             MICPC=MICPC+1
(1)  013344  060573                     <MOVE!WRTEBR!DP!<DECA!SP13>>

1048 013346                             Z       RH1                     ;IF ALUOUT IS ALL ONES IS NUMBERED MSG
(1)  000570                             MICPC=MICPC+1
(1)  013346  115505                     <JUMP!ZCOND!<RH1-INIT&3000*4>!<RH1-INIT&777/2>>

1049 013350                             RSTATE  RCVA
(1)  000571                             MICPC=MICPC+1
(1)  013350  000400                     <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
(1)  000572                             MICPC=MICPC+1
(1)  013352  063223                     <MOVE!SPX!BR!SELB!SP3>
```

```
 1050  013354                          BRWRTE  DP,<SELA!SP10>                  ;LOAD LINE STATUS WORD IN BR
  (1)          000573                  MICPC=MICPC+1
  (1)  013354  060610                  <MOVE!WRTEBR!DP!<SELA!SP10>>
  (1)
 1051  013356                          BR4     FLUSH1
  (1)          000574                  MICPC=MICPC+1
  (1)  013356  117040                  <JUMP!BR4CON!<FLUSH1-INIT&3000*4>!<FLUSH1-INIT&777/2>>
  (1)
 1052  013360                  CG1:    BRSHFT                                  ;SHIFT RIGHT
  (1)          000575                  MICPC=MICPC+1
  (1)  013360  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
  (1)
 1053  013362                          BR4     10$
  (1)          000576                  MICPC=MICPC+1
  (1)  013362  107204                  <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
  (1)
 1054  013364                          LDMA    IMM,TYPTAB                      ;ADDRESS TYPE TABLE
  (1)          000577                  MICPC=MICPC+1
  (1)             001                  .IF IDN IMM,IMM
  (1)  013364  010163                  <MOVE!LDMAR!IMM!<TYPTAB&377>>
  (1)                                  .IFF
  (1)                                  <MOVE!LDMAR!IMM!<TYPTAB>>
  (1)             000                  .ENDC
  (1)
 1055  013366                          CMP     <MEMX!INCMAR>,SP13
  (1)          000600                  MICPC=MICPC+1
  (1)  013366  054373                  <SUBTC!MEMX!INCMAR!SP13>
  (1)
 1056  013370                          Z       REP
  (1)          000601                  MICPC=MICPC+1
  (1)  013370  115404                  <JUMP!ZCOND!<REP-INIT&3000*4>!<REP-INIT&777/2>>
  (1)
 1057  013372                          CMP     <MEMX!INCMAR>,SP13
  (1)          000602                  MICPC=MICPC+1
  (1)  013372  054373                  <SUBTC!MEMX!INCMAR!SP13>
  (1)
 1058  013374                          Z       NAK
  (1)          000603                  MICPC=MICPC+1
  (1)  013374  115443                  <JUMP!ZCOND!<NAK-INIT&3000*4>!<NAK-INIT&777/2>>
  (1)
 1059  013376                  10$:    LDMA    IMM,TYPSTT                      ;SET POINTER TO START TYPE
  (1)          000604                  MICPC=MICPC+1
  (1)             001                  .IF IDN IMM,I...
  (1)  013376  010165                  <MOVE!LDMAR!I...  TYPSTT&377>>
  (1)                                  .IFF
  (1)                                  <MOVE!LDMAR!IMM!<TYPSTT>>
  (1)             000                  .ENDC
  (1)
 1060  013400                          CMP     <MEMX!INCMAR>,SP13
  (1)          000605                  MICPC=MICPC+1
  (1)  013400  054373                  <SUBTC!MEMX!INCMAR!SP13>
  (1)
 1061  013402                          Z       START
  (1)          000606                  MICPC=MICPC+1
  (1)  013402  115413                  <JUMP!ZCOND!<START-INIT&3000*4>!<START-INIT&777/2>>
  (1)
```

```
1062  '
1063  013404                                    CMP     <MEMX!INCMAR>,SP13                      ;STACK TYPE
 (1)          000607                           MICPC=MICPC+1
 (1)  013404  054373                           <SUBTC!MEMX!INCMAR!SP13>
 (1)
1064  013406                                    Z       STACK
 (1)          000610                           MICPC=MICPC+1
 (1)  013406  115425                           <JUMP!ZCOND!<STACK-INIT&3000*4>!<STACK-INIT&777/2>>
 (1)
1065  013410                                    CMP     <MEMX!INCMAR>,SP13      ;ACK TYPE
 (1)          000611                           MICPC=MICPC+1
 (1)  013410  054373                           <SUBTC!MEMX!INCMAR!SP13>
 (1)
1066  013412                                    Z       ACK
 (1)          000612                           MICPC=MICPC+1
 (1)  013412  105620                           <JUMP!ZCOND!<ACK-INIT&3000*4>!<ACK-INIT&777/2>>
 (1)
1067  013414                                    ALWAYS  IDLE                                    ;OTHERWISE IGNORE--MUST BE OBS MSG
 (1)          000613                           MICPC=MICPC+1
 (1)  013414  100445                           <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1068                 001                      .IF DF  LOW
1069  013416                          RCVCK:   SPBR    IBUS,RCVCON,SP0                         ;READ RCVR CONTROL CSR
 (1)          000614                           MICPC=MICPC+1
 (1)  013416  023640                           <MOVE!SPBRX!IBUS!RCVCON!SP0>
 (1)
1070  013420                                    BRWRTE  BR,ADD!SP0                              ;SHIFT LEFT
 (1)          000615                           MICPC=MICPC+1
 (1)  013420  060400                           <MOVE!WRTEBR!BR!<ADD!SP0>>
 (1)
1071  013422                                    BR7     I1
 (1)          000616                           MICPC=MICPC+1
 (1)  013422  103452                           <JUMP!BR7CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1072  013424                                    ALWAYS  TA1
 (1)          000617                           MICPC=MICPC+1
 (1)  013424  110405                           <JUMP!ALCOND!<TA1-INIT&3000*4>!<TA1-INIT&777/2>>
 (1)
1073  013426                          ACK:     BRWRTE  BR,AA!SP10                              ;READ LINE STATUS-SHIFTING LEFT
 (1)          000620                           MICPC=MICPC+1
 (1)  013426  060530                           <MOVE!WRTEBR!BR!<AA!SP10>>
 (1)
1074  013430                                    BR4     5$                                      ;IF START RECD -- CLEAR START MODE
 (1)          000621                           MICPC=MICPC+1
 (1)  013430  107223                           <JUMP!BR4CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
 (1)
1075  013432                                    ALWAYS  IDLE
 (1)          000622                           MICPC=MICPC+1
 (1)  013432  100445                           <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1076  013434                          5$:      BRWRTE  IMM,327                                 ;CLEAR START MODE
 (1)          000623                           MICPC=MICPC+1
 (1)  013434  000727                           <MOVE!WRTEBR!IMM!<327>>
 (1)
1077  013436                                    SP      BR,AANDB,SP10                           ;IN LINE STATUS
 (1)          000624                           MICPC=MICPC+1
```

```
  (1)  013436  063270                    <MOVE!SPX!BR!AANDB!SP1G>
  (1)
1078   013440                            ALWAYS  RD5
  (1)          000625                    MICPC=MICPC+1
  (1)  013440  104517                    <JUMP!ALCOND!<RD5-INIT&3000*4>!<RD5-INIT&777/2>>
  (1)
1079           000                       .ENDC
```

```
1081
1082                    ;******************TIME CRITICAL CODE-- CHANGE WITH GREAT CARE*********************
1083  013442                        .SBTTL  RCVK01--ROUTINE TO HANDLE FIRST BYTE ODD RECEIVE
RCVK01: SPBR    IBUS,NPR,SPO                    ;READ NPR REGISTER
 (1)            000626          MICPC=MICPC+1
 (1)  013442    123600          <MOVE!SPBRX!IBUS!NPR!SPO>
 (1)
1084  013444
        BRO     IDLE
 (1)            000627          MICPC=MICPC+1
 (1)  013444    102045          <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1085  013446
        BRWRTE  IMM,200                         ;MASK FOR CO(BYTE TRANSFER)
 (1)            000630          MICPC=MICPC+1
 (1)  013446    000600          <MOVE!WRTEBR!IMM!<200>>
 (1)
1086  013450
        OUT     BR,<AORB!ONPR>                  ;TURN ON CO
 (1)            000631          MICPC=MICPC+1
 (1)  013450    061310          <MOVE!WROUTX!BR!<AORB!ONPR>>
 (1)
1087  013452
        STATE   RKE1
 (1)            000632          MICPC=MICPC+1
 (1)  013452    000670          <MOVE!WRTEBR!IMM!<RKE1-INIT&777/2>>
1088  013454
        ALWAYS  RCVK02
 (1)            000633          MICPC=MICPC+1
 (1)  013454    104637          <JUMP!ALCOND!<RCVK02-INIT&3000*4>!<RCVK02-INIT&777/2>>
 (1)
1089                    .SBTTL  RCVK0--PROCESS ODD CHARACTER
1090       001          .IF NDF LOW
1091                    RCVK0:  STATE   RCVKE
1092                    RCVK02: SP      BR,SELB,SP3                     ;SET STATE
1093                            OUTPUT  IBUS,RCVDAT!OUTDA2              ;OUT CHAR TO BUFFER
1094                    RK2:    SPBR    IBUS,NPR,SPO                    ;NPR BUSY
1095                            BRO     RK1                             ;IF SO GET READY TO GO
1096       000                  .ENDC
1097       001                  .IF DF  LOW
1098  013456            RCVK0:  SPBR    IBUS,NPR,SPO                    ;IS AN NPR GOING
 (1)            000634          MICPC=MICPC+1
 (1)  013456    123600          <MOVE!SPBRX!IBUS!NPR!SPO>
 (1)
1099  013460
        BRO     IDLE                            ;IF SO --- GET OUT
 (1)            000635          MICPC=MICPC+1
 (1)  013460    102045          <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1100  013462
        STATE   RCVKE
 (1)            000636          MICPC=MICPC+1
 (1)  013462    000645          <MOVE!WRTEBR!IMM!<RCVKE-INIT&777/2>>
1101  013464           RCVK02:  SP      BR,SELB,SP3                     ;SET STATE
 (1)            000637          MICPC=MICPC+1
 (1)  013464    063223          <MOVE!SPX!BR!SELB!SP3>
 (1)
1102  013466
        OUTPUT  IBUS,RCVDAT!OUTDA2              ;OUTPUT A CHAR
 (1)            000640          MICPC=MICPC+1
 (1)  013466    022203          <MOVE!WROUT!IBUS!<RCVDAT!OUTDA2>>
 (1)
1103  013470           RK2:
1104       000                  .ENDC
1105  013470           RK8:     BRWRTE  IMM,21                          ;SET OUT NPR (C1) AND NPR REQ
```

```
 (1)            000641                  MICPC=MICPC+1
 (1)  013470    000421                  <MOVE!WRTEBR!IMM!<21>>
 (1)
1106  013472                            SP      IBUS,NPR,SPO                    ;READ NPR REGISTER
 (1)            000642                  MICPC=MICPC+1
 (1)  013472    123200                  <MOVE!SPX!IBUS!NPR!SPO>
 (1)
1107  013474                      RK7:  OUT     BR,<AORB!ONPR>                  ;WRITE NPR REGISTER
 (1)            000643                  MICPC=MICPC+1
 (1)  013474    061310                  <MOVE!WROUTX!BR!<AORB!ONPR>>
 (1)
1108  013476                            ALWAYS  IDLE
 (1)            000644                  MICPC=MICPC+1
 (1)  013476    100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1109               001                  .IF NDF LOW
1110                            RK1:    LDMA    IMM,OSTATE                      ;LOAD POINTER TO OLD STATE STACK
1111                                    MEM     DP,<SELA!SP3>                   ;STORE CURRENT NEXT STATE POINTER
1112                                    STATE   RHBLOC                          ;SET STATE FOR NPR BLOCKED
1113                                    ALWAYS  REXIT
1114                            RHBLOC: LDMA    IMM,OSTATE                      ;ADDRESS OLD STATE POITER
1115                                    SP      MEMX,SELB,SP3                   ;RESTORE THE STATE
1116                                    ALWAYS  RK2                             ;TRY THE NPR NOW
1117               000                  .ENDC
```

```
 1119                                    .SBTTL  RCVKE--HANDLE EVEN BYTES
 1120  013500                   RCVKE:   BRWRTE  IBUS,NPR                ;READ NPR CONTROL REGISTER
  (1)          000645                   MICPC=MICPC+1
  (1)  013500  120600                   <MOVE!WRTEBR!IBUS!<NPR>>
  (1)
 1121               001                  .IF NDF LOW
 1122                                    BR4     RK4                      ;IF  RECV NPR--BRANCH
 1123               000                  .ENDC
 1124               001                  .IF DF  LOW
 1125  013502                            BRO     IDLE
  (1)          000646                   MICPC=MICPC+1
  (1)  013502  102045                   <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
 1126               000                  .ENDC
 1127  013504                   RK5:     SP      IBUS,IOBA1,SPO           ;READ LOW BYTE OF BA TO SP
  (1)          000647                   MICPC=MICPC+1
  (1)  013504  023140                   <MOVE!SPX!IBUS!IOBA1!SPO>
  (1)
 1128  013506                            OUTPUT  DP,<INCA!OBA1>           ;WRITE INCREMENTED BA
  (1)          000650                   MICPC=MICPC+1
  (1)  013506  062066                   <MOVE!WROUT!DP!<INCA!OBA1>>
  (1)
 1129  013510                   RK50:    SP      BR,DECA,SP4              ;DECREMENT CHARACTER COUNT
  (1)          000651                   MICPC=MICPC+1
  (1)  013510  063164                   <MOVE!SPX!BR!DECA!SP4>
  (1)
 1130  013512                            C       10$                      ;NO OVERFLOW
  (1)          000652                   MICPC=MICPC+1
  (1)  013512  105255                   <JUMP!CCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
  (1)
 1131  013514                            SP      BR,DECA,SP5              ;OVERFLOW - DECREMENT HIGH BYTE
  (1)          000653                   MICPC=MICPC+1
  (1)  013514  063165                   <MOVE!SPX!BR!DECA!SP5>
  (1)
 1132  013516                            Z       RL3                      ;BYTE COUNT ZERO
  (1)          000654                   MICPC=MICPC+1
  (1)  013516  105721                   <JUMP!ZCOND!<RL3-INIT&3000*4>!<RL3-INIT&777/2>>
  (1)
 1133  013520                   10$:     SP      IBUS,IOBA1,SPO           ;READ INCREMENTED BA
  (1)          000655                   MICPC=MICPC+1
  (1)  013520  023140                   <MOVE!SPX!IBUS!IOBA1!SPO>
  (1)
 1134  013522                            OUTPUT  DP,<INCA!OBA1>           ;WRITE INCREMENTED BA
  (1)          000656                   MICPC=MICPC+1
  (1)  013522  062066                   <MOVE!WROUT!DP!<INCA!OBA1>>
  (1)
 1135  013524                            C       ICBA22                   ;IF CARRY INC BA HIGH
  (1)          000657                   MICPC=MICPC+1
  (1)  013524  115030                   <JUMP!CCOND!<ICBA22-INIT&3000*4>!<ICBA22-INIT&777/2>>
  (1)
 1136  013526                   RK9:     SP      IBUS,RCVDAT,SPO          ;READ CHAR AND SAVE IN SPO
  (1)          000660                   MICPC=MICPC+1
  (1)  013526  023200                   <MOVE!SPX!IBUS!RCVDAT!SPO>
  (1)
 1137  013530                   RK3:     OUTPUT  BR,SELA!OUTDA1           ;WRITE THE CHARACTER
  (1)          000661                   MICPC=MICPC+1
```

```
  (1)  013530  062202                    <MOVE!WROUT!BR!<SELA!OUTDA1>>
  (1)
1138   013532                           SP      BR,DECA,SP4                     ;DECREMENT THE COUNTOF BYTES
  (1)          000662                   MICPC=MICPC+1
  (1)  013532  063164                   <MOVE!SPX!BR!DECA!SP4>
  (1)
1139   013534                           C       RK6                             ;NO OVERFLOW
  (1)          000663                   MICPC=MICPC+1
  (1)  013534  105266                   <JUMP!CCOND!<RK6-INIT&3000*4>!<RK6-INIT&777/2>>
  (1)
1140   013536                           SP      BR,DECA,SP5                     ;DECREMENT HIGH BYTE OF COUNT
  (1)          000664                   MICPC=MICPC+1
  (1)  013536  063165                   <MOVE!SPX!BR!DECA!SP5>
  (1)
1141   013540                           Z       RL4                             ;BYTE COUNT ZERO
  (1)          000665                   MICPC=MICPC+1
  (1)  013540  111765                   <JUMP!ZCOND!<RL4-INIT&3000*4>!<RL4-INIT&777/2>>
  (1)
1142                001                  .IF NDF LOW
1143                                RK6:  BRWRTE  IBUS,RCVCON                     ;READ RECEIVER CONTROL REGISTER
1144                                      BR4     RCVKO                           ;IF ANOTHER CHARACTER--PROCESS
1145                                      STATE   RCVKO
1146                                      ALWAYS  REXIT
1147                                RK4:  BRO     IDLE
1148                                      ALWAYS  RK5                             ;IF NO NPR --PROCESS
1149                000                   .ENDC
1150                001                   .IF DF  LOW
1151   013542                       RK6:  STATE   RCVKO
  (1)          000666                   MICPC=MICPC+1
  (1)  013542  000634                   <MOVE!WRTEBR!IMM!<RCVKO-INIT&777/2>>
1152   013544                           ALWAYS  REXIT
  (1)          000667                   MICPC=MICPC+1
  (1)  013544  104422                   <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1153                000                  .ENDC
1154
1155   013546                       RKE1: SP      IBUS,NPR,SPO                    ;READ NPR REGISTER
  (1)          000670                   MICPC=MICPC+1
  (1)  013546  123200                   <MOVE!SPX!IBUS!NPR!SPO>
  (1)
1156   013550                           BRWRTE  IMM,177                         ;MASK FOR ALL BUT CD
  (1)          000671                   MICPC=MICPC+1
  (1)  013550  000577                   <MOVE!WRTEBR!IMM!<177>>
  (1)
1157   013552                           OUT     BR,<AANDB!ONPR>                 ;TURN OFF ALL BUT CD
  (1)          000672                   MICPC=MICPC+1
  (1)  013552  061270                   <MOVE!WROUTX!BR!<AANDB!ONPR>>
  (1)
1158   013554                           ALWAYS  RK50
  (1)          000673                   MICPC=MICPC+1
  (1)  013554  104651                   <JUMP!ALCOND!<RK50-INIT&3000*4>!<RK50-INIT&777/2>>
  (1)
1159                                ;*****************END OF TIME CRITICAL PATH*************************************
1160
1161   013556                       RCVKE0: SP    IBUS,RCVDAT,SPO           ;READ CHARACTER AND SAVE IN SPO
  (1)          000674                   MICPC=MICPC+1
```

```
   (1)  013556  023200                    <MOVE!SPX!IBUS!RCVDAT!SPD>
   (1)
1162    013560                          BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
   (1)          000675                  MICPC=MICPC+1
   (1)  013560  060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
   (1)
1163    013562                          BR7     PASWRD                  ;MAINT MODE - SEE IF RLD MESSAGE
   (1)          000676                  MICPC=MICPC+1
   (1)  013562  117600                  <JUMP!BR7CON!<PASWRD-INIT&3000*4>!<PASWRD-INIT&777/2>>
   (1)
1164    013564                          ALWAYS  RK3                     ;OTHERWISE PROCESS NORMALLY
   (1)          000677                  MICPC=MICPC+1
   (1)  013564  104661                  <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
   (1)
```

```
 1166
 1167  013566                 .SBTTL  RCVI--STORE UNNUMBERED MESSAGE TYPE
RCVI:  SP      IBUS,RCVDAT,SP13        ;STORE UNNUMBERED TYPE
       MICPC=MICPC+1
       <MOVE!SPX!IBUS!RCVDAT!SP13>

       STATE   RCVJ                    ;NEXT STATE IS J
       MICPC=MICPC+1
       <MOVE!WRTEBR!IMM!<RCVJ-INIT&777/2>>
       ALWAYS  REXIT
       MICPC=MICPC+1
       <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>

       ;
```

(1) 000700
(1) 013566 023213
(1)
(1) 013570 000701
(1) 013570 000703
(1) 013572 000702
(1) 013572 104422
(1)

```
 1172
 1173  013574                         .SBTTL  RCVJ--ROUTINE TO HANDLE SUBTYPE FIELD,SELECT AND FINAL
RCVJ:  013574  000703                 ALWAYS  SELQSY          ;"CALL" SELECT AND QSYNC SUBRCUTINE
  (1)                                 MICPC=MICPC+1
  (1)  013574  114470                 <JUMP!ALCOND!<SELQSY-INIT&3000*4>!<SELQSY-INIT&777/2>>
  (1)
 1174  013576                         STATE   RCVR                    ;NEXT STATE IS N
  (1)                                 MICPC=MICPC+1
  (1)  013576  000706                 <MOVE!WRTEBR!IMM!<RCVR-INIT&777/2>>
 1175  013600                         ALWAYS  REXIT
  (1)                                 MICPC=MICPC+1
  (1)  013600  104422                 <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
```

```
1177
1178                                    .SBTTL  RCVR--UNNUMBERED MESSAGE RESPONSE FIELD
1179                                    ;ENTERED FROM IDLE LOOP
1180                                    ;
1180  013602                    RCVR:   BRWRTE  IMM,3                   ;REP MESSAGE TYPE TO BR
 (1)          000706                    MICPC=MICPC+1
 (1)  013602  000403                    <MOVE!WRTEBR!IMM!<3>>
 (1)
1181  013604                            NOP     BR,SUB,SP13             ;IS TYPE ACK OR NAK
 (1)          000707                    MICPC=MICPC+1
 (1)  013604  060353                    <BR!SUB!SP13>
 (1)
1182  013606                            STATE   RCVQ                    ;NEXT STATE IS RCVQ
 (1)          000710                    MICPC=MICPC+1
 (1)  013606  000713                    <MOVE!WRTEBR!IMM!<RCVQ-INIT&777/2>>
1183                                                                    ;***NOTE THIS INSTR DOES NOT CLOCK "C"
1184  013610                            C       RCVF1                   ;IF NOT IGNORE
 (1)          000711                    MICPC=MICPC+1
 (1)  013610  105136                    <JUMP!CCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
 (1)
1185  013612                            ALWAYS  RD2                     ;DO RANGE CHECKS
 (1)          000712                    MICPC=MICPC+1
 (1)  013612  104503                    <JUMP!ALCOND!<RD2-INIT&3000*4>!<RD2-INIT&777/2>>
 (1)
```

```
 1187
 1188
 1189
 1190  013614                          RCVQ:   STATE   RCVF                    ;NEXT STATE IS ADDRESS
  (1)             000713                         MICPC=MICPC+1
  (1)  013614     000535                         <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
 1191  013616                                    ALWAYS  RCVF1
  (1)             000714                         MICPC=MICPC+1
  (1)  013616     104536                         <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
  (1)
```

```
                .SBTTL  RCVQ--UNNUMBERED MESSAGE--NUMBER FIELD
                ;ENTER  FROM IDLE
                .
```

```
                                        .SBTTL  RCVL--PROCESS CRC3
                                        ;ENTERED FROM  IDLE LOOP
1195  013620                    RCVL:   SPBR    IBUS,NPR,SPD                    ;READ NPR CONTROL
  (1)         000715                    MICPC=MICPC+1
  (1)  013620 123600                    <MOVE!SPBRX!IBUS!NPR!SPD>
  (1)
1196              001                   .IF NDF LOW
1197                                    BR4     RL1                             ;RCV NPR BRANCH
1198              000                   .ENDC
1199              001                   .IF DF  LOW
1200  013622                            BRD     IDLE
  (1)         000716                    MICPC=MICPC+1
  (1)  013622 102045                    <JUMP!BRDCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
1201              000                   .ENDC
1202  013624                    RL2:    BRWRTE  IMM,177                         ;MASK TO TURN OFF CD
  (1)         000717                    MICPC=MICPC+1
  (1)  013624 000577                    <MOVE!WRTEBR!IMM!<177>>
  (1)
1203  013626                            OUT     BR,AANDB!ONPR
  (1)         000720                    MICPC=MICPC+1
  (1)  013626 061270                    <MOVE!WROUTX!BR!<AANDB!ONPR>>
  (1)
1204  013630                    RL3:    SPBR    IBUS,IOBA1,SPD                  ;READ LOW ORDER BYTE OF ADDRESS
  (1)         000721                    MICPC=MICPC+1
  (1)  013630 023540                    <MOVE!SPBRX!IBUS!IOBA1!SPD>
  (1)
1205  013632                            OUTPUT  BR,INCA!OBA1                    ;INCREMENT THE LOW ORDER BYTE
  (1)         000722                    MICPC=MICPC+1
  (1)  013632 062066                    <MOVE!WROUT!BR!<INCA!OBA1>>
  (1)
1206  013634                            SP      IBUS,IOBA2,SPD                  ;READ HIGH BYTE
  (1)         000723                    MICPC=MICPC+1
  (1)  013634 023160                    <MOVE!SPX!IBUS!IOBA2!SPD>
  (1)
1207  013636                            OUTPUT  BR,AC!OBA2                      ;ADD CARRY TO HIGH BYTE
  (1)         000724                    MICPC=MICPC+1
  (1)  013636 062107                    <MOVE!WROUT!BR!<AC!OBA2>>
  (1)
1208                                    ;
1209  013640                            STATE   RCVM
  (1)         000725                    MICPC=MICPC+1
  (1)  013640 000727                    <MOVE!WRTEBR!IMM!<RCVM-INIT&777/2>>
1210  013642                            ALWAYS  RCVF1
  (1)         000726                    MICPC=MICPC+1
  (1)  013642 104536                    <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
  (1)
1211                                    ;
1212              001                   .IF NDF LOW
1213                              RL1:  BRD     IDLE                            ;NPR GOING --GET OUT
1214                                    ALWAYS  RL2
1215              000                   .ENDC
1216                                    ;
```

```
                        .SBTTL  RCVM--PROCESS CRC4--END OF DATA MESSAGE
                        ;ENTERED FROM IDLE LOOP
                        ;IF CRC CORRECT -- QUEUE INTERUPT AND UPDATE RESPONSE
                        ;
                        ;IF CRC WRONG SEND NAK
1223  013644   RCVM:    BRWRTE  IBUS,UBBR                       ;READ UNIBUS BR REGISTER
  (1)          000727   MICPC=MICPC+1
  (1)  013644  120620   <MOVE!WRTEBR!IBUS!<UBBR>>
  (1)
1224  013646           BRO     NXMERR                          ;NON-EXISTANT MEMORY
  (1)          000730   MICPC=MICPC+1
  (1)  013646  116063   <JUMP!BROCON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
  (1)
1225  013650           SP      IBUS,RCVDAT,SPO                 ;READ CRC CHARACTER
  (1)          000731   MICPC=MICPC+1
  (1)  013650  023200   <MOVE!SPX!IBUS!RCVDAT!SPO>
  (1)
1226  013652           BRWRTE  IBUS,RCVCON                     ;READ RECEIVER CONTROL REGISTER
  (1)          000732   MICPC=MICPC+1
  (1)  013652  020640   <MOVE!WRTEBR!IBUS!<RCVCON>>
  (1)
1227  013654           BRO     RCVM1                           ;IF CRC GOOD -- PROCESS
  (1)          000733   MICPC=MICPC+1
  (1)  013654  116216   <JUMP!BROCON!<RCVM1-INIT&3000*4>!<RCVM1-INIT&777/2>>
  (1)
1228  013656           BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
  (1)          000734   MICPC=MICPC+1
  (1)  013656  060601   <MOVE!WRTEBR!BR!<SELA!SP1>>
  (1)
1229  013660           BR7     RHX                             ;CRC ERROR IN BOOT MODE - FLUSH
  (1)          000735   MICPC=MICPC+1
  (1)  013660  107751   <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
  (1)
1230  013662           LDMA    IMM,T                           ;ELSE SEND NAK --DATA ERROR
  (1)          000736   MICPC=MICPC+1
  (1)             001   .IF IDN IMM,IMM
  (1)  013662  010153   <MOVE!LDMAR!IMM!<T&377>>
  (1)                   .IFF
  (1)                   <MOVE!LDMAR!IMM!<T>>
  (1)             000   .ENDC
  (1)
1231  013664           MEMINC  IMM,2                           ;NAK TYPE
  (1)          000737   MICPC=MICPC+1
  (1)  013664  016402   <MOVE!WRMEM!INCMAR!IMM!<2>>
  (1)
1232  013666           MEMINC  IMM,302                         ;DATA ERROR SUBTYPE
  (1)          000740   MICPC=MICPC+1
  (1)  013666  016702   <MOVE!WRMEM!INCMAR!IMM!<302>>
  (1)
1233  013670           LDMA    IMM,NDATS
  (1)          000741   MICPC=MICPC+1
  (1)             001   .IF IDN IMM,IMM
  (1)  013670  010014   <MOVE!LDMAR!IMM!<NDATS&377>>
  (1)                   .IFF
  (1)                   <MOVE!LDMAR!IMM!<NDATS>>
  (1)             000   .ENDC
```

```
  (1)
1234  013672                        ALWAYS  RH5                             ;SEND NAK
  (1)         000742                MICPC=MICPC+1
  (1)  013672 104557                <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
  (1)
1235
1236  013674                  RCVM0:  LDMA    IMM,<<RTHRS+3>>                 ;POINT TO ERROR WORD
  (1)         000743                MICPC=MICPC+1
  (1)            001                .IF IDN IMM,IMM
  (1)  013674 010177                <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<<RTHRS+3>>>
  (1)            000                .ENDC
  (1)
1237  013676                        BRWRTE  IMM,10                          ;MAINT MESSAGE ERROR
  (1)         000744                MICPC=MICPC+1
  (1)  013676 000410                <MOVE!WRTEBR!IMM!<10>>
  (1)
1238  013700                        ALWAYS RCEXY                            ;GIVE FATAL ERROR
  (1)         000745                MICPC=MICPC+1
  (1)  013700 114525                <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

013702                  EM2:    BRWRTE  IBUS,RCVDAT             ;READ THE CHAR
        000746                  MICPC=MICPC+1
013702  020600                  <MOVE!WRTEBR!IBUS!<RCVDAT>>

013704                          CMP     BR,SP16                 ;IS IT A MATCH
        000747                  MICPC=MICPC+1
013704  060376                  <SUBTC!BR!SP16>

013706                          Z       EM3
        000750                  MICPC=MICPC+1
013706  105757                  <JUMP!ZCOND!<EM3-INIT&3000*4>!<EM3-INIT&777/2>>

                                                                ;FALL INTO RHX
013710                  RHX:    BRWRTE  BR,AA!SP1               ;READ STATUS BYTE SHIFTED LEFT
        000751                  MICPC=MICPC+1
013710  060521                  <MOVE!WRTEBR!BR!<AA!SP1>>

013712                          BR4     10$                     ;DLE RECEIVED IN NORMAL MODE
        000752                  MICPC=MICPC+1
013712  107354                  <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>

013714                          ALWAYS  FLUSH                   ;ALREADY IN MAINT MODE
        000753                  MICPC=MICPC+1
013714  104415                  <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>

013716                  10$:    BRWRTE  IMM,163                 ;MASK TO CLEAR ALL MAINT RELATED BITS
        000754                  MICPC=MICPC+1
013716  000563                  <MOVE!WRTEBR!IMM!<163>>

013720                          SP      BR,AANDB,SP1            ;CLEAR THEM
        000755                  MICPC=MICPC+1
013720  063261                  <MOVE!SPX!BR!AANDB!SP1>

013722                          ALWAYS  FLUSH
        000756                  MICPC=MICPC+1
013722  104415                  <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>

013724                  EM3:    SP      BR,DECA,SP4             ;DECREMENT CHARACTER COUNT BY ONE
        000757                  MICPC=MICPC+1
013724  063164                  <MOVE!SPX!BR!DECA!SP4>

013726                          Z       EMTRIG                  ;TRIGGER AC LOW
        000760                  MICPC=MICPC+1
013726  115720                  <JUMP!ZCOND!<EMTRIG-INIT&3000*4>!<EMTRIG-INIT&777/2>>

013730                          ALWAYS  IDLE
        000761                  MICPC=MICPC+1
013730  100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

```
1259                                    ;
1260  013732                    BOOT:   BRWRTE  BR,SELA!SP1           ;SEE IF IN MAINT. MODE
 (1)          000762                   MICPC=MICPC+1
 (1)  013732  060601                   <MOVE!WRTEBR!BR!<SELA!SP1>>
 (1)
1261  013734                            BR7     RA3                   ;BRANCH IF SO AND TREAT DLE LIKE NUM. MSG.
 (1)          000763                   MICPC=MICPC+1
 (1)  013734  103747                   <JUMP!BR7CON!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
 (1)
1262  013736                            BRWRTE  IMM,210               ;MASK TO SET MAINT MODE AND DLE RECV'D
 (1)          000764                   MICPC=MICPC+1
 (1)  013736  000610                   <MOVE!WRTEBR!IMM!<210>>
 (1)
1263  013740                            SP      BR,AORB,SP1           ;SET THE BITS
 (1)          000765                   MICPC=MICPC+1
 (1)  013740  063301                   <MOVE!SPX!BR!AORB!SP1>
 (1)
1264  013742                            ALWAYS  RA3                   ;TREAT LIKE NUMBERED MESSAGE
 (1)          000766                   MICPC=MICPC+1
 (1)  013742  100747                   <JUMP!ALCOND!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
 (1)
1265  013744                    RESEXT: BRWRTE  IMM,4                 ;ADD TO MXT BITS
 (1)          000767                   MICPC=MICPC+1
 (1)  013744  000404                   <MOVE!WRTEBR!IMM!<4>>
 (1)
1266  013746                            SP      IBUS,NPR,SPO
 (1)          000770                   MICPC=MICPC+1
 (1)  013746  123200                   <MOVE!SPX!IBUS!NPR!SPO>
 (1)
1267  013750                            OUT     BR,ADD!ONPR           ;DO IT
 (1)          000771                   MICPC=MICPC+1
 (1)  013750  061010                   <MOVE!WROUTX!BR!<ADD!ONPR>>
 (1)
1268  013752                            ALWAYS  RES1
 (1)          000772                   MICPC=MICPC+1
 (1)  013752  110753                   <JUMP!ALCOND!<RES1-INIT&3000*4>!<RES1-INIT&777/2>>
 (1)
1269  013754                    TABMXT: BRWRTE  IMM,4                 ;INCREMENT MXT
 (1)          000773                   MICPC=MICPC+1
 (1)  013754  000404                   <MOVE!WRTEBR!IMM!<4>>
 (1)
1270  013756                            SP      IBUS,UBBR,SPO         ;READ BR CONTROL
 (1)          000774                   MICPC=MICPC+1
 (1)  013756  123220                   <MOVE!SPX!IBUS!UBBR!SPO>
 (1)
1271  013760                            OUT     BR,ADD!OBR
 (1)          000775                   MICPC=MICPC+1
 (1)  013760  061011                   <MOVE!WROUTX!BR!<ADD!OBR>>
 (1)
1272  013762                            ALWAYS  ECX
 (1)          000776                   MICPC=MICPC+1
 (1)  013762  114767                   <JUMP!ALCOND!<ECX-INIT&3000*4>!<ECX-INIT&777/2>>
 (1)
1273  013764                            $ZERO
 (1)          000777                   MICPC=MICPC+1
 (1)  013764  000000                   000000
```

(1)

```
                                .=INIT+2000
                                MICPC=777
                                .SBTTL  TMTDA--TRANSMITTER DISPATCH ROUTINE
                                ;
1275            013766          TMTDA:  BRWRTE  IBUS,TMTCON                     ;READ TRANMITTER CONTROL REGISTER
                000777                  MICPC=MICPC+1
                                        <MOVE!WRTEBR!IBUS!<TMTCON>>
1276
1277
1278
1279    013766                  
  (1)           001000
  (1)   013766  020620
  (1)
1280    013770                          .BR4    DP,SELA,<2!PAGE2>               ;IF READY PROCEED
  (1)           001001                  MICPC=MICPC+1
  (1)   013770  173202                  <JUMP! BR4CON!DP!SELA!2!PAGE2>
  (1)
1281    013772                          ALWAYS  I1                              ;ELSE IDLE
  (1)           001002                  MICPC=MICPC+1
  (1)   013772  100452                  <JUMP!ALCOND!<I1-INIT%3000*4>!<I1-INIT%777/2>>
  (1)
```

```
                                        .SBTTL  TMTA--FIRST CHARACTER OF HEADER
                                        ;
1285  013774                    TMTA:   BRWRTE  BR,AA!SP10                      ;SHIFT LEFT
(1)           001003                    MICPC=MICPC+1
(1)   013774  060530                    <MOVE!WRTEBR!BR!<AA!SP10>>
(1)
1286  013776                            BR7     RCVCK
(1)           001004                    MICPC=MICPC+1
(1)   013776  107614                    <JUMP!BR7CON!<RCVCK-INIT&3000*4>!<RCVCK-INIT&777/2>>
(1)
1287  014000                    TA1:    BRWRTE  BR,SELA!SP10                    ;REREAD STATUS
(1)           001005                    MICPC=MICPC+1
(1)   014000  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
1288  014002                            BR0     NUMSYN                          ;IF UNNUMBPENDING  -- SEND IT
(1)           001006                    MICPC=MICPC+1
(1)   014002  112031                    <JUMP!BRCON!<NUMSYN-INIT&3000*4>!<NUMSYN-INIT&777/2>>
(1)
1289  014004                            BRSHFT
(1)           001007                    MICPC=MICPC+1
(1)   014004  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
(1)
1290  014006                            BR4     I1                              ;IF START MODE--EXIT
(1)           001010                    MICPC=MICPC+1
(1)   014006  103052                    <JUMP!BR4CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
(1)
1291  014010                            BR1     NUMSYN                          ;IF LINE HAS GONE IDLE SEND SYN
(1)           001011                    MICPC=MICPC+1
(1)   014010  112431                    <JUMP!BR1CON!<NUMSYN-INIT&3000*4>!<NUMSYN-INIT&777/2>>
(1)
1292                                                                            ;ELSE--START TO SEND MESSAGE
1293  014012                    TMTEXT: TSTATE  TMTB
(1)           001012                    MICPC=MICPC+1
(1)   014012  000453                    <MOVE!WRTEBR!IMM!<TMTB-INIT&777/2>>
(1)           001013                    MICPC=MICPC+1
(1)   014014  063222                    <MOVE!SPX!BR!SELB!SP2>
1294  014016                            BRWRTE  BR,SELA!SP1                     ;ARE WE IN BOOT MODE
(1)           001014                    MICPC=MICPC+1
(1)   014016  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
1295  014020                            BR7     TMTBT                           ;IF SO SEND DLE
(1)           001015                    MICPC=MICPC+1
(1)   014020  113427                    <JUMP!BR7CON!<TMTBT-INIT&3000*4>!<TMTBT-INIT&777/2>>
(1)
1296  014022                            BRWRTE  BR,<SELA!SP10>                  ;UNNUMB MESSGE?
(1)           001016                    MICPC=MICPC+1
(1)   014022  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
1297  014024                            BR0     TMTUN                           ;IF SO --BRANCH
(1)           001017                    MICPC=MICPC+1
(1)   014024  112023                    <JUMP!BRCON!<TMTUN-INIT&3000*4>!<TMTUN-INIT&777/2>>
(1)
1298  014026                            BRWRTE  IMM,201                         ;ELSE STORE SOH
(1)           001020                    MICPC=MICPC+1
(1)   014026  000601                    <MOVE!WRTEBR!IMM!<201>>
(1)
```

```
1299  014030                    TMTA5:  OUTPUT  BR,<SELB!TMTDAT>              ;IN TMT SILO
 (1)          001021                    MICPC=MICPC+1
 (1)  014030  062230                    <MOVE!WROUT!BR!<SELB!TMTDAT>>
 (1)
1300  014032                            ALWAYS  I1
 (1)          001022                    MICPC=MICPC+1
 (1)  014032  100452                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1301  014034                    TMTUN:  TSTATE  TMTI
 (1)          001023                    MICPC=MICPC+1
 (1)  014034  000600                    <MOVE!WRTEBR!IMM!<TMTI-INIT&777/2>>
 (1)          001024                    MICPC=MICPC+1
 (1)  014036  063222                    <MOVE!SPX!BR!SELB!SP2>
1302  014040                            BRWRTE  IMM,5                          ;ENQ TO BR
 (1)          001025                    MICPC=MICPC+1
 (1)  014040  000405                    <MOVE!WRTEBR!IMM!<5>>
 (1)
1303  014042                            ALWAYS  TMTA5
 (1)          001026                    MICPC=MICPC+1
 (1)  014042  110421                    <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
 (1)
1304  014044                    TMTBT:  BRWRTE  IMM,220                 ;WRITE A DLE TO BR
 (1)          001027                    MICPC=MICPC+1
 (1)  014044  000620                    <MOVE!WRTEBR!IMM!<220>>
 (1)
1305  014046                            ALWAYS  TMTA5                   ;SEND IT
 (1)          001030                    MICPC=MICPC+1
 (1)  014046  110421                    <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
 (1)
1306                                ;
1307  014050                    NUMSYN: BRWRTE  BR,<SELA!SP10>                 ;READ LINE STATUS WORD
 (1)          001031                    MICPC=MICPC+1
 (1)  014050  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
 (1)
1308  014052                            BR7     5$                             ;IF OK TO SEND--PROCEED
 (1)          001032                    MICPC=MICPC+1
 (1)  014052  113434                    <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
 (1)
1309  014054                            ALWAYS  I1                             ;ELSE--IDLE
 (1)          001033                    MICPC=MICPC+1
 (1)  014054  100452                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1310  014056                    5$:     BRWRTE  IBUS,MODEM              ;ARE WE STILL SENDING?
 (1)          001034                    MICPC=MICPC+1
 (1)  014056  020660                    <MOVE!WRTEBR!IBUS!<MODEM>>
 (1)
1311  014060                            BRSHFT
 (1)          001035                    MICPC=MICPC+1
 (1)  014060  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1312  014062                            BR4     I1                     ;RTS SET? IF SO WE ARE--STALL
 (1)          001036                    MICPC=MICPC+1
 (1)  014062  103052                    <JUMP!BR4CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1313  014064                            BRWRTE  IMM,373                 ;MASK TO TURN OFFLINE IDLE
 (1)          001037                    MICPC=MICPC+1
```

```
  (1)  014064  000773                    <MOVE!WRTEBR!IMM!<373>>
  (1)
1314   014066                            SP      BR,AANDB,SP10          ;IN LINE STATUS WORD
  (1)          001040                   MICPC=MICPC+1
  (1)  014066  063270                    <MOVE!SPX!BR!AANDB!SP10>
  (1)
1315   014070                            TSTATE  TMTA1
  (1)          001041                   MICPC=MICPC+1
  (1)  014070  000445                    <MOVE!WRTEBR!IMM!<TMTA1-INIT&777/2>>
  (1)          001042                   MICPC=MICPC+1
  (1)  014072  063222                    <MOVE!SPX!BR!SELB!SP2>
1316              001                   .IF NDF $LOW
1317                                    BRWRTE  IMM,12                 ;SET UP NUMBER OF SYNS
1318              000                   .ENDC
1319              001                   .IF DF  $LOW
1320   014074                           BRWRTE  IMM,10
  (1)          001043                   MICPC=MICPC+1
  (1)  014074  000410                    <MOVE!WRTEBR!IMM!<10>>
  (1)
1321              000                   .ENDC
1322   014076                           SP      BR,SELB,SP6                ;STORE IN SP6
  (1)          001044                   MICPC=MICPC+1
  (1)  014076  063226                    <MOVE!SPX!BR!SELB!SP6>
  (1)
1323   014100                    TMTA1: SP      BR,DECA,SP6                ;DECREMENT SYN COUNT
  (1)          001045                   MICPC=MICPC+1
  (1)  014100  063166                    <MOVE!SPX!BR!DECA!SP6>
  (1)
1324   014102                           Z       TMTEXT
  (1)          001046                   MICPC=MICPC+1
  (1)  014102  111412                    <JUMP!ZCOND!<TMTEXT-INIT&3000*4>!<TMTEXT-INIT&777/2>>
  (1)
1325   014104                           BRWRTE  IMM,1                  ;MASK FOR SOM
  (1)          001047                   MICPC=MICPC+1
  (1)  014104  000401                    <MOVE!WRTEBR!IMM!<1>>
  (1)
1326   014106                           OUTPUT  BR,SELB!OTMTCO         ;WRITE IT TO TMTR CONTROL
  (1)          001050                   MICPC=MICPC+1
  (1)  014106  062231                    <MOVE!WROUT!BR!<SELB!OTMTCO>>
  (1)
1327   014110                           BRWRTE  IMM,226                ;SYNC CHAR
  (1)          001051                   MICPC=MICPC+1
  (1)  014110  000626                    <MOVE!WRTEBR!IMM!<226>>
  (1)
1328   014112                           ALWAYS  TMTA5
  (1)          001052                   MICPC=MICPC+1
  (1)  014112  110421                    <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
  (1)
```

```
                                        .SBTTL  TMTB--OUTPUT FIRST CHAR OF COUNT
                                        ;
1332  014114                    TMTB:   SPBR    IBUS,NPR,SPO                    ;READ BR CONTROL REG
 (1)          001053                    MICPC=MICPC+1
 (1)  014114  123600                    <MOVE!SPBRX!IBUS!NPR!SPO>
 (1)
1333  014116                            BRO     IDLE                    ;NPR GOING--GET OUT
 (1)          001054                    MICPC=MICPC+1
 (1)  014116  102045                    <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1334  014120                            LDMA    IMM,LTC                         ;GETPOINTER TO NEXT TMT LINK
 (1)          001055                    MICPC=MICPC+1
 (1)            001                     .IF IDN IMM,IMM
 (1)  014120  010071                    <MOVE!LDMAR!IMM!<LTC&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<LTC>>
 (1)            000                     .ENDC
 (1)
1335  014122                            LDMA    MEMX,SELB!SPX!SP16              ;POINT TO THE LINK
 (1)          001056                    MICPC=MICPC+1
 (1)            001                     .IF IDN MEMX,IMM
 (1)                                    <MOVE!LDMAR!IMM!<SELB!SPX!SP16&377>>
 (1)                                    .IFF
 (1)  014122  053236                    <MOVE!LDMAR!MEMX!<SELB!SPX!SP16>>
 (1)            000                     .ENDC
 (1)
1336  014124                            MEMINC  IMM,3                           ;WRITE MSG TMTED TO FLAGS
 (1)          001057                    MICPC=MICPC+1
 (1)  014124  016403                    <MOVE!WRMEM!INCMAR!IMM!<3>>
 (1)
1337  014126                            MEMINC  DP,SELA!SP12                    ;PICK UP MSGNO
 (1)          001060                    MICPC=MICPC+1
 (1)  014126  076612                    <MOVE!WRMEM!INCMAR!DP!<SELA!SP12>>
 (1)
1338  014130                            STATE   TMTC                            ;ADDRESS TMTR STATE
 (1)          001061                    MICPC=MICPC+1
 (1)  014130  000500                    <MOVE!WRTEBR!IMM!<TMTC-INIT&777/2>>
1339  014132                    TBO:    SP      BR,SELB,SP2                     ;UPDATE IT
 (1)          001062                    MICPC=MICPC+1
 (1)  014132  063222                    <MOVE!SPX!BR!SELB!SP2>
 (1)
1340  014134                            OUTPUT  <MEMX!INCMAR>,SELB!IBA1         ;WRITELOWBYTEOFADDRESS
 (1)          001063                    MICPC=MICPC+1
 (1)  014134  056224                    <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA1>>
 (1)
1341  014136                            OUTPUT  <MEMX!INCMAR>,SELB!IBA2         ;WRITE HIGH BYTE OF ADDRESS
 (1)          001064                    MICPC=MICPC+1
 (1)  014136  056225                    <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA2>>
 (1)
1342  014140                            SP      MEMX,SELB,SP7   ;HIGH BYTE OF COUNT TO SP7
 (1)          001065                    MICPC=MICPC+1
 (1)  014140  043227                    <MOVE!SPX!MEMX!SELB!SP7>
 (1)
1343                                                    ;WAIT TO MASK OFF MEM EXT. BITS
1344  014142                            SP      IMM,300,SPO                     ;MASK FOR MXT
 (1)          001066                    MICPC=MICPC+1
```

```
   (1)  014142  003300                <MOVE!SPX!IMM!300!SPO>
   (1)
1345  014144                         BRWRTE  MEMX!INCMAR,AANDB!SPO                ;TURN OFF CC2
   (1)         001067                MICPC=MICPC+1
   (1)  014144  054660                <MOVE!WRTEBR!MEMX!INCMAR!<AANDB!SPO>>
   (1)
1346  014146                         BRSHFT                                       ;SHIFT BITS INTO CORRECT POSITION
   (1)         001070                MICPC=MICPC+1
   (1)  014146  001620                <MOVE!SHFTBR!WRTEBR!SELB>
   (1)
1347  014150                         BRSHFT
   (1)         001071                MICPC=MICPC+1
   (1)  014150  001620                <MOVE!SHFTBR!WRTEBR!SELB>
   (1)
1348  014152                         BRSHFT
   (1)         001072                MICPC=MICPC+1
   (1)  014152  001620                <MOVE!SHFTBR!WRTEBR!SELB>
   (1)
1349  014154                         BRSHFT
   (1)         001073                MICPC=MICPC+1
   (1)  014154  001620                <MOVE!SHFTBR!WRTEBR!SELB>
   (1)
1350  014156                         OUT     BR,SELB!ONPR
   (1)         001074                MICPC=MICPC+1
   (1)  014156  061230                <MOVE!WROUTX!BR!<SELB!ONPR>>
   (1)
1351  014160                         SPBR    MEMX!INCMAR,SELB,SP6                 ;LOWBYTE OF COUNT TO SP6
   (1)         001075                MICPC=MICPC+1
   (1)  014160  057626                <MOVE!SPBRX!MEMX!INCMAR!SELB!SP6>
   (1)
1352  014162                         OUTPUT  BR,SELB!TMTDAT                       ;WRITE IT TO TMTR SILO
   (1)         001076                MICPC=MICPC+1
   (1)  014162  062230                <MOVE!WROUT!BR!<SELB!TMTDAT>>
   (1)
1353  014164                         ALWAYS  IDLE
   (1)         001077                MICPC=MICPC+1
   (1)  014164  100445                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
   (1)
1354                               ;
```

```
                        .SBTTL  TMTC--OUTPUT SECOND CHAR OF COUNT
                        ;
1356
1357
1358  014166            TMTC:   BRWRTE  IMM,77                          ;MASK TO CLEAR MXT BITS
 (1)        001100              MICPC=MICPC+1
 (1)  014166  000477            <MOVE!WRTEBR!IMM!<77>>
 (1)
1359  014170                    SPBR    BR,AANDB,SP7                    ;CLEAR THEM
 (1)        001101              MICPC=MICPC+1
 (1)  014170  063667            <MOVE!SPBRX!BR!AANDB!SP7>
 (1)
1360  014172                    OUTPUT  DP,<SELB!TMTDAT>                ;WRITE TO TMT SILO
 (1)        001102              MICPC=MICPC+1
 (1)  014172  062230            <MOVE!WROUT!DP!<SELB!TMTDAT>>
 (1)
1361  014174                    LDMA    IMM,LTC                         ;POINT TO TMT BUFFER
 (1)        001103              MICPC=MICPC+1
 (1)           001              .IF IDN IMM,IMM
 (1)  014174  010071            <MOVE!LDMAR!IMM!<LTC&377>>
 (1)                            .IFF
 (1)                            <MOVE!LDMAR!IMM!<LTC>>
 (1)              000           .ENDC
 (1)
1362  014176                    BRWRTE  IMM,6                           ;OFFSET TO NEXT LINK
 (1)        001104              MICPC=MICPC+1
 (1)  014176  000406            <MOVE!WRTEBR!IMM!<6>>
 (1)
1363  014200                    MEM     BR,ADD!SP16                     ;UPDATE THE POINTER
 (1)        001105              MICPC=MICPC+1
 (1)  014200  062416            <MOVE!WRMEM!BR!<ADD!SP16>>
 (1)
1364  014202                    BRWRTE  IMM,TML8                                ;GET WRAPAROUND ADDRESS
 (1)        001106              MICPC=MICPC+1
 (1)  014202  000545            <MOVE!WRTEBR!IMM!<TML8>>
 (1)
1365  014204                    CMP     BR,SP16                         ;WRAPAORUND
 (1)        001107              MICPC=MICPC+1
 (1)  014204  060376            <SUBTC!BR!SP16>
 (1)
1366  014206                    Z       10$
 (1)        001110              MICPC=MICPC+1
 (1)  014206  111513            <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1367  014210              5$:   STATE   TMTD
 (1)        001111              MICPC=MICPC+1
 (1)  014210  000515            <MOVE!WRTEBR!IMM!<TMTD-INIT&777/2>>
1368  014212                    ALWAYS  XEXIT
 (1)        001112              MICPC=MICPC+1
 (1)  014212  100451            <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
 (1)
1369  014214              10$:  MEM     IMM,TML1                        ;GO BACK TO FIRST LINK
 (1)        001113              MICPC=MICPC+1
 (1)  014214  002473            <MOVE!WRMEM!IMM!<TML1>>
 (1)
1370  014216                    ALWAYS  5$
 (1)        001114              MICPC=MICPC+1
 (1)  014216  110511            <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
```

```
                (1)
1371                    :
```

```
                                        .SBTTL  TMTD--RESPONSE FIELD-NUMBERED MESSAGE
014220                          TMTD:   STATE   TMTE
                                        MICPC=MICPC+1
001115
014220  000523                          <MOVE!WRTEBR!IMM!<TMTE-INIT&777/2>>
014222                                  SP      BR,DECA,SP6                     ;ADJUSRT COUNT FOR  TWO'S  COMPLEMENT
                                        MICPC=MICPC+1
001116
014222  063166                          <MOVE!SPX!BR!DECA!SP6>
014224                                  C       TD2                             ;NO OVERFLOW
                                        MICPC=MICPC+1
001117
014224  111121                          <JUMP!CCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>
014226                                  SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
                                        MICPC=MICPC+1
001120
014226  063167                          <MOVE!SPX!BR!DECA!SP7>
014230                          TD2:    LDMA    IMM,ISP11                       ;RESP FIELD ADDR TO MAR
                                        MICPC=MICPC+1
001121
   001
014230  010171                          .IF  IDN  IMM,IMM
                                        <MOVE!LDMAR!IMM!<ISP11&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<ISP11>>
                                        .ENDC
      000
                                        .IF NDF LOW
      001                               OUTPUT  MEMX,SELB!TMTDAT                ;WRITE IT TO SILO
```

```
1395                                    ALWAYS  XEXIT
```

```
 1387                 000                        .ENDC
 1388                 001                        .IF DF  LOW
 1389  014232                                    ALWAYS  TJ1
  (1)                 001122                    MICPC=MICPC+1
  (1)  014232        110606                     <JUMP!ALCOND!<TJ1-INIT$3000*4>!<TJ1-INIT$777/3>>
  (1)
 1390                 000                        .ENDC
```

```
                                                .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>>
```

```
                        .SBTTL  TMTF--NUMBERED MSG ADDRESS FIELD
                        ;
1404  014250           TMTF:   STATE   TF1
 (1)          001131           MICPC=MICPC+1
 (1)  014250  000535           <MOVE!WRTEBR!IMM!<TF1-INIT&777/2>>
1405  014252           TF2:    SP      BR,SELB,SP2
 (1)          001132           MICPC=MICPC+1
 (1)  014252  063222           <MOVE!SPX!BR!SELB!SP2>
 (1)
1406  014254                   BRWRTE  IMM,1                   ;LOAD ADDRESS
 (1)          001133           MICPC=MICPC+1
 (1)  014254  000401           <MOVE!WRTEBR!IMM!<1>>
 (1)
1407               001         .IF NDF LOW
1408                           OUTPUT  BR,<SELB!TMTDAT>
1409                           ALWAYS  I1
1410               000         .ENDC
1411               001         .IF DF  LOW
1412  014256                   ALWAYS  TMTA5
 (1)          001134           MICPC=MICPC+1
 (1)  014256  110421           <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
 (1)
1413               000         .ENDC
```

```
 1415
 1416  014260                          TF1:    .SBTTL  TF1-NUMBERED MSG HEADER EOM
                                               BRWRTE  IMM,2                   ;EOM  MASK TO BR
  (1)          001135                         MICPC=MICPC+1
  (1)  014260  000402                         <MOVE!WRTEBR!IMM!<2>>
  (1)
 1417  014262                                  OUTPUT  BR,<SELB!OTMTCO>        ;UPDATE TMTR CONTROL REGISTER
  (1)          001136                         MICPC=MICPC+1
  (1)  014262  062231                         <MOVE!WROUT!BR!<SELB!OTMTCO>>
  (1)
 1418  014264                                  OUTPUT  BR,<SELB!TMTDAT>        ;OUTPUT A GARBAGE CHAR
  (1)          001137                         MICPC=MICPC+1
  (1)  014264  062230                         <MOVE!WROUT!BR!<SELB!TMTDAT>>
  (1)
 1419  014266                                  BRWRTE  IBUS,IIBA1              ;READ LOW ORDER FROM INBA
  (1)          001140                         MICPC=MICPC+1
  (1)  014266  020500                         <MOVE!WRTEBR!IBUS!<IIBA1>>
  (1)
 1420  014270                                  BRO     TMTF1                   ;IF ODD BYTE--BRANCH
  (1)          001141                         MICPC=MICPC+1
  (1)  014270  112155                         <JUMP!BROCON!<TMTF1-INIT&3000*4>!<TMTF1-INIT&777/2>>
  (1)
 1421  014272                                  STATE   TMTH
  (1)          001142                         MICPC=MICPC+1
  (1)  014272  000544                         <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
 1422  014274                                  ALWAYS  XEXIT
  (1)          001143                         MICPC=MICPC+1
  (1)  014274  100451                         <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
  (1)
```

```
                                ;************TIME CRITICAL PATH--MODIFY WITH GREAT CARE
                                        .SBTTL  TMTH--ROUTINE TO OUTPUT DATA CHARACTERS
                                        ;
014276                  TMTH:   SPBR    IBUS,NPR,SPO                    ;READ NPR CONTROL
(1)     001144                  MICPC=MICPC+1
(1)  014276  123600             <MOVE!SPBRX!IBUS!NPR!SPO>
(1)
        001                     .IF NDF LOW
                                BR4     5$                              ;IF RECV NPR --PROCESS
        000                     .ENDC
014300                          BRO     I1                              ;IF NPR IN PROGRESS --BRANCH
(1)     001145                  MICPC=MICPC+1
(1)  014300  102052             <JUMP!BROCON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
(1)
014302                  5$:     OUTPUT  IBUS,<INDAT1!TMTDAT>            ;WRITE THE EVEN CHAR TO TMT SILO
(1)     001146                  MICPC=MICPC+1
(1)  014302  022010             <MOVE!WROUT!IBUS!<INDAT1!TMTDAT>>
(1)
014304                          SP      IBUS,IIBA1,SPO                  ;READ LOW BYTE OF BA TO SP
(1)     001147                  MICPC=MICPC+1
(1)  014304  023100             <MOVE!SPX!IBUS!IIBA1!SPO>
(1)
014306                          OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT INCREMENTED BA
(1)     001150                  MICPC=MICPC+1
(1)  014306  062064             <MOVE!WROUT!BR!<INCA!IBA1>>
(1)
014310                          SP      BR,DECA,SP6                     ;DECREMENT CHARACTER  COUNT
(1)     001151                  MICPC=MICPC+1
(1)  014310  063166             <MOVE!SPX!BR!DECA!SP6>
(1)
014312                          C       TH6                             ;NO OVERFLOW
(1)     001152                  MICPC=MICPC+1
(1)  014312  111155             <JUMP!CCOND!<TH6-INIT&3000*4>!<TH6-INIT&777/2>>
(1)
014314                          SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
(1)     001153                  MICPC=MICPC+1
(1)  014314  063167             <MOVE!SPX!BR!DECA!SP7>
(1)
014316                          Z       HEH1                            ;BYTE  COUNT ZERO
(1)     001154                  MICPC=MICPC+1
(1)  014316  115402             <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
(1)
014320                  TH6:
        001                     .IF NDF LOW
                                BRWRTE  IBUS,TMTCON             ;READ TMTR CONTROL CSR
                                BR4     TH9                             ;IF MORE ROOM IN SILO--BRANCH
        000                     .ENDC
014320                  TMTF1:  STATE   TMTH0
(1)     001155                  MICPC=MICPC+1
(1)  014320  000557             <MOVE!WRTEBR!IMM!<TMTH0-INIT&777/2>>
014322                          ALWAYS  XEXIT
(1)     001156                  MICPC=MICPC+1
(1)  014322  100451             <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
(1)
014324                  TMTH0:
        001                     .IF  DF LOW
```

```
1448  014324                          SPBR    IBUS,NPR,SPO            ;NPR BUSY
 (1)          001157                 MICPC=MICPC+1
 (1)  014324  123600                 <MOVE!SPBRX!IBUS!NPR!SPO>
 (1)
1449  014326                          BRO     I1
 (1)          001160                 MICPC=MICPC+1
 (1)  014326  102052                 <JUMP!BROCON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
 (1)
1450             000                .ENDC
1451  014330                    TH9:  OUTPUT  IBUS,<INDAT2!TMTDAT>            ;ODD CHAR TO SILO
 (1)          001161                 MICPC=MICPC+1
 (1)  014330  022030                 <MOVE!WROUT!IBUS!<INDAT2!TMTDAT>>
 (1)
1452  014332                          SP      IBUS,IIBA1,SPO                  ;READ LOW BYTE TO BA
 (1)          001162                 MICPC=MICPC+1
 (1)  014332  023100                 <MOVE!SPX!IBUS!IIBA1!SPO>
 (1)
1453  014334                          OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT THE INCREMENTED BA
 (1)          001163                 MICPC=MICPC+1
 (1)  014334  062064                 <MOVE!WROUT!BR!<INCA!IBA1>>
 (1)
1454  014336                          C       HOINCH
 (1)          001164                 MICPC=MICPC+1
 (1)  014336  111372                 <JUMP!CCOND!<HOINCH-INIT&3000*4>!<HOINCH-INIT&777/2>>
 (1)
1455  014340                    TH8:  SP      BR,DECA,SP6                     ;DECREMENT CHARACTERCOUNT
 (1)          001165                 MICPC=MICPC+1
 (1)  014340  063166                 <MOVE!SPX!BR!DECA!SP6>
 (1)
1456  014342                          C       TH7                             ;NO OVERFLOW
 (1)          001166                 MICPC=MICPC+1
 (1)  014342  111171                 <JUMP!CCOND!<TH7-INIT&3000*4>!<TH7-INIT&777/2>>
 (1)
1457  014344                          SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF  COUNT
 (1)          001167                 MICPC=MICPC+1
 (1)  014344  063167                 <MOVE!SPX!BR!DECA!SP7>
 (1)
1458  014346                          Z       HEH1                            ;BYTE COUNT ZERO
 (1)          001170                 MICPC=MICPC+1
 (1)  014346  115402                 <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
 (1)
1459  014350                    TH7:  SPBR    IBUS,NPR,SPO                    ;READ NPR REGISTER
 (1)          001171                 MICPC=MICPC+1
 (1)  014350  123600                 <MOVE!SPBRX!IBUS!NPR!SPO>
 (1)
1460             001                .IF NDF LOW
1461                                BRO     TH2                             ;IF NPR BUSY WAIT TO GO
1462             000                .ENDC
1463  014352                          STATE   TMTH
 (1)          001172                 MICPC=MICPC+1
 (1)  014352  000544                 <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
1464  014354                    TH3:  SP      BR,SELB,SP2                     ;SAVE TSTATE
 (1)          001173                 MICPC=MICPC+1
 (1)  014354  063222                 <MOVE!SPX!BR!SELB!SP2>
 (1)
1465  014356                    TH3X: BRWRTE  IMM,157                         ;CLEAR C0 AND C1
```

```
  (1)           001174                  MICPC=MICPC+1
  (1)  014356   000557                  <MOVE!WRTEBR!IMM!<157>>
  (1)
1466   014360                           SP      BR,AANDB,SPO                    ;CLEAR THE BITS
  (1)           001175                  MICPC=MICPC+1
  (1)  014360   063260                  <MOVE!SPX!BR!AANDB!SPO>
  (1)
1467   014362                           BRWRTE  IMM,1                           ;WRITE  NPR BITS TO BR
  (1)           001176                  MICPC=MICPC+1
  (1)  014362   000401                  <MOVE!WRTEBR!IMM!<1>>
  (1)
1468              001                   .IF NDF LOW
1469                                    OUT     BR,<AORB!CNPR>
1470                                    ALWAYS  I1
1471                            TH2:    STATE   TH7
1472                                    ALWAYS  XEXIT
1473              000                   .ENDC
1474              001                   .IF DF  LOW
1475   014364                           ALWAYS  RK7
  (1)           001177                  MICPC=MICPC+1
  (1)  014364   104643                  <JUMP!ALCOND!<RK7-INIT&3000*4>!<RK7-INIT&777/2>>
  (1)
1476              000                   .ENDC
1477                            ;***************END TIME CRITICAL PATH*****************************
1478                                    ;
```

```
                                        .SBTTL  TMTI--SEND UNNUMBERED TYPE FIELD
014366                          TMTI:   LDMA    IMM,T                           ;ADDRESS OF TYPE FIELD TO MAR
        001200                          MICPC=MICPC+1
           001                          .IF IDN IMM,IMM
014366  010153                          <MOVE!LDMAR!IMM!<T&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<T>>
                                        .ENDC
               000
014370                                  SP      MEMX,SELB,SP6                   ;COPY IT TO SP6
        001201                          MICPC=MICPC+1
014370  043226                          <MOVE!SPX!MEMX!SELB!SP6>
014372                                  STATE   TMTJ
        001202                          MICPC=MICPC+1
014372  000604                          <MOVE!WRTEBR!IMM!<TMTJ-INIT&777/2>>
014374                                  ALWAYS  TJ1
        001203                          MICPC=MICPC+1
014374  110606                          <JUMP!ALCOND!<TJ1-INIT&3000*4>!<TJ1-INIT&777/2>>

                                        ;
                                        .SBTTL  TMTJ--SEND SUB-TYPE FIELD
014376                          TMTJ:   LDMA    IMM,ST                          ;ADDRESS OF SUB-TYPE FIELD TO MAR
        001204                          MICPC=MICPC+1
           001                          .IF IDN IMM,IMM
014376  010154                          <MOVE!LDMAR!IMM!<ST&377>>
                                        .IFF
                                        <MOVE!LDMAR!IMM!<ST>>
                                        .ENDC
               000
                                        STATE   TMTK
        001205                          MICPC=MICPC+1
014400  000610                          <MOVE!WRTEBR!IMM!<TMTK-INIT&777/2>>
014402                          TJ1:    OUTPUT  MEMX,SELB!TMTDAT
        001206                          MICPC=MICPC+1
014402  042230                          <MOVE!WROUT!MEMX!<SELB!TMTDAT>>
014404                                  ALWAYS  XEXIT
        001207                          MICPC=MICPC+1
014404  100451                          <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>

                                        ;
```

```
                                        .SBTTL  TMTK--OUTPUT RESPONSE FIELD (UNNUMB MSG)
                                        ;
014406                          TMTK:   BRWRTE  IMM,3                           ;WRITE A 3 TO BR
(1)     001210                          MICPC=MICPC+1
(1)  014406  000403                     <MOVE!WRTEBR!IMM!<3>>
(1)
014410                                  NOP     BR,SUB,SP6                      ;IF TYPE LESS THAN 3
(1)     001211                          MICPC=MICPC+1
(1)  014410  060346                     <BR!SUB!SP6>
(1)
014412                                  TSTATE  TMTL
(1)     001212                          MICPC=MICPC+1
(1)  014412  000616                     <MOVE!WRTEBR!IMM!<TMTL-INIT&777/2>>
(1)     001213                          MICPC=MICPC+1
(1)  014414  063222                     <MOVE!SPX!BR!SELB!SP2>
014416                                  C       TMTLO
(1)     001214                          MICPC=MICPC+1
(1)  014416  111223                     <JUMP!CCOND!<TMTLO-INIT&3000*4>!<TMTLO-INIT&777/2>>
(1)
014420                                  ALWAYS  TD2
(1)     001215                          MICPC=MICPC+1
(1)  014420  110521                     <JUMP!ALCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>
(1)
                                        ;
                                        .SBTTL  TMTL--UNNUMB MSG NUMBER FIELD
014422                          TMTL:   TSTATE  TMTM
(1)     001216                          MICPC=MICPC+1
(1)  014422  000627                     <MOVE!WRTEBR!IMM!<TMTM-INIT&777/2>>
(1)     001217                          MICPC=MICPC+1
(1)  014424  063222                     <MOVE!SPX!BR!SELB!SP2>
014426                                  BRWRTE  IMM,3
(1)     001220                          MICPC=MICPC+1
(1)  014426  000403                     <MOVE!WRTEBR!IMM!<3>>
(1)
014430                                  CMP     BR,SP6                  ;IS MESSAGE REP
(1)     001221                          MICPC=MICPC+1
(1)  014430  060366                     <SUBTC!BR!SP6>
(1)
014432                                  Z       TMTL1                           ;YES
(1)     001222                          MICPC=MICPC+1
(1)  014432  111625                     <JUMP!ZCOND!<TMTL1-INIT&3000*4>!<TMTL1-INIT&777/2>>
(1)
014434                          TMTLO:  BRWRTE  IMM,0                           ;ADDRESS CONTNAT OF ZERO
(1)     001223                          MICPC=MICPC+1
(1)  014434  000400                     <MOVE!WRTEBR!IMM!<0>>
(1)
014436                                  ALWAYS  TMTA5
(1)     001224                          MICPC=MICPC+1
(1)  014436  110421                     <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
(1)
                                        ;
014440                          TMTL1:  BRWRTE  BR,DECA!SP12                    ;WRITE A RESPONSE
(1)     001225                          MICPC=MICPC+1
(1)  014440  060572                     <MOVE!WRTEBR!BR!<DECA!SP12>>
(1)
                  001                   .IF NDF LOW
```

```
1511                                        OUTPUT  BR,SELB!TMTDAT
1512                                        ALWAYS  I1
1513                 000                    .ENDC
1514                 001                    .IF DF  LOW
1515  014442                                ALWAYS  TMTA5
  (1)               001226                 MICPC=MICPC+1
  (1)  014442       110421                 <JUMP!ALCOND!<TMTA5-INIT&2000*4>!<TMTA5-INIT&777/2>>
  (1)
1516                 000                    .ENDC
1517                                        ;
```

```
                                        .SBTTL  TMTM--UNNUMB MSG--STATION ADDRESS
014444                          TMTM:   STATE   TNEOM
        001227                          MICPC=MICPC+1
014444  000631                          <MOVE!WRTEBR!IMM!<TNEOM-INIT&777/2>>
014446                                  ALWAYS  TF2
        001230                          MICPC=MICPC+1
014446  110532                          <JUMP!ALCOND!<TF2-INIT&3000*4>!<TF2-INIT&777/2>>

014450                          TNEOM:  BRWRTE  IMM,2                           ;END OF MESSAGE TO BR
        001231                          MICPC=MICPC+1
014450  000402                          <MOVE!WRTEBR!IMM!<2>>

014452                                  OUTPUT  BR,<SELB!OTMTCO>
        001232                          MICPC=MICPC+1
014452  062231                          <MOVE!WROUT!BR!<SELB!OTMTCO>>

014454                                  OUTPUT  BR,<SELB!TMTDAT>                ;OUTPUT A GARBAGE CHARACTER
        001233                          MICPC=MICPC+1
014454  062230                          <MOVE!WROUT!BR!<SELB!TMTDAT>>

014456                                  BRWRTE  IMM,4                           ;SET UP LINE HAS GONE IDLE MASK
        001234                          MICPC=MICPC+1
014456  000404                          <MOVE!WRTEBR!IMM!<4>>

014460                                  SPBR    BR,AORB,SP10                    ;UPDATE LINE STATUS WORD
        001235                          MICPC=MICPC+1
014460  063710                          <MOVE!SPBRX!BR!AORB!SP10>

014462                                  BRWRTE  BR,AA!SP10                      ;SHIFT STATUS LEFT
        001236                          MICPC=MICPC+1
014462  060530                          <MOVE!WRTEBR!BR!<AA!SP10>>

014464                                  BR7     10$                             ;IF HDX SET---BRANCH TO CLEAR OK TO SEND
        001237                          MICPC=MICPC+1
014464  113643                          <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>

014466                                  BRWRTE  IMM,376                         ;MASK TO TURN OFF UNNUMB PENDDING
        001240                          MICPC=MICPC+1
014466  000776                          <MOVE!WRTEBR!IMM!<376>>

014470                          5$:     SP      BR,AANDB,SP10                   ;MASK TO LINE STATUS WORD
        001241                          MICPC=MICPC+1
014470  063270                          <MOVE!SPX!BR!AANDB!SP10>

014472                                  ALWAYS  TEOM2
        001242                          MICPC=MICPC+1
014472  110734                          <JUMP!ALCOND!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>

014474                          10$:    BRWRTE  IMM,176                         ;CLEAR OK TO SEND AND UNNUMB PENPENDING
        001243                          MICPC=MICPC+1
014474  000576                          <MOVE!WRTEBR!IMM!<176>>

014476                                  ALWAYS  5$
        001244                          MICPC=MICPC+1
014476  110641                          <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
```

```
                        .SBTTL  TIMSRV--TIMEOUT ROUTINE--SENDS  REP
                        ;
                        .ENABLE LSB
014500          TIMSRV: SP      IBUS,UBBR,SPO                   ;READ UNIBUS BR REGISTER
(1)     001245          MICPC=MICPC+1
(1)     014500  123220  <MOVE!SPX!IBUS!UBBR!SPO>
(1)
014502                  BRWRTE  IMM,177                         ;MASK OFF  BR REQ
(1)     001246          MICPC=MICPC+1
(1)     014502  000577  <MOVE!WRTEBR!IMM!<177>>
(1)
                                                                ;RESET TIMER---SLICK MOVE
                                                                ;SINCE TIMER IS RESET BY WRITING
                                                                ;A 1 AND THE EXPIRATION   LOCKS
                                                                ;LIKE 1--VOILA
014504                  OUT     BR,<AANDB!OBR>                  ;AND THE BIT ON
(1)     001247          MICPC=MICPC+1
(1)     014504  061271  <MOVE!WROUTX!BR!<AANDB!OBR>>
(1)
014506                  BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
(1)     001250          MICPC=MICPC+1
(1)     014506  060601  <MOVE!WRTEBR!BR!<SELA!SP1>>
(1)
014510                  BR7     IDLE                            ;IF IN MAINT. MODE DISABLE TIMER
(1)     001251          MICPC=MICPC+1
(1)     014510  103445  <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
014512                  SP      BR,DECA,SP15                    ;DECREMENT THE COUNTER
(1)     001252          MICPC=MICPC+1
(1)     014512  063175  <MOVE!SPX!BR!DECA!SP15>
(1)
014514                  Z       20$                             ;IF ALL ONES HAS EXPIRED
(1)     001253          MICPC=MICPC+1
(1)     014514  111662  <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
(1)
014516          10$:    BRWRTE  BR,SELA!SP10            ;READ LINE STATUS
(1)     001254          MICPC=MICPC+1
(1)     014516  060610  <MOVE!WRTEBR!BR!<SELA!SP10>>
(1)
014520                  BR1     TABUPD                          ;NUMBERED MESSAGE IN PROGRESS
(1)     001255          MICPC=MICPC+1
(1)     014520  116737  <JUMP!BR1CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
(1)
014522                  BR0     TABUPD                          ;UNNUMBMSGIN PROGRESS
(1)     001256          MICPC=MICPC+1
(1)     014522  116337  <JUMP!BR0CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
(1)
014524                  BRSHFT
(1)     001257          MICPC=MICPC+1
(1)     014524  001620  <MOVE!SHFTBR!WRTEBR!SELB>
(1)
014526                  BR4     IDLE                            ;START MODE
(1)     001260          MICPC=MICPC+1
(1)     014526  103045  <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
014530                  ALWAYS  SNDACK                          ;ELSE SEND ACK
```

```
(1)             001261
(1)  014530     110727          MICPC=MICPC+1
(1)                             <JUMP!ALCOND!<SNDACK-INIT&3000*4>!<SNDACK-INIT&777/2>>
(1)
1555  014532
1556  014532                    TIME1:
(1)             001262    20$:  BRWRTE  IMM,2                           ;
(1)  014532     000402          MICPC=MICPC+1
(1)                             <MOVE!WRTEBR!IMM!<2>>
(1)
1557  014534                    SP      BR,SELB,SP15                    ;RESET THE TIMER TICK COUNT
(1)             001263          MICPC=MICPC+1
(1)  014534     063235          <MOVE!SPX!BR!SELB!SP15>
(1)
1560  014536                    BRWRTE  DP,<SELA!SP10>                  ;READ LINE STATUS WORD
(1)             001264          MICPC=MICPC+1
(1)  014536     060610          <MOVE!WRTEBR!DP!<SELA!SP10>>
(1)
1561  014540                    BRSHFT
(1)             001265          MICPC=MICPC+1
(1)  014540     001620          <MOVE!SHFTBR!WRTEBR!SELB>
(1)
1562  014542                    BR4     BS1                             ;IF IN START MODE--BRANCH
(1)             001266          MICPC=MICPC+1
(1)  014542     103076          <JUMP!BR4CON!<BS1-INIT&3000*4>!<BS1-INIT&777/2>>
(1)
1563  014544                    BRWRTE  BR,DECA!SP12                    ;GET LAST NUMBER SENT
(1)             001267          MICPC=MICPC+1
(1)  014544     060572          <MOVE!WRTEBR!BR!<DECA!SP12>>
(1)
1564  014546                    CMP     BR,SP17                         ;COMPARE TO LAST ACKED
(1)             001270          MICPC=MICPC+1
(1)  014546     060377          <SUBTC!BR!SP17>
(1)
1565  014550                    Z       10$                     ;IF EQ --SEND ACK
(1)             001271          MICPC=MICPC+1
(1)  014550     111654          <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
(1)
1566  014552                TIME2:  LDMA    IMM,T                           ;LOAD ADDRESS OF TYPE FIELD IN UNNUMB SK
(1)             001272          MICPC=MICPC+1
(1)                 001         .IF IDN IMM,IMM
(1)  014552     010153          <MOVE!LDMAR!IMM!<T&377>>
(1)                             .IFF
(1)                             <MOVE!LDMAR!IMM!<T>>
(1)                 000         .ENDC
(1)
1567  014554                    MEMINC  IMM,3                           ;LOAD REP TYPE
(1)             001273          MICPC=MICPC+1
(1)  014554     016403          <MOVE!WRMEM!INCMAR!IMM!<3>>
(1)
1570  014556                    MEMINC  IMM,300                         ;ZERO THE SUB-TYPE
(1)             001274          MICPC=MICPC+1
(1)  014556     016700          <MOVE!WRMEM!INCMAR!IMM!<300>>
(1)
1571  014560                    LDMA    IMM,REPCS                       ;CUMULATIVE REPS RECD
(1)             001275          MICPC=MICPC+1
(1)                 001         .IF IDN IMM,IMM
(1)  014560     010015          <MOVE!LDMAR!IMM!<REPCS&377>>
```

```
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<REPCS>>
(1)                 000                 .ENDC
(1)
1568  014562                            SP      MEMX,SELB,SPO                   ;COPY IT TO SPO
(1)             001276                  MICPC=MICPC+1
(1)   014562    043220                  <MOVE!SPX!MEMX!SELB!SPO>
(1)
1569  014564                            MEM     BR,INCA!SPO                     ;INCREMENT IT
(1)             001277                  MICPC=MICPC+1
(1)   014564    062460                  <MOVE!WRMEM!BR!<INCA!SPO>>
(1)
1570  014566                            LDMA    IMM,REPST                       ;ADDRESS DYNAMIC REP COUNTER
(1)             001300                  MICPC=MICPC+1
(1)                 001                 .IF IDN IMM,IMM
(1)   014566    010003                  <MOVE!LDMAR!IMM!<REPST&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<REPST>>
(1)                 000                 .ENDC
(1)
1571  014570                            BRWRTE  MEMX,SELB                       ;COPY IT TO THE BR
(1)             001301                  MICPC=MICPC+1
(1)   014570    040620                  <MOVE!WRTEBR!MEMX!<SELB>>
(1)
1572  014572                            BSHFTB
(1)             001302                  MICPC=MICPC+1
(1)   014572    061620                  <MOVE!SHFTBR!SELB!BR>
(1)
1573  014574                            MEM     BR,SELB
(1)             001303                  MICPC=MICPC+1
(1)   014574    062620                  <MOVE!WRMEM!BR!<SELB>>
(1)
1574  014576                            BRO     RTHRES
(1)             001304                  MICPC=MICPC+1
(1)   014576    102353                  <JUMP!BROCON!<RTHRES-INIT&3000*4>!<RTHRES-INIT&777/2>>
(1)
1575  014600                            BRWRTE  IMM,201                         ;MASK FOR OK TO SEND
(1)             001305                  MICPC=MICPC+1
(1)   014600    000601                  <MOVE!WRTEBR!IMM!<201>>
(1)
1576  014602                            SP      BR,AORB,SP10                    ;OR IT IN
(1)             001306                  MICPC=MICPC+1
(1)   014602    063310                  <MOVE!SPX!BR!AORB!SP10>
(1)
1577  014604                            ALWAYS  IDLE
(1)             001307                  MICPC=MICPC+1
(1)   014604    100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
(1)
1578                                    .DSABLE LSB
1579                                    ;
```

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 1581  014606                          TEOM:   BRWRTE  IBUS,UBBR
  (1)                                           MICPC=MICPC+1
  (1)  014606  120620                           <MOVE!WRTEBR!IBUS!<UBBR>>
  (1)
 1582  014610                                  BRO     NXMERR                          ;NON-EXISTANT MEMORY
  (1)                                           MICPC=MICPC+1
  (1)  014610  116063                           <JUMP!BROCON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
  (1)
 1583  014612                                  BRWRTE  IMM,2                           ;EOM TO BR
  (1)                                           MICPC=MICPC+1
  (1)  014612  000402                           <MOVE!WRTEBR!IMM!<2>>
  (1)
 1584  014614                                  OUTPUT  BR,<SELB!OTMTCO>                ;WRITE TMTR CONTROL
  (1)                                           MICPC=MICPC+1
  (1)  014614  062231                           <MOVE!WROUT!BR!<SELB!OTMTCO>>
  (1)
 1585  014616                                  OUTPUT  BR,<SELB!TMTDAT>                ;WRITE GARBAGE DATA
  (1)                                           MICPC=MICPC+1
  (1)  014616  062230                           <MOVE!WROUT!BR!<SELB!TMTDAT>>
  (1)
 1586  014620                                  BRWRTE  BR,SELA!SP1                     ;CKECK FOR BOOT MODE
  (1)                                           MICPC=MICPC+1
  (1)  014620  060601                           <MOVE!WRTEBR!BR!<SELA!SP1>>
  (1)
 1587  014622                                  BR7     BTEOM                           ;---IF SET IS MAINT MSG
  (1)                                           MICPC=MICPC+1
  (1)  014622  113755                           <JUMP!BR7CON!<BTEOM-INIT&3000*4>!<BTEOM-INIT&777/2>>
  (1)
 1588  014624                                  SP      BR,INCA,SP12                    ;INCREMENT THE MESSAGE NUMBER
  (1)                                           MICPC=MICPC+1
  (1)  014624  063272                           <MOVE!SPX!BR!INCA!SP12>
  (1)
 1589  014626                          TEOM1:  LDMA    IMM,LTC                         ;ADDRESS LAST TMT LINK
  (1)                                           MICPC=MICPC+1
  (1)                                           .IF IDN IMM,IMM
  (1)  014626  010071                           <MOVE!LDMAR!IMM!<LTC&377>>
  (1)
  (1)                                           .IFF
  (1)                                           <MOVE!LDMAR!IMM!<LTC>>
  (1)                                           .ENDC
  (1)
 1590  014630                                  LDMA    MEMX,SELB
  (1)                                           MICPC=MICPC+1
  (1)                                           .IF IDN MEMX,IMM
  (1)                                           <MOVE!LDMAR!IMM!<SELB&377>>
  (1)
  (1)                                           .IFF
  (1)  014630  050220                           <MOVE!LDMAR!MEMX!<SELB>>
  (1)                                           .ENDC
  (1)
 1591  014632                                  BRWRTE  MEMX,SELB
  (1)                                           MICPC=MICPC+1
  (1)  014632  040620                           <MOVE!WRTEBR!MEMX!<SELB>>
  (1)
 1592  014634                                  BRO     TEOM2
  (1)                                           MICPC=MICPC+1
  (1)  014634  112334                           <JUMP!BROCON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
  (1)
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1593  014636                    TEOM3:  BRWRTE  IMM,375                 ;TURN OFF MESSAGE PENDING
 (1)          001324                    MICPC=MICPC+1
 (1)  014636  000775                    <MOVE!WRTEBR!IMM!<375>>
 (1)
1594  014640                            SPBR    BR,AANDB,SP10           ;
 (1)          001325                    MICPC=MICPC+1
 (1)  014640  063670                    <MOVE!SPBRX!BR!AANDB!SP10>
 (1)
1595  014642                            BRO     TEOM2                   ;IF UNNUMB PENDING--GO AWAY
 (1)          001326                    MICPC=MICPC+1
 (1)  014642  112334                    <JUMP!BROCON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
 (1)
1596                                    .SBTTL  SNDACK--ROUTINE TO SEND AN ACK
1597  014644                    SNDACK: LDMA    IMM,T
 (1)          001327                    MICPC=MICPC+1
 (1)            001                     .IF IDN IMM,IMM
 (1)  014644  010153                    <MOVE!LDMAR!IMM!<T&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<T>>
 (1)            000                     .ENDC
 (1)
1598  014646                            MEMINC  IMM,1
 (1)          001330                    MICPC=MICPC+1
 (1)  014646  016401                    <MOVE!WRMEM!INCMAR!IMM!<1>>
 (1)
1599  014650                            BRWRTE  IMM,5
 (1)          001331                    MICPC=MICPC+1
 (1)  014650  000405                    <MOVE!WRTEBR!IMM!<5>>
 (1)
1600  014652                    SA2:    MEMINC  IMM,300
 (1)          001332                    MICPC=MICPC+1
 (1)  014652  016700                    <MOVE!WRMEM!INCMAR!IMM!<300>>
 (1)
1601  014654                    SA3:    SP      BR,AORB,SP10
 (1)          001333                    MICPC=MICPC+1
 (1)  014654  063310                    <MOVE!SPX!BR!AORB!SP10>
 (1)
1602                                    .
1603  014656                    TEOM2:  STATE   TMTA
 (1)          001334                    MICPC=MICPC+1
 (1)  014656  000403                    <MOVE!WRTEBR!IMM!<TMTA-INIT&777/2>>
1604  014660                            ALWAYS  XEXIT
 (1)          001335                    MICPC=MICPC+1
 (1)  014660  100451                    <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
 (1)
1605  014662                    FUDGE:  BRWRTE  IBUS,NPR                ;READ NPR CONTROL
 (1)          001336                    MICPC=MICPC+1
 (1)  014662  120600                    <MOVE!WRTEBR!IBUS!<NPR>>
 (1)
1606  014664                            BRO     IDLE                    ;IF NPR GOING---LEAVE
 (1)          001337                    MICPC=MICPC+1
 (1)  014664  102045                    <JUMP!BROCON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
 (1)
1607  014666                            BRWRTE  BR!LDMAR,SELA!SP4       ;LOAD THE MAR
 (1)          001340                    MICPC=MICPC+1
 (1)  014666  070604                    <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
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 (1)
1608  014670                        BR7     BS2                     ;IF SET - READ BACK ALL 200
 (1)          001341                MICPC=MICPC+1
 (1)  014670  103505                <JUMP!BR7CON!<BS2-INIT&3000*4>!<BS2-INIT&777/2>>
 (1)
1609  014672                        MEMINC  IBUS,INDAT1             ;OTHERWISE RESTORE TWO BYTES
 (1)          001342                MICPC=MICPC+1
 (1)  014672  036400                <MOVE!WRMEM!INCMAR!IBUS!<INDAT1>>
 (1)
1610  014674                        MEMINC  IBUS,INDAT2             ;..
 (1)          001343                MICPC=MICPC+1
 (1)  014674  036420                <MOVE!WRMEM!INCMAR!IBUS!<INDAT2>>
 (1)
1611  014676                        BRWRTE  IMM,2                   ;UPDATE---UNIBUS ADDRESS
 (1)          001344                MICPC=MICPC+1
 (1)  014676  000402                <MOVE!WRTEBR!IMM!<2>>
 (1)
1612  014700                        SP      BR,ADD,SP4              ;UPDATE NPR COUNTER
 (1)          001345                MICPC=MICPC+1
 (1)  014700  063004                <MOVE!SPX!BR!ADD!SP4>
 (1)
1613  014702                        SP      IBUS,IIBA1,SPO          ;UPDATE ADDRESS LOW
 (1)          001346                MICPC=MICPC+1
 (1)  014702  023100                <MOVE!SPX!IBUS!IIBA1!SPO>
 (1)
1614  014704                        OUTPUT  BR,ADD!IBA1
 (1)          001347                MICPC=MICPC+1
 (1)  014704  062004                <MOVE!WROUT!BR!<ADD!IBA1>>
 (1)
1615  014706                        SP      IBUS,IIBA2,SPO          ;READ HIGH ADDRESS
 (1)          001350                MICPC=MICPC+1
 (1)  014706  023120                <MOVE!SPX!IBUS!IIBA2!SPO>
 (1)
1616  014710                        OUTPUT  BR,AC!IBA2              ;UPDATE HIGH
 (1)          001351                MICPC=MICPC+1
 (1)  014710  062105                <MOVE!WROUT!BR!<AC!IBA2>>
 (1)
1617  014712                        C       RESEXT                  ;IF CARRY---UPDATE MXT
 (1)          001352                MICPC=MICPC+1
 (1)  014712  105367                <JUMP!CCOND!<RESEXT-INIT&3000*4>!<RESEXT-INIT&777/2>>
 (1)
1618  014714                RES1:   SP      IBUS,NPR,SPO            ;READ NPR REGISTER
 (1)          001353                MICPC=MICPC+1
 (1)  014714  123200                <MOVE!SPX!IBUS!NPR!SPO>
 (1)
1619  014716                        ALWAYS  TH3X                    ;GO DO ANOTHER NPR
 (1)          001354                MICPC=MICPC+1
 (1)  014716  110574                <JUMP!ALCOND!<TH3X-INIT&3000*4>!<TH3X-INIT&777/2>>
 (1)
1620  014720                BTEOM:  BRWRTE  IMM,374                 ;MASK FOR CLEAR MSG PENDING
 (1)          001355                MICPC=MICPC+1
 (1)  014720  000774                <MOVE!WRTEBR!IMM!<374>>
 (1)
1621  014722                        SP      BR,AANDB,SP10           ;TURN THEM OFF IN LINE STATUS WORD
 (1)          001356                MICPC=MICPC+1
 (1)  014722  063270                <MOVE!SPX!BR!AANDB!SP10>
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  (1)
1622  014724                        SP      ' BR,SELB,SP13          ;STORE UNRECOGNIZABLE VALUE INTO SP13
  (1)           001357              MICPC=MICPC+1
  (1)  014724   063233              <MOVE!SPX!BR!SELB!SP13>
  (1)
1623                                                                ;SO "RH3" WILL EXIT BACK TO IDLE LOOP
1624  014726                        LDMA    IMM,STC                 ;ADDRESS START OF TMT  CHAIN
  (1)           001360              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  014726   010070              <MOVE!LDMAR!IMM!<STC&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<STC>>
  (1)              000              .ENDC
  (1)
1625  014730                        SP      MEMX,SELB,SP0           ;COPY LINK ADDRESS
  (1)           001361              MICPC=MICPC+1
  (1)  014730   043220              <MOVE!SPX!MEMX!SELB!SP0>
  (1)
1626  014732                        TSTATE  NUMSYN                  ;CHANGE XMIT STATE TO LINE IS IDLE
  (1)           001362              MICPC=MICPC+1
  (1)  014732   000431              <MOVE!WRTEBR!IMM!<NUMSYN-INIT&777/2>>
  (1)           001363              MICPC=MICPC+1
  (1)  014734   063222              <MOVE!SPX!BR!SELB!SP2>
1627  014736                        ALWAYS  TDON2                   ;POST A DONE
  (1)           001364              MICPC=MICPC+1
  (1)  014736   114534              <JUMP!ALCOND!<TDON2-INIT&3000*4>!<TDON2-INIT&777/2>>
  (1)
1628  014740                  RL4:  RSTATE  RCVL
  (1)           001365              MICPC=MICPC+1
  (1)  014740   000715              <MOVE!WRTEBR!IMM!<RCVL-INIT&777/2>>
  (1)           001366              MICPC=MICPC+1
  (1)  014742   063223              <MOVE!SPX!BR!SELB!SP3>
1629  014744                        SP      IBUS,NPR,SP0            ;READ NPR CONTROL REGISTER
  (1)           001367              MICPC=MICPC+1
  (1)  014744   123200              <MOVE!SPX!IBUS!NPR!SP0>
  (1)
1630              001               .IF NDF LOW
1631                                BRWRTE  IMM,200                 ;MASK FOR CO
1632                                OUT     BR,<AORB!ONPR>          ;SET CO
1633                                ALWAYS  RK2
1634              000               .ENDC
1635              001               .IF DF  LOW
1636  014746                        BRWRTE  IMM,221
  (1)           001370              MICPC=MICPC+1
  (1)  014746   000621              <MOVE!WRTEBR!IMM!<221>>
  (1)
1637  014750                        ALWAYS  RK7
  (1)           001371              MICPC=MICPC+1
  (1)  014750   104643              <JUMP!ALCOND!<RK7-INIT&3000*4>!<RK7-INIT&777/2>>
  (1)
1638              000               .ENDC
1639  014752                  HOINCH: SP      IBUS,IIBA2,SP0
  (1)           001372              MICPC=MICPC+1
  (1)  014752   023120              <MOVE!SPX!IBUS!IIBA2!SP0>
  (1)
1640  014754                        OUTPUT  BR,INCA!IBA2                    ;OUTPUT INCREMENTED BA
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  (1)           001373                  MICPC=MICPC+1
  (1)  014754   062065                  <MOVE!WROUT!BR!<INCA!IBA2>>
  (1)
1641   014756                           C       5$                              ;INCREMENT BYTEW COUNT
  (1)           001374                  MICPC=MICPC+1
  (1)  014756   111376                  <JUMP!CCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
  (1)
1642   014760                           ALWAYS  TH8
  (1)           001375                  MICPC=MICPC+1
  (1)  014760   110565                  <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
  (1)
1643                                     ;INCREMENT MXT BITS
1644   014762                    5$:     SP      IBUS,NPR,SPO                    ;READ NPR REG IWTH CURRENT MXT BITS
  (1)           001376                  MICPC=MICPC+1
  (1)  014762   123200                  <MOVE!SPX!IBUS!NPR!SPO>
  (1)
1645   014764                           BRWRTE  IMM,4                           ;WRITE BIT TO ADD
  (1)           001377                  MICPC=MICPC+1
  (1)  014764   000404                  <MOVE!WRTEBR!IMM!<4>>
  (1)
1646   014766                           OUT     BR,<ADD!ONPR>                   ;TURN ON PROPER MXT BITS
  (1)           001400                  MICPC=MICPC+1
  (1)  014766   061010                  <MOVE!WROUTX!BR!<ADD!ONPR>>
  (1)
1647   014770                           ALWAYS  TH8
  (1)           001401                  MICPC=MICPC+1
  (1)  014770   110565                  <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
  (1)
1648                                     ;
1649   014772                    HEH1:   STATE   TEOM
  (1)           001402                  MICPC=MICPC+1
  (1)  014772   000710                  <MOVE!WRTEBR!IMM!<TEOM-INIT&777/2>>
1650   014774                           ALWAYS  XEXIT
  (1)           001403                  MICPC=MICPC+1
  (1)  014774   100451                  <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
  (1)
1651                                     ;
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1653
1654  014776                    REP:    LDMA    IMM,REPCR               ;LOAD MAR ADDRESS WITH POINTER TO REPS RECD
 (1)          001404                    MICPC=MICPC+1
 (1)             001                    .IF IDN IMM,IMM
 (1)  014776  010016                    <MOVE!LDMAR!IMM!<REPCR&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<REPCR>>
 (1)             000                    .ENDC
 (1)
1655  015000                            SP      MEMX,SELB,SP0           ;READ NUMBER OF REPS RECD
 (1)          001405                    MICPC=MICPC+1
 (1)  015000  043220                    <MOVE!SPX!MEMX!SELB!SP0>
 (1)
1656  015002                            MEM     DP,<INCA!SP0>           ;INCREMNT REPS RECD
 (1)          001406                    MICPC=MICPC+1
 (1)  015002  062460                    <MOVE!WRMEM!DP!<INCA!SP0>
 (1)
1657  015004                            LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
 (1)          001407                    MICPC=MICPC+1
 (1)             001                    .IF IDN IMM,IMM
 (1)  015004  010153                    <MOVE!LDMAR!IMM!<T&377>>
 (1)                                    .IFF
 (1)                                    <MOVE!LDMAR!IMM!<T>>
 (1)             000                    .ENDC
 (1)
1658  015006                            MEMINC  IMM,2                   ; LOAD NAK TYPE
 (1)          001410                    MICPC=MICPC+1
 (1)  015006  016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
 (1)
1659  015010                            MEMINC  IMM,303                 ;LOAD REP RESPONSE SUB-TYPE
 (1)          001411                    MICPC=MICPC+1
 (1)  015010  016703                    <MOVE!WRMEM!INCMAR!IMM!<303>>
 (1)
1660  015012                            ALWAYS  SNAK                    ;SEND AN UNNUMB MSG
 (1)          001412                    MICPC=MICPC+1
 (1)  015012  114712                    <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
 (1)
1661                                    ;
1662                                    .SBTTL  START HANDLER
1663  015014                    START:  BRWRTE  DP,<SELA!SP10>          ;READ LINE STATUS WORD
 (1)          001413                    MICPC=MICPC+1
 (1)  015014  060610                    <MOVE!WRTEBR!DP!<SELA!SP10>>
 (1)
1664  015016                            BRSHFT                          ;GET START MODE BIT IN TESTABLE POSITION
 (1)          001414                    MICPC=MICPC+1
 (1)  015016  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1665  015020                            BR4     10$                     ;IF IN START MODE SET STACK
 (1)          001415                    MICPC=MICPC+1
 (1)  015020  117021                    <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1666                                                                    ;ELSE SET UP START ERROR
1667  015022                            LDMA    IMM,<<RTHRS+3>>
 (1)          001416                    MICPC=MICPC+1
 (1)             001                    .IF IDN IMM,IMM
 (1)  015022  010177                    <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
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  (1)                                       .IFF
  (1)                                       <MOVE!LDMAR!IMM!<<RTHRS+3>>>
  (1)             000                       .ENDC
  (1)
1668  015024                                BRWRTE  IMM,200
  (1)             001417                    MICPC=MICPC+1
  (1)  015024     000600                    <MOVE!WRTEBR!IMM!<200>>
  (1)
1669  015026                                ALWAYS  RCEXY
  (1)             001420                    MICPC=MICPC+1
  (1)  015026     114525                    <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
  (1)
1670  015030                          10$:   LDMA    IMM,T                    ;SET UP ADDRESS OF TYPE FIELD
  (1)             001421                    MICPC=MICPC+1
  (1)                001                    .IF IDN IMM,IMM
  (1)  015030     010153                    <MOVE!LDMAR!IMM!<T&377>>
  (1)                                       .IFF
  (1)                                       <MOVE!LDMAR!IMM!<T>>
  (1)             000                       .ENDC
  (1)
1671  015032                                MEMINC  IMM,7                    ;WRITE STACK TYPE
  (1)             001422                    MICPC=MICPC+1
  (1)  015032     016407                    <MOVE!WRMEM!INCMAR!IMM!<7>>
  (1)
1672  015034                                BRWRTE  IMM,11                   ;SET START RECD AND UNNUMB PENDING
  (1)             001423                    MICPC=MICPC+1
  (1)  015034     000411                    <MOVE!WRTEBR!IMM!<11>>
  (1)
1673  015036                                ALWAYS  SA2                      ;SEND THE UNNUMBERED MESSAGE
  (1)             001424                    MICPC=MICPC+1
  (1)  015036     110732                    <JUMP!ALCOND!<SA2-INIT&3000*4>!<SA2-INIT&777/2>>
  (1)
1674                                        ;
1675                                        .SBTTL  STACK HANDLER
1676  015040                          STACK: BRWRTE  IMM,327                  ;MASK TO CLEAR START MODE
  (1)             001425                    MICPC=MICPC+1
  (1)  015040     000727                    <MOVE!WRTEBR!IMM!<327>>
  (1)
1677  015042                                SP      BR,AANDB,SP10            ;CLEAR START MODE
  (1)             001426                    MICPC=MICPC+1
  (1)  015042     063270                    <MOVE!SPX!BR!AANDB!SP10>
  (1)
1678  015044                                ALWAYS  TIME1                    ;RESET TIMER AND IDLE
  (1)             001427                    MICPC=MICPC+1
  (1)  015044     110662                    <JUMP!ALCOND!<TIME1-INIT&3000*4>!<TIME1-INIT&777/2>>
  (1)
```

```
1680  015046
 (1)          001430
 (1)  015046  023160
 (1)
1681  015050
 (1)          001431
 (1)  015050  062067
 (1)
1682  015052
 (1)          001432
 (1)  015052  115034
 (1)
1683  015054
 (1)          001433
 (1)  015054  104660
 (1)
1684
1685  015056
 (1)          001434
 (1)  015056  123220
 (1)
1686  015060
 (1)          001435
 (1)  015060  000404
 (1)
1687  015062
 (1)          001436
 (1)  015062  061011
 (1)
1688  015064
 (1)          001437
 (1)  015064  104660
 (1)
1689  015066
 (1)          001440
 (1)  015066  003200
 (1)
1690  015070
 (1)          001441
 (1)  015070  062212
 (1)
1691  015072
 (1)          001442
 (1)  015072  104575
 (1)
1692  015074
 (1)          001443
 (1)             001
 (1)  015074  010070
 (1)
 (1)
 (1)             000
 (1)
1693  015076
 (1)          001444
 (1)  015076  057220
```

```
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  RK9
        MICPC=MICPC+1
        <JUMP!ALCOND!<RK9-INIT&3000*4>!<RK9-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  RK9
        MICPC=MICPC+1
        <JUMP!ALCOND!<RK9-INIT&3000*4>!<RK9-INIT&777/2>>

FLUSH1: SP      IMM,200,SPO                     ;FLUSH THE RECVR
        MICPC=MICPC+1
        <MOVE!SPX!IMM!200!SPO>

        OUTPUT  BR,<SELA!ORCVCO>
        MICPC=MICPC+1
        <MOVE!WROUT!BR!<SELA!ORCVCO>>

        ALWAYS  CG1
        MICPC=MICPC+1
        <JUMP!ALCOND!<CG1-INIT&3000*4>!<CG1-INIT&777/2>>

NAK:    LDMA    IMM,STC                 ;ADDRESS START OF TMT CHAIN
        MICPC=MICPC+1
        .IF IDN IMM,IMM
        <MOVE!LDMAR!IMM!<STC&377>>
        .IFF
        <MOVE!LDMAR!IMM!<STC>>
        .ENDC

        SP      MEMX!INCMAR,SELB,SPO            ;COPY IT TO SPO
        MICPC=MICPC+1
        <MOVE!SPX!MEMX!INCMAR!SELB!SPO>
```

```
  (1)
1694  015100                        MEM     BR,SELA!SP0             ;COPY START  OF CHAIN
  (1)         001445                MICPC=MICPC+1
  (1)  015100 062600                <MOVE!WRMEM!BR!<SELA!SP0>>
  (1)
1695  015102                        BRWRTE  BR,INCA!SP17                    ;GETLASTMESSAGE ACKED
  (1)         001446                MICPC=MICPC+1
  (1)  015102 060477                <MOVE!WRTEBR!BR!<INCA!SP17>>
  (1)
1696  015104                        SP      BR,SELB,SP12                    ;COPY TO CURRENT NUMBER
  (1)         001447                MICPC=MICPC+1
  (1)  015104 063232                <MOVE!SPX!BR!SELB!SP12>
  (1)
1697  015106                        BRWRTE  IMM,6                   ;WRITE NUMBERED MSG PENDING
  (1)         001450                MICPC=MICPC+1
  (1)  015106 000406                <MOVE!WRTEBR!IMM!<6>>
  (1)
1698                                                            ; AND LINE HAS GONE IDLE
1699  015110                        SP      BR,AORB,SP10            ;SET IT IN LINE STATUS WORD
  (1)         001451                MICPC=MICPC+1
  (1)  015110 063310                <MOVE!SPX!BR!AORB!SP10>
  (1)
1700  015112                        SP      BR,SELB,SP15            ;RESET TIMER COUNT
  (1)         001452                MICPC=MICPC+1
  (1)  015112 063235                <MOVE!SPX!BR!SELB!SP15>
  (1)
1701  015114                        ALWAYS  TEOM1
  (1)         001453                MICPC=MICPC+1
  (1)  015114 110720                <JUMP!ALCOND!<TEOM1-INIT&3000*4>!<TEOM1-INIT&777/2>>
  (1)
1702  015116                ININT:  BRWRTE  IMM,15                  ;MASK FOR TURN OFF ALL BUT EXT MEM BITS + NXM
  (1)         001454                MICPC=MICPC+1
  (1)  015116 000415                <MOVE!WRTEBR!IMM!<15>>
  (1)
1703  015120                        SP      IBUS,UBBR,SP0           ;READ BR  CONTROL REGISTER
  (1)         001455                MICPC=MICPC+1
  (1)  015120 123220                <MOVE!SPX!IBUS!UBBR!SP0>
  (1)
1704  015122                        SP      BR,AANDB,SP0            ;MASK OFF VECTOR TO X04
  (1)         001456                MICPC=MICPC+1
  (1)  015122 063260                <MOVE!SPX!BR!AANDB!SP0>
  (1)
1705  015124                        BRWRTE  IMM,200                 ;MASK FOR INTERRUPT
  (1)         001457                MICPC=MICPC+1
  (1)  015124 000600                <MOVE!WRTEBR!IMM!<200>>
  (1)
1706  015126                        OUT     BR,AORB!OBR             ;INTERRUPT
  (1)         001460                MICPC=MICPC+1
  (1)  015126 061311                <MOVE!WROUTX!BR!<AORB!OBR>>
  (1)
1707  015130                        SP      IBUS,INCON,SP0          ;RESTORE INPUT CONTROLCSR
  (1)         001461                MICPC=MICPC+1
  (1)  015130 123000                <MOVE!SPX!IBUS!INCON!SP0>
  (1)
1708  015132                        ALWAYS  NIDLE4
  (1)         001462                MICPC=MICPC+1
```

```
    (1)  015132  100563          <JUMP!ALCOND!<NIDLE4-INIT&3000*4>!<NIDLE4-INIT&777/2>>
    (1)
  1709                          :
```

```
                        .SBTTL NXMERR ---NON EXISTANT MEMORY HANDLER
015134          NXMERR: LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
                        MICPC=MICPC+1
                        .IF IDN IMM,IMM
015134 010177           <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
                        .IFF
                        <MOVE!LDMAR!IMM!<<RTHRS+3>>>
                        .ENDC

015136                  MEMINC  IMM,1
                        MICPC=MICPC+1
015136 016401           <MOVE!WRMEM!INCMAR!IMM!<1>>

015140                  MEM     IMM,0                   ;NXM ERROR BIT
                        MICPC=MICPC+1
015140 002400           <MOVE!WRMEM!IMM!<0>>

015142                  SP      MEMX,SELB,SP10          ;CLEAR STATUS
                        MICPC=MICPC+1
015142 043230           <MOVE!SPX!MEMX!SELB!SP10>

015144                  ALWAYS  RCEXX
                        MICPC=MICPC+1
015144 114527           <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
```

```
 1718
 1719
 1720  015146                         .SBTTL  SELQSY--ROUTINETOCHECK SELECT AND QSYNC AND DIDDLE LINE STATUS WORD
                                      ;USES SP5. ALWAYS CALLED BY FIRST INSTR IN A RSTATE
                              SELQSY: SPBR    IBUS,RCVDAT,SP5                 ;READCHARACTERINTO  SP5 AND THE BR
       001470                         MICPC=MICPC+1
 (1)   015146  023605                <MOVE!SPBRX!IBUS!RCVDAT!SP5>
 (1)
 1721  015150                         BR7     15$                             ;SELECT SET?--BRANCH
       001471                         MICPC=MICPC+1
 (1)   015150  117477                <JUMP!BR7CON!<15$-INIT&3000*4>!<15$-INIT&777/2>>
 (1)
 1722  015152                  5$:    BRWRTE  BR,AA!SP5                       ;SHIFTBR LEFT
       001472                         MICPC=MICPC+1
 (1)   015152  060525                <MOVE!WRTEBR!BR!<AA!SP5>>
 (1)
 1723  015154                         BR7     20$                             ;FINAL SET?
       001473                         MICPC=MICPC+1
 (1)   015154  117502                <JUMP!BR7CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
 (1)
 1724  015156                  10$:   BRWRTE  IMM,77                          ;MASK   TO BR
       001474                         MICPC=MICPC+1
 (1)   015156  000477                <MOVE!WRTEBR!IMM!<77>>
 (1)
 1725  015160                         SPBR    BR,AANDB,SP5                    ;TURN OFF SELECTANDFINAL
       001475                         MICPC=MICPC+1
 (1)   015160  063665                <MOVE!SPBRX!BR!AANDB!SP5>
 (1)
 1726  015162                         .ALWAY  BR,INCA,SP3!PAGE1
       001476                         MICPC=MICPC+1
 (1)   015162  164463                <JUMP!ALCOND!BR!INCA!SP3!PAGE1>
 (1)
 1727
 1728  015164                  15$:   BRWRTE  IMM,200                         ;SET OK TO SEND
       001477                         MICPC=MICPC+1
 (1)   015164  000600                <MOVE!WRTEBR!IMM!<200>>
 (1)
 1729  015166                         SP      BR,AORB,SP10                    ;IN LINE STATUS WORD
       001500                         MICPC=MICPC+1
 (1)   015166  063310                <MOVE!SPX!BR!AORB!SP10>
 (1)
 1730  015170                         ALWAYS  5$
       001501                         MICPC=MICPC+1
 (1)   015170  114472                <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
 (1)
 1731  015172                  20$:   BRWRTE  IMM,20                          ;SETCLEARACTIVE
       001502                         MICPC=MICPC+1
 (1)   015172  000420                <MOVE!WRTEBR!IMM!<20>>
 (1)
 1732  015174                         SP      BR,AORB,SP10                    ;IN LINE STATUS WORD
       001503                         MICPC=MICPC+1
 (1)   015174  063310                <MOVE!SPX!BR!AORB!SP10>
 (1)
 1733  015176                         ALWAYS  10$
       001504                         MICPC=MICPC+1
 (1)   015176  114474                <JUMP!ALCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
```

```
                                        ;FUGITIVE RECEIVE ROUTINES---DON'T FIT IN PAGE
015200                          RH1:    BRWRTE  IBUS,IOBA1                      ;READ LOW BYTE OF IN BA
        001505                          MICPC=MICPC+1
015200  020540                          <MOVE!WRTEBR!IBUS!<IOBA1>>
(1)
015202                                  BRO     RCVODD                          ;IF SET IS ODD TRANSFER
        001506                          MICPC=MICPC+1
015202  116111                          <JUMP!BROCON!<RCVODD-INIT&3000*4>!<RCVODD-INIT&777/2>>
(1)
                                        .IF NDF LOW
                                        BRWRTE  IBUS,RCVCON                     ;IS THE RECEIVER READY?
                                        BR4     RCVKEO                          ;YES--GO PROCESS
                                        .ENDC
015204                                  STATE   RCVKEO
        001507                          MICPC=MICPC+1
015204  000674                          <MOVE!WRTEBR!IMM!<RCVKEO-INIT&777/2>>
015206                                  ALWAYS  REXIT
        001510                          MICPC=MICPC+1
015206  104422                          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
(1)

015210                          RCVODD: STATE   RCVK01
        001511                          MICPC=MICPC+1
015210  000626                          <MOVE!WRTEBR!IMM!<RCVK01-INIT&777/2>>
015212                                  ALWAYS  REXIT
        001512                          MICPC=MICPC+1
015212  104422                          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
(1)

015214                          RCLOW:  CMP     MEMX,SP4                        ;COMPARE LOW ORDER BITS OF COUNT
        001513                          MICPC=MICPC+1
015214  040364                          <SUBTC!MEMX!SP4>
(1)
015216                                  C       RCFATL                          ;CARRY--TOO BIG
        001514                          MICPC=MICPC+1
015216  115116                          <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
(1)
015220                                  ALWAYS  RC5                     ;ELSE CONTINUE
        001515                          MICPC=MICPC+1
015220  104475                          <JUMP!ALCOND!<RC5-INIT&3000*4>!<RC5-INIT&777/2>>
(1)
015222                          RCFATL: LDMA    IMM,T
        001516                          MICPC=MICPC+1
           001                          .IF IDN IMM,IMM
015222  010153                          <MOVE!LDMAR!IMM!<T&377>>
(1)                                     .IFF
(1)                                     <MOVE!LDMAR!IMM!<T>>
(1)             000                     .ENDC
(1)
015224                                  MEMINC  IMM,2
        001517                          MICPC=MICPC+1
015224  016402                          <MOVE!WRTMEM!INCMAR!IMM!<2>>
(1)
015226                                  MEM     IMM,311
        001520                          MICPC=MICPC+1
015226  002711                          <MOVE!WRTMEM!IMM!<311>>
```

```
  (1)
1754  015230                        LDMA    IMM,<<RTHRS+1>>          ;ADDRESS ERROR LINK
  (1)           001521              MICPC=MICPC+1
  (1)              001              .IF IDN IMM,IMM
  (1)  015230  010175               <MOVE!LDMAR!IMM!<<RTHRS+1>&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<<RTHRS+1>>>
  (1)                 000           .ENDC
  (1)
1755  015232                        MEMINC  IBUS,IOBA1
  (1)           001522              MICPC=MICPC+1
  (1)  015232  036540               <MOVE!WRMEM!INCMAR!IBUS!<IOBA1>>
  (1)
1756  015234                        MEMINC  IBUS,IOBA2
  (1)           001523              MICPC=MICPC+1
  (1)  015234  036560               <MOVE!WRMEM!INCMAR!IBUS!<IOBA2>>
  (1)
1757  015236                        BRWRTE  IMM,20
  (1)           001524              MICPC=MICPC+1
  (1)  015236  000420               <MOVE!WRTEBR!IMM!<20>>
  (1)
1758  015240                  RCEXY:  MEMINC  IMM,0
  (1)           001525              MICPC=MICPC+1
  (1)  015240  016400               <MOVE!WRMEM!INCMAR!IMM!<0>>
  (1)
1759  015242                        MEM     BR,SELB
  (1)           001526              MICPC=MICPC+1
  (1)  015242  062620               <MOVE!WRMEM!BR!<SELB>>
  (1)
1760  015244                  RCEXX:  OUTPUT  IMM,<200!ORCVC0>         ;FLUSH THE INPUT SILO
  (1)           001527              MICPC=MICPC+1
  (1)  015244  002212               <MOVE!WROUT!IMM!<200!ORCVC0>>
  (1)
1761  015246                        SP      IMM,1,SP1        ;SET INIT MODE IN PORT STATUS WORD
  (1)           001530              MICPC=MICPC+1
  (1)  015246  003001               <MOVE!SPX!IMM!1!SP1>
  (1)
1762  015250                        ALWAYS  NTRS1
  (1)           001531              MICPC=MICPC+1
  (1)  015250  114674               <JUMP!ALCOND!<NTRS1-INIT&3000*4>!<NTRS1-INIT&777/2>>
  (1)
1763                                ;
1764  015252                  TDON3:  BRWRTE  MEMX,SUB!SP17                    ;COMPARE RESPONSE TO MSG NO
  (1)           001532              MICPC=MICPC+1
  (1)  015252  040757               <MOVE!WRTEBR!MEMX!<SUB!SP17>>
  (1)
1765  015254                        BR7     RH3                              ;IF NEGATIVE EXIT
  (1)           001533              MICPC=MICPC+1
  (1)  015254  107567               <JUMP!BR7CON!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
  (1)
1766  015256                  TDON2:  LDMA    BR,SELA!SP0                      ;ADDRESS THE TRANSMITLINK
  (1)           001534              MICPC=MICPC+1
  (1)              001              .IF IDN BR,IMM
  (1)                               <MOVE!LDMAR!IMM!<SELA!SP0&377>>
  (1)                               .IFF
  (1)  015256  070200               <MOVE!LDMAR!BR!<SELA!SP0>>
```

```
  (1)                 000                       .ENDC
  (1)
1767  015260                                    MEM     IMM,0                       ;TURN OF ASSIGNEDAND TMTED BITS IN FLAG
  (1)               001535                      MICPC=MICPC+1
  (1)   015260      002400                      <MOVE!WRMEM!IMM!<0>>
  (1)
1768  015262                                    LDMA    IMM,STC
  (1)               001536                      MICPC=MICPC+1
  (1)                  001                      .IF IDN IMM,IMM
  (1)   015262      010070                      <MOVE!LDMAR!IMM!<STC&377>>
  (1)                                           .IFF
  (1)                                           <MOVE!LDMAR!IMM!<STC>>
  (1)                 000                       .ENDC
  (1)
1769  015264                                    MEM     IMM,TML1                    ;ASSUME WRAPAROUND
  (1)               001537                      MICPC=MICPC+1
  (1)   015264      002473                      <MOVE!WRMEM!IMM!<TML1>>
  (1)
1770  015266                                    BRWRTE  IMM,TML8                    ;WRAPAROUND?
  (1)               001540                      MICPC=MICPC+1
  (1)   015266      000545                      <MOVE!WRTEBR!IMM!<TML8>>
  (1)
1771  015270                                    CMP     BR,SPO
  (1)               001541                      MICPC=MICPC+1
  (1)   015270      060360                      <SUBTC!BR!SPO>
  (1)
1772  015272                                    Z       TDON4                       ;YES
  (1)               001542                      MICPC=MICPC+1
  (1)   015272      115545                      <JUMP!ZCOND!<TDON4-INIT&3000*4>!<TDON4-INIT&777/2>>
  (1)
1773  015274                                    BRWRTE  IMM,6                       ;OFFSET FOR NEXT TMT LINK
  (1)               001543                      MICPC=MICPC+1
  (1)   015274      000406                      <MOVE!WRTEBR!IMM!<6>>
  (1)
1774  015276                                    MEM     BR,ADD!SPO                  ;UPDATE THE POINTER
  (1)               001544                      MICPC=MICPC+1
  (1)   015276      062400                      <MOVE!WRMEM!BR!<ADD!SPO>>
  (1)
1775  015300                              TDON4:  LDMA    IMM,NXTSP                   ;ADDRESS DONE LINK
  (1)               001545                      MICPC=MICPC+1
  (1)                  001                      .IF IDN IMM,IMM
  (1)   015300      010241                      <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                                           .IFF
  (1)                                           <MOVE!LDMAR!IMM!<NXTSP>>
  (1)                 000                       .ENDC
  (1)
1776  015302                                    LDMA    MEMX,SELB!SPX!SP3           ;ADDRESS THE LINK,COPYING
  (1)               001546                      MICPC=MICPC+1
  (1)                  001                      .IF IDN MEMX,IMM
  (1)                                           <MOVE!LDMAR!IMM!<SELB!SPX!SP3&377>>
  (1)                                           .IFF
  (1)   015302      053223                      <MOVE!LDMAR!MEMX!<SELB!SPX!SP3>>
  (1)                 000                       .ENDC
  (1)
1777                                                                              ;ITS ADDRESS TO SPO
1778  015304                                    MEMINC  IMM,200                     ;WRITE THE INTERRUPT TYPE
```

```
  (1)           001547                  MICPC=MICPC+1
  (1)  015304   016600                  <MOVE!WRMEM!INCMAR!IMM!<200>>
  (1)
 1779  015306                           MEM     BR,INCA!SPO                     ;COPY ACTUAL LINK ADDRESS
  (1)           001550                  MICPC=MICPC+1
  (1)  015306   062460                  <MOVE!WRMEM!BR!<INCA!SPO>>
  (1)
 1780  015310                           LDMA    IMM,NXTSP                       ;ADDRESS PTR INT STACK
  (1)           001551                  MICPC=MICPC+1
  (1)              001                  .IF IDN IMM,IMM
  (1)  015310   010241                  <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                                   .IFF
  (1)                                   <MOVE!LDMAR!IMM!<NXTSP>>
  (1)              000                  .ENDC
  (1)
 1781  015312                           MEM     IMM,INTSTK                      ;ASSUME WRAP AROUND
  (1)           001552                  MICPC=MICPC+1
  (1)  015312   002642                  <MOVE!WRMEM!IMM!<INTSTK>>
  (1)
 1782  015314                           BRWRTE  IMM,<<MMEND-2>>                 ;ADDRESS ENDOFINT STACK
  (1)           001553                  MICPC=MICPC+1
  (1)  015314   000776                  <MOVE!WRTEBR!IMM!<<MMEND-2>>>
  (1)
 1783  015316                           CMP     BR,SP3                          ;WRAPAROUND?
  (1)           001554                  MICPC=MICPC+1
  (1)  015316   060363                  <SUBTC!BR!SP3>
  (1)
 1784  015320                           Z       TDON40                          ;YES---BRANCH
  (1)           001555                  MICPC=MICPC+1
  (1)  015320   115560                  <JUMP!ZCOND!<TDON40-INIT&3000*4>!<TDON40-INIT&777/2>>
  (1)
 1785  015322                           BRWRTE  IMM,2                           ;OFFSET TO NEXT PAIR
  (1)           001556                  MICPC=MICPC+1
  (1)  015322   000402                  <MOVE!WRTEBR!IMM!<2>>
  (1)
 1786  015324                           MEM     BR,ADD!SP3                      ;UPDATE POINTER
  (1)           001557                  MICPC=MICPC+1
  (1)  015324   062403                  <MOVE!WRMEM!BR!<ADD!SP3>>
  (1)
 1787  015326                    TDON40: BRWRTE  IMM,20                          ;WRITE INTERUPT PENDING
  (1)           001560                  MICPC=MICPC+1
  (1)  015326   000420                  <MOVE!WRTEBR!IMM!<20>>
  (1)
 1788  015330                           SP      BR,AORB,SP1                     ;IN PORT STATUS WORD
  (1)           001561                  MICPC=MICPC+1
  (1)  015330   063301                  <MOVE!SPX!BR!AORB!SP1>
  (1)
 1789  015332                           LDMA    IMM,ETC                         ;ADDRESS NEXT EMPTY PTR
  (1)           001562                  MICPC=MICPC+1
  (1)              001                  .IF IDN IMM,IMM
  (1)  015332   010072                  <MOVE!LDMAR!IMM!<ETC&377>>
  (1)                                   .IFF
  (1)                                   <MOVE!LDMAR!IMM!<ETC>>
  (1)              000                  .ENDC
  (1)
 1790  015334                           SP      MEMX,SELB,SPO                   ;COPY IT TO SPO
```

```
  (1)          001563                    MICPC=MICPC+1
  (1)  015334  043220                    <MOVE!SPX!MEMX!SELB!SPO>
  (1)
1791   015336                            LDMA    IMM,STC                         ;GET NEXT DONE PTR
  (1)          001564                    MICPC=MICPC+1
  (1)             001                    .IF IDN IMM,IMM
  (1)  015336  010070                    <MOVE!LDMAR!IMM!<STC&377>>
  (1)                                    .IFF
  (1)                                    <MOVE!LDMAR!IMM!<STC>>
  (1)             000                    .ENDC
  (1)
1792   015340                            CMP     MEMX,SPO                        ;IDENTICAL?
  (1)          001565                    MICPC=MICPC+1
  (1)  015340  040360                    <SUBTC!MEMX!SPO>
  (1)
1793   015342                            Z       RH3                             ;FINISH PROCESSING HEADER
  (1)          001566                    MICPC=MICPC+1
  (1)  015342  105567                    <JUMP!ZCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
  (1)
1794
1795   015344                    TDON1:  LDMA    IMM,ISP17                       ;GET LAST ACKED
  (1)          001567                    MICPC=MICPC+1
  (1)             001                    .IF IDN IMM,IMM
  (1)  015344  010155                    <MOVE!LDMAR!IMM!<ISP17&377>>
  (1)                                    .IFF
  (1)                                    <MOVE!LDMAR!IMM!<ISP17>>
  (1)             000                    .ENDC
  (1)
1796   015346                            SP      MEMX,SELB,SP17                  ;STORE IT IN SP17
  (1)          001570                    MICPC=MICPC+1
  (1)  015346  043237                    <MOVE!SPX!MEMX!SELB!SP17>
  (1)
1797   015350                            LDMA    IMM,STC                         ;GET START OF TMT CHAIN
  (1)          001571                    MICPC=MICPC+1
  (1)             001                    .IF IDN IMM,IMM
  (1)  015350  010070                    <MOVE!LDMAR!IMM!<STC&377>>
  (1)                                    .IFF
  (1)                                    <MOVE!LDMAR!IMM!<STC>>
  (1)             000                    .ENDC
  (1)
1798   015352                            LDMA    MEMX,SELB!SPBRX!SPO             ;ADDRESS THE LINK
  (1)          001572                    MICPC=MICPC+1
  (1)             001                    .IF IDN MEMX,IMM
  (1)                                    <MOVE!LDMAR!IMM!<SELB!SPBRX!SPO&377>>
  (1)                                    .IFF
  (1)  015352  053620                    <MOVE!LDMAR!MEMX!<SELB!SPBRX!SPO>>
  (1)             000                    .ENDC
  (1)
1799   015354                            BRWRTE  MEMX!INCMAR,SELB                ;GET THE FLAGS
  (1)          001573                    MICPC=MICPC+1
  (1)  015354  054620                    <MOVE!WRTEBR!MEMX!INCMAR!<SELB>>
  (1)
1800   015356                            BRI     TDON3                           ;IFBUFFER ASSIGNED PROCEED
  (1)          001574                    MICPC=MICPC+1
  (1)  015356  116532                    <JUMP!BRICON!<TDON3-INIT&3000*4>!<TDON3-INIT&777/2>>
  (1)
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1801  015360                        ALWAYS  RH3                             ;ELSE---EXIT
 (1)          001575                MICPC=MICPC+1
 (1)  015360  104567                <JUMP!ALCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
 (1)
1802
1803  015362                  OVRRUN: BRWRTE  IMM,4
 (1)          001576                MICPC=MICPC+1
 (1)  015362  000404                <MOVE!WRTEBR!IMM!<4>>
 (1)
1804  015364                        ALWAYS  NTRSO
 (1)          001577                MICPC=MICPC+1
 (1)  015364  114671                <JUMP!ALCOND!<NTRSO-INIT&3000*4>!<NTRSO-INIT&777/2>>
 (1)
1805
1806                            ; INPUTS:
1807                            ;       SPO = RECEIVE CHARACTER
1808
1809  015366                    PASWRD: SP      IBUS,LNOSW,SP16         ;READ PASSWD SWITCH
 (1)          001600                MICPC=MICPC+1
 (1)  015366  023336                <MOVE!SPX!IBUS!LNOSW!SP16>
 (1)
1810  015370                        Z       10$                         ;IF ALL ONES NO RLD ENABLED
 (1)          001601                MICPC=MICPC+1
 (1)  015370  115605                <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1811  015372                        BRWRTE  IMM,6                       ;CHECK FOR ENTER MOP MODE
 (1)          001602                MICPC=MICPC+1
 (1)  015372  000406                <MOVE!WRTEBR!IMM!<6>>
 (1)
1812  015374                        CMP     BR,SPO
 (1)          001603                MICPC=MICPC+1
 (1)  015374  060360                <SUBTC!BR!SPO>
 (1)
1813  015376                        Z       20$                         ;IF EQUAL   ENTER MOP
 (1)          001604                MICPC=MICPC+1
 (1)  015376  115613                <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
 (1)
1814  015400                  10$:  BRWRTE  BR,SELA!SP1                 ;READ STATUS BYTE
 (1)          001605                MICPC=MICPC+1
 (1)  015400  060601                <MOVE!WRTEBR!BR!<SELA!SP1>>
 (1)
1815  015402                        BRSHFT                              ;SHIFT IT RIGHT
 (1)          001606                MICPC=MICPC+1
 (1)  015402  001620                <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1816  015404                        BR1     RHX                         ;MESSAGE WITH NO BUFFER ASSIGNED
 (1)          001607                MICPC=MICPC+1
 (1)  015404  106751                <JUMP!BR1CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
 (1)
1817  015406                        BRSHFT                              ;SHIFT RIGHT AGAIN
 (1)          001610                MICPC=MICPC+1
 (1)  015406  001620                <MOVE!SHFTBR!WRTEBR!SELB>
 (1)
1818  015410                        BR1     RCVMO                       ;DLE RECEIVED IN NORMAL MODE
 (1)          001611                MICPC=MICPC+1
 (1)  015410  106743                <JUMP!BR1CON!<RCVMO-INIT&3000*4>!<RCVMO-INIT&777/2>>
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  (1)
1819  015412                    ALWAYS  RK3                     ;HANDLE MAINT MODE MESSAGE
  (1)           001612          MICPC=MICPC+1
  (1)  015412   104661          <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
  (1)
1820  015414                    20$:  SP      BR,DECA,SP4             ;COUNT FOR NUMB OF COMPARES
  (1)           001613          MICPC=MICPC+1
  (1)  015414   063164          <MOVE!SPX!BR!DECA!SP4>
  (1)
1821  015416                          STATE   EM2
  (1)           001614          MICPC=MICPC+1
  (1)  015416   000746          <MOVE!WRTEBR!IMM!<EM2-INIT&777/2>>
1822  015420                    ALWAYS  REXIT
  (1)           001615          MICPC=MICPC+1
  (1)  015420   104422          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1823  015422                    RCVM1:  LDMA    IMM,ISP11                       ;ADDRESS SP11 IMAGE
  (1)           001616          MICPC=MICPC+1
  (1)              001          .IF IDN IMM,IMM
  (1)  015422   010171          <MOVE!LDMAR!IMM!<ISP11&377>>
  (1)                           .IFF
  (1)                           <MOVE!LDMAR!IMM!<ISP11>>
  (1)              000          .ENDC
  (1)
1824  015424                    MEM     BR,DECA!SP11                    ;COPY SP11
  (1)           001617          MICPC=MICPC+1
  (1)  015424   062571          <MOVE!WRMEM!BR!<DECA!SP11>>
  (1)
1825  015426                    LDMA    IMM,NXTSP
  (1)           001620          MICPC=MICPC+1
  (1)              001          .IF IDN IMM,IMM
  (1)  015426   010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                           .IFF
  (1)                           <MOVE!LDMAR!IMM!<NXTSP>>
  (1)              000          .ENDC
  (1)
1826  015430                    SP      MEMX!LDMAR,SELB,SP3                     ;COPY TO SP3
  (1)           001621          MICPC=MICPC+1
  (1)  015430   053223          <MOVE!SPX!MEMX!LDMAR!SELB!SP3>
  (1)
1827  015432                    MEMINC  IMM,204                         ;RECEIVE DONE IMAGE
  (1)           001622          MICPC=MICPC+1
  (1)  015432   016604          <MOVE!WRMEM!INCMAR!IMM!<204>>
  (1)
1828  015434                    MEM     BR!LDMAR,SELA!SP14                      ;COPY LINK ADDRWESS TO NEXT INTE
  (1)           001623          MICPC=MICPC+1
  (1)  015434   072614          <MOVE!WRMEM!BR!LDMAR!<SELA!SP14>>
  (1)
1829  015436                    MEMINC  IMM,0                           ;ZERO THE FLAGS
  (1)           001624          MICPC=MICPC+1
  (1)  015436   016400          <MOVE!WRMEM!INCMAR!IMM!<0>>
  (1)
1830  015440                    SP      IBUS,IOBA1,SP4                  ;GET BEGIN ADDRESS LOW
  (1)           001625          MICPC=MICPC+1
  (1)  015440   023144          <MOVE!SPX!IBUS!IOBA1!SP4>
  (1)
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1831  015442                        SP      IBUS,IOBA2,SP5                  ;AND HIGH BYTE
 (1)          001626                MICPC=MICPC+1
 (1)  015442  023165                <MOVE!SPX!IBUS!IOBA2!SP5>
 (1)
1832  015444                        SP      MEMX!INCMAR,SUB,SP4             ;SUBTRACT TO GET COUNT
 (1)          001627                MICPC=MICPC+1
 (1)  015444  057344                <MOVE!SPX!MEMX!INCMAR!SUB!SP4>
 (1)
1833  015446                        C       10$                     ;IF CARRY SET THEN NO CARRY!
 (1)          001630                MICPC=MICPC+1
 (1)  015446  115232                <JUMP!CCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 (1)
1834  015450                        SP      BR,DECA,SP5             ;DECREMENT HIGH BYTE OF ADDRESS
 (1)          001631                MICPC=MICPC+1
 (1)  015450  063165                <MOVE!SPX!BR!DECA!SP5>
 (1)
1835  015452                10$:    SP      MEMX!INCMAR,SUB,SP5             ;SUBTRACT FOR COUNT
 (1)          001632                MICPC=MICPC+1
 (1)  015452  057345                <MOVE!SPX!MEMX!INCMAR!SUB!SP5>
 (1)
1836  015454                        MEMINC  BR,SELA!SP5                     ;COPY TO MEMORY LINK
 (1)          001633                MICPC=MICPC+1
 (1)  015454  076605                <MOVE!WRMEM!INCMAR!BR!<SELA!SP5>>
 (1)
1837  015456                        MEMINC  BR,SELA!SP4
 (1)          001634                MICPC=MICPC+1
 (1)  015456  076604                <MOVE!WRMEM!INCMAR!BR!<SELA!SP4>>
 (1)
1838  015460                        BRWRTE  IMM,2
 (1)          001635                MICPC=MICPC+1
 (1)  015460  000402                <MOVE!WRTEBR!IMM!<2>>
 (1)
1839  015462                        LDMA    IMM,NXTSP                       ;ADDRESS NEXT INT STACK
 (1)          001636                MICPC=MICPC+1
 (1)             001                .IF IDN IMM,IMM
 (1)  015462  010241                <MOVE!LDMAR!IMM!<NXTSP&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<NXTSP>>
 (1)                 000            .ENDC
 (1)
1840  015464                        MEM     BR,ADD!SP3
 (1)          001637                MICPC=MICPC+1
 (1)  015464  062403                <MOVE!WRMEM!BR!<ADD!SP3>>
 (1)
1841  015466                        BRWRTE  IMM,<<MMEND-2>>                 ;ADDRESSEND OF INT STACK
 (1)          001640                MICPC=MICPC+1
 (1)  015466  000776                <MOVE!WRTEBR!IMM!<<MMEND-2>>>
 (1)
1842  015470                        CMP     BR,SP3                          ;WRAP AROUND
 (1)          001641                MICPC=MICPC+1
 (1)  015470  060363                <SUBTC!BR!SP3>
 (1)
1843  015472                        Z       RMIFLP                          ;IFYES-- BRANCH
 (1)          001642                MICPC=MICPC+1
 (1)  015472  115644                <JUMP!ZCOND!<RMIFLP-INIT&3000*4>!<RMIFLP-INIT&777/2>>
 (1)
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1844  015474                        ALWAYS  RMX1
 (1)          001643                MICPC=MICPC+1
 (1)  015474  114645                <JUMP!ALCOND!<RMX1-INIT&3000*4>!<RMX1-INIT&777/2>>
 (1)
1845  015476                  RMIFLP: MEM     IMM,INTSTK
 (1)          001644                MICPC=MICPC+1
 (1)  015476  002642                <MOVE!WRMEM!IMM!<INTSTK>>
 (1)
1846  015500                  RMX1:
1847  015500                        LDMA    IMM,LRC
 (1)          001645                MICPC=MICPC+1
 (1)             001                .IF IDN IMM,IMM
 (1)  015500  010024                <MOVE!LDMAR!IMM!<LRC&377>>
 (1)                                .IFF
 (1)                                <MOVE!LDMAR!IMM!<LRC>>
 (1)             000                .ENDC
 (1)
1848  015502                        BRWRTE  IMM,5                   ;INDEX TO NEXT BUFFER
 (1)          001646                MICPC=MICPC+1
 (1)  015502  000405                <MOVE!WRTEBR!IMM!<5>>
 (1)
1849  015504                        SP      BR,ADD,SP14             ;UPDATE COPY OF POINTER
 (1)          001647                MICPC=MICPC+1
 (1)  015504  063014                <MOVE!SPX!BR!ADD!SP14>
 (1)
1850  015506                        BRWRTE  IMM,STC                 ;ADDRESS OF WRAP AROUND POINT
 (1)          001650                MICPC=MICPC+1
 (1)  015506  000470                <MOVE!WRTEBR!IMM!<STC>>
 (1)
1851  015510                        CMP     BR,SP14                 ;WRAPAROUND?
 (1)          001651                MICPC=MICPC+1
 (1)  015510  060374                <SUBTC!BR!SP14>
 (1)
1852  015512                        Z       RMFLIP                  ;IF YES---BRANCH
 (1)          001652                MICPC=MICPC+1
 (1)  015512  115655                <JUMP!ZCOND!<RMFLIP-INIT&3000*4>!<RMFLIP-INIT&777/2>>
 (1)
1853  015514                        MEM     BR,SELA!SP14            ;ELSE UPDATE THE POINTER
 (1)          001653                MICPC=MICPC+1
 (1)  015514  062614                <MOVE!WRMEM!BR!<SELA!SP14>>
 (1)
1854  015516                        ALWAYS  RMX
 (1)          001654                MICPC=MICPC+1
 (1)  015516  114656                <JUMP!ALCOND!<RMX-INIT&3000*4>!<RMX-INIT&777/2>>
 (1)
1855  015520                  RMFLIP: MEM     IMM,RCL1                ;POINT TO FIRST LINK
 (1)          001655                MICPC=MICPC+1
 (1)  015520  002425                <MOVE!WRMEM!IMM!<RCL1>>
 (1)
1856  015522                  RMX:    BRWRTE  IMM,20                  ;MASK FOR INTERUPT PENDING
 (1)          001656                MICPC=MICPC+1
 (1)  015522  000420                <MOVE!WRTEBR!IMM!<20>>
 (1)
1857  015524                        SP      DP,AORB,SP1             ;UPDATE PORT STATUS WORD
 (1)          001657                MICPC=MICPC+1
 (1)  015524  063301                <MOVE!SPX!DP!AORB!SP1>
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  (1)
1858  015526                          BRWRTE  DP,<SELA!SP10>                    ;READ LINE STATUS WORD
  (1)         001660                MICPC=MICPC+1
  (1)  015526 060610                <MOVE!WRTEBR!DP!<SELA!SP10>>
  (1)
1859  015530                          BR4     FLUSH                             ;IF CLEAR ACTIVE SET---FLUSH
  (1)         001661                MICPC=MICPC+1
  (1)  015530 107015                <JUMP!BR4CON!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
  (1)
1860  015532                    RM1:  STATE   RCVA
  (1)         001662                MICPC=MICPC+1
  (1)  015532 000400                <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
1861  015534                          ALWAYS  REXIT
  (1)         001663                MICPC=MICPC+1
  (1)  015534 104422                <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  (1)
1862  015536                    NTHRES: LDMA    IMM,ST
  (1)         001664                MICPC=MICPC+1
  (1)            00:                .IF IDN IMM,IMM
  (1)  015536 010154                <MOVE!LDMAR!IMM!<ST&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<ST>>
  (1)            000                .ENDC
  (1)
1863  015540                          SPBR    MEMX,SELB,SPO
  (1)         001665                MICPC=MICPC+1
  (1)  015540 043620                <MOVE!SPBRX!MEMX!SELB!SPO>
  (1)
1864  015542                          BRWRTE  BR,ADD!SPO                        ;SHIFT LEFT
  (1)         001666                MICPC=MICPC+1
  (1)  015542 060400                <MOVE!WRTEBR!BR!<ADD!SPO>>
  (1)
1865  015544                          BR4     OVRRUN
  (1)         001667                MICPC=MICPC+1
  (1)  015544 117176                <JUMP!BR4CON!<OVRRUN-INIT&3000*4>!<OVRRUN-INIT&777/2>>
  (1)
1866  015546                          BRWRTE  IMM,1
  (1)         001670                MICPC=MICPC+1
  (1)  015546 000401                <MOVE!WRTEBR!IMM!<1>>
  (1)
1867  015550                    ERRXX:
1868  015550                    NTRSO:  LDMA    IMM,<<RTHRS+3>>
  (1)         001671                MICPC=MICPC+1
  (1)            001                .IF IDN IMM,IMM
  (1)  015550 010177                <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<<RTHRS+3>>>
  (1)            000                .ENDC
  (1)
1869  015552                          MEMINC  IMM,0
  (1)         001672                MICPC=MICPC+1
  (1)  015552 016400                <MOVE!WRMEM!INCMAR!IMM!<0>>
  (1)
1870  015554                          MEM     BR,SELB
  (1)         001673                MICPC=MICPC+1
  (1)  015554 062620                <MOVE!WRMEM!BR!<SELB>>
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  (1)
1871  015556                        NTRS1:  LDMA    IMM,NXTSP
  (1)           001674                      MICPC=MICPC+1
  (1)              001                      .IF IDN IMM,IMM
  (1)  015556  010241                      <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                                      .IFF
  (1)                                      <MOVE!LDMAR!IMM!<NXTSP>>
  (1)              000                     .ENDC
  (1)
1872  015560                                LDMA    MEMX,SELB!SPX!SPO
  (1)           001675                      MICPC=MICPC+1
  (1)              001                      .IF IDN MEMX,IMM
  (1)                                       <MOVE!LDMAR!IMM!<SELB!SPX!SPO&377>>
  (1)                                       .IFF
  (1)  015560  053220                       <MOVE!LDMAR!MEMX!<SELB!SPX!SPO>>
  (1)              000                      .ENDC
  (1)
1873  015562                                MEMINC  IMM,201
  (1)           001676                      MICPC=MICPC+1
  (1)  015562  016601                       <MOVE!WRMEM!INCMAR!IMM!<201>>
  (1)
1874  015564                                MEM     IMM,<<RTHRS>>
  (1)           001677                      MICPC=MICPC+1
  (1)  015564  002574                       <MOVE!WRMEM!IMM!<<RTHRS>>>
  (1)
1875  015566                                LDMA    IMM,NXTSP
  (1)           001700                      MICPC=MICPC+1
  (1)              001                      .IF IDN IMM,IMM
  (1)  015566  010241                       <MOVE!LDMAR!IMM!<NXTSP&377>>
  (1)                                       .IFF
  (1)                                       <MOVE!LDMAR!IMM!<NXTSP>>
  (1)              000                      .ENDC
  (1)
1876  015570                                MEM     IMM,INTSTK                      ;ASSUME QUEUE WRAP AROUND
  (1)           001701                      MICPC=MICPC+1
  (1)  015570  002642                       <MOVE!WRMEM!IMM!<INTSTK>>
  (1)
1877  015572                                BRWRTE  IMM,<<MMEND-2>>
  (1)           001702                      MICPC=MICPC+1
  (1)  015572  000776                       <MOVE!WRTEBR!IMM!<<MMEND-2>>>
  (1)
1878  015574                                CMP     BR,SPO
  (1)           001703                      MICPC=MICPC+1
  (1)  015574  060360                       <SUBTC!BR!SPO>
  (1)
1879  015576                                Z       NTRS2                           ;IT DID WRAP AROUND
  (1)           001704                      MICPC=MICPC+1
  (1)  015576  115707                       <JUMP!ZCOND!<NTRS2-INIT&3000*4>!<NTRS2-INIT&777/2>>
  (1)
1880  015600                                BRWRTE  IMM,2                           ;OFFSET TO NEXT PAIR
  (1)           001705                      MICPC=MICPC+1
  (1)  015600  000402                       <MOVE!WRTEBR!IMM!<2>>
  (1)
1881  015602                                MEM     BR,ADD!SPO                      ;UPDATE QUEUE POINTER
  (1)           001706                      MICPC=MICPC+1
  (1)  015602  062400                       <MOVE!WRMEM!BR!<ADD!SPO>>
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                (1)
1882  015604
                001707          NTRS2:  BRWRTE  IMM,20
                                        MICPC=MICPC+1
(1)   015604    000420                  <MOVE!WRTEBR!IMM!<20>>
                (1)
1883  015606
                001710                  SPBR    BR,AORB,SP1
                                        MICPC=MICPC+1
(1)   015606    063701                  <MOVE!SPBRX!BR!AORB!SP1>
                (1)
1884  015610
                001711                  BRO     TAB1                    ;FLAGGED BY ERROR TYPE
                                        MICPC=MICPC+1
(1)   015610    116342                  <JUMP!BROCON!<TAB1-INIT&3000*4>!<TAB1-INIT&777/2>>
                (1)
1885  015612
                001712          SNAK:   LDMA    IMM,ISP11
                                        MICPC=MICPC+1
                  001                   .IF IDN IMM,IMM
(1)   015612    010171                  <MOVE!LDMAR!IMM!<ISP11&377>>
                (1)                     .IFF
                (1)                     <MOVE!LDMAR!IMM!<ISP11>>
                  000                   .ENDC
                (1)
1886  015614
                001713                  SP      MEMX,SELB,SP11
                                        MICPC=MICPC+1
(1)   015614    043231                  <MOVE!SPX!MEMX!SELB!SP11>
                (1)
1887  015616
                001714                  SP      BR,INCA,SP11                    ;INCREMENT MSG EXPECTED
                                        MICPC=MICPC+1
(1)   015616    063071                  <MOVE!SPX!BR!INCA!SP11>
                (1)
1888  015620
                001715          SNAK1:  BRWRTE  IMM,1                           ;UNNUMB PENING BIT TO BR
                                        MICPC=MICPC+1
(1)   015620    000401                  <MOVE!WRTEBR!IMM!<1>>
                (1)
1889  015622
                001716          SNAK2:  SP      BR,AORB,SP10                    ;UPDATE LINE STATUS WORD
                                        MICPC=MICPC+1
(1)   015622    063310                  <MOVE!SPX!BR!AORB!SP10>
                (1)
1890  015624
                001717                  ALWAYS  FLUSH
                                        MICPC=MICPC+1
(1)   015624    104415                  <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
                (1)
1891
1892  015626
                001720          EMTRIG: BRWRTE  IMM,24
                                        MICPC=MICPC+1
(1)   015626    000424                  <MOVE!WRTEBR!IMM!<24>>
                (1)
1893  015630
                001721                  OUTPUT  BR,<SELB!OBA1>
                                        MICPC=MICPC+1
(1)   015630    062226                  <MOVE!WROUT!BR!<SELB!OBA1>>
                (1)
1894  015632
                001722                  BRWRTE  IMM,0
                                        MICPC=MICPC+1
(1)   015632    000400                  <MOVE!WRTEBR!IMM!<0>>
                (1)
1895  015634
                001723                  OUTPUT  BR,<SELB!OBA2>
                                        MICPC=MICPC+1
```

```
   (1)  015634  062227                    <MOVE!WROUT!BR!<SELB!OBA2>>
   (1)
1896    015636                           SPBR    IBUS,BM873,SPO          ;READ BM873 ADDRESS---
   (1)          001724                   MICPC=MICPC+1
   (1)  015636  023740                   <MOVE!SPBRX!IBUS!BM873!SPO>
   (1)
1897    015640                           OUTPUT  BR,SELB!OUTDA1          ;SET UP LOW BYTE OF ADDRESS
   (1)          001725                   MICPC=MICPC+1
   (1)  015640  062222                   <MOVE!WROUT!BR!<SELB!OUTDA1>>
   (1)
1898    015642                           BRWRTE  IMM,366                 ;HIGH BYTE BASE FOR ROM BOOT
   (1)          001726                   MICPC=MICPC+1
   (1)  015642  000766                   <MOVE!WRTEBR!IMM!<366>>
   (1)
1899    015644                           OUTPUT  BR,SELB!OUTDA2          :
   (1)          001727                   MICPC=MICPC+1
   (1)  015644  062223                   <MOVE!WROUT!BR!<SELB!OUTDA2>>
   (1)
1900    015646                   EM6:    BRWRTE  IMM,21                  ;MASK FOR TIMER AND ALSO TO START NPR
   (1)          001730                   MICPC=MICPC+1
   (1)  015646  000421                   <MOVE!WRTEBR!IMM!<21>>
   (1)
1901    015650                           OUT     BR,<SELB!OBR>
   (1)          001731                   MICPC=MICPC+1
   (1)  015650  061231                   <MOVE!WROUTX!BR!<SELB!OBR>>
   (1)
1902    015652                           OUT     BR,<SELB!ONPR>
   (1)          001732                   MICPC=MICPC+1
   (1)  015652  061230                   <MOVE!WROUTX!BR!<SELB!ONPR>>
   (1)
1903    015654                   EM1:    BRWRTE  IBUS,NPR                ;READ NPR CONTROL
   (1)          001733                   MICPC=MICPC+1
   (1)  015654  120600                   <MOVE!WRTEBR!IBUS!<NPR>>
   (1)
1904    015656                           BRO     CKTIME
   (1)          001734                   MICPC=MICPC+1
   (1)  015656  102372                   <JUMP!BROCON!<CKTIME-INIT&3000*4>!<CKTIME-INIT&777/2>>
   (1)
1905    015660                           MEMADR  RM1                     ;IF NPR DONE
   (1)          001735                   MICPC=MICPC+1
   (1)             001                   .IF B
   (1)  015660  002662                   <MOVE!WRMEM!<RM1-INIT&777/2>>
   (1)                                   .IFF
   (1)                                   <MOVE!WRMEM!!<RM1-INIT&777/2>>
   (1)             000                   .ENDC
1906    015662                           ALWAYS  ACLOW
   (1)          001736                   MICPC=MICPC+1
   (1)  015662  100765                   <JUMP!ALCOND!<ACLOW-INIT&3000*4>!<ACLOW-INIT&777/2>>
   (1)
1907    015664                   TABUPD: SPBR    IBUS,RCVCON,SPO         ;READ RECEIVER CONTROL REG
   (1)          001737                   MICPC=MICPC+1
   (1)  015664  023640                   <MOVE!SPBRX!IBUS!RCVCON!SPO>
   (1)
1908    015666                           BRWRTE  BR,ADD!SPO              ;SHIFT LEFT
   (1)          001740                   MICPC=MICPC+1
   (1)  015666  060400                   <MOVE!WRTEBR!BR!<ADD!SPO>>
```

```
  (1)
1909  015670                    BR7     IDLE                    ;RECEIVE ACTIVE--IDLE
  (1)         001741            MICPC=MICPC+1
  (1)  015670  103445           <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
1910  015672                    TAB1:   LDMA    IMM,IMG10
  (1)         001742            MICPC=MICPC+1
  (1)            001            .IF IDN IMM,IMM
  (1)  015672  010156           <MOVE!LDMAR!IMM!<IMG10&377>>
  (1)                           .IFF
  (1)                           <MOVE!LDMAR!IMM!<IMG10>>
  (1)            000            .ENDC
  (1)
1911  015674                    BRWRTE  IMM,2
  (1)         001743            MICPC=MICPC+1
  (1)  015674  000402           <MOVE!WRTEBR!IMM!<2>>
  (1)
1912  015676                    MEMINC  BR,AANDB!SP10           ;SAVE BIT 1 OF SP10
  (1)         001744            MICPC=MICPC+1
  (1)  015676  076670           <MOVE!WRMEM!INCMAR!BR!<AANDB!SP10>>
  (1)
1913  015700                    MEMINC  BR,SELA!SP11            ;SAVE SP11
  (1)         001745            MICPC=MICPC+1
  (1)  015700  076611           <MOVE!WRMEM!INCMAR!BR!<SELA!SP11>>
  (1)
1914  015702                    MEMINC  BR,SELA!SP12            ;SAVE SP12
  (1)         001746            MICPC=MICPC+1
  (1)  015702  076612           <MOVE!WRMEM!INCMAR!BR!<SELA!SP12>>
  (1)
1915  015704                    MEMINC  BR,SELA!SP17            ;SAVE SP17
  (1)         001747            MICPC=MICPC+1
  (1)  015704  076617           <MOVE!WRMEM!INCMAR!BR!<SELA!SP17>>
  (1)
1916                            ;
1917  015706                    STATE   RB2             ;NOTE: THE BRG CANNOT BE CHANGED FROM THIS
  (1)         001750            MICPC=MICPC+1
  (1)  015706  000461           <MOVE!WRTEBR!IMM!<RB2-INIT&777/2>>
1918                                                    ;POINT UNTIL THE BRANCH TO RB0
1919  015710                    CMP     BR,SP3
  (1)         001751            MICPC=MICPC+1
  (1)  015710  060363           <SUBTC!BR!SP3>
  (1)
1920  015712                    Z       IDLE
  (1)         001752            MICPC=MICPC+1
  (1)  015712  101445           <JUMP!ZCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  (1)
1921                            ;
1922  015714                    SP      MEMX,SELB,SP13
  (1)         001753            MICPC=MICPC+1
  (1)  015714  043233           <MOVE!SPX!MEMX!SELB!SP13>
  (1)
1923  015716                    PSTATE  TBU1                    ;NEW PORT STATE ADDRESS
  (1)  015716                   MEM     IMM,<<TBU1-INIT&777/2>>
  (2)         001754            MICPC=MICPC+1
  (2)  015716  002775           <MOVE!WRMEM!IMM!<<TBU1-INIT&777/2>>>
  (2)
```

```
1924  015720                        SP      IMM,4,SP4               ;INITIALIZE COUNT
  (1)         001755                MICPC=MICPC+1
  (1)  015720 003004                <MOVE!SPX!IMM!4!SP4>
  (1)
1925                                                                ;NOTE: FIRST 6 RAM LOCATIONS ARE NOT WRITTEN
1926                                                                ;TO CORE TABLE.
1927  015722                        LDMA    IMM,BASE                ;MAR NOW POINTS TO BASE
  (1)         001756                MICPC=MICPC+1
  (1)            001                .IF IDN IMM,IMM
  (1)  015722 010017                <MOVE!LDMAR!IMM!<BASE&377>>
  (1)                               .IFF
  (1)                               <MOVE!LDMAR!IMM!<BASE>>
  (1)            000                .ENDC
  (1)
1928  015724                        ALWAYS  RB0             ;THE BRG MUST BE PRESET TO STATE RB2
  (1)         001757                MICPC=MICPC+1
  (1)  015724 104443                <JUMP!ALCOND!<RB0-INIT&3000*4>!<RB0-INIT&777/2>>
  (1)
1929  015726                  EC2:  BRWRTE  IMM,2                    ;INCREMENT COUNT/TEST
  (1)         001760                MICPC=MICPC+1
  (1)  015726 000402                <MOVE!WRTEBR!IMM!<2>>
  (1)
1930  015730                        SP      BR,ADD,SP4
  (1)         001761                MICPC=MICPC+1
  (1)  015730 063004                <MOVE!SPX!BR!ADD!SP4>
  (1)
1931  015732                        SP      IBUS,IOBA1,SP0          ;POINT TO NEXT ADDRESS
  (1)         001762                MICPC=MICPC+1
  (1)  015732 023140                <MOVE!SPX!IBUS!IOBA1!SP0>
  (1)
1932  015734                        OUTPUT  BR,ADD!OBA1
  (1)         001763                MICPC=MICPC+1
  (1)  015734 062006                <MOVE!WROUT!BR!<ADD!OBA1>>
  (1)
1933  015736                        SP      IBUS,IOBA2,SP0
  (1)         001764                MICPC=MICPC+1
  (1)  015736 023160                <MOVE!SPX!IBUS!IOBA2!SP0>
  (1)
1934  015740                        OUTPUT  BR,AC!OBA2
  (1)         001765                MICPC=MICPC+1
  (1)  015740 062107                <MOVE!WROUT!BR!<AC!OBA2>>
  (1)
1935  015742                        C       TABMXT
  (1)         001766                MICPC=MICPC+1
  (1)  015742 105373                <JUMP!CCOND!<TABMXT-INIT&3000*4>!<TABMXT-INIT&777/2>>
  (1)
1936
1937  015744                  ECX:  BRWRTE  BR!LDMAR,SELA!SP4               ;READ COUNTER
  (1)         001767                MICPC=MICPC+1
  (1)  015744 070604                <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
  (1)
1938  015746                        BR7     20$                     ;ALL DONE
  (1)         001770                MICPC=MICPC+1
  (1)  015746 117774                <JUMP!BR7CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
  (1)
1939  015750                        OUTPUT  MEMX!INCMAR,SELB!OUTDA1         ;STORE COUNTS OF ERRORS
```

```
  (1)           001771                  MICPC=MICPC+1
  (1)  015750   056222                  <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA1>>
  (1)
 1940  015752                           OUTPUT  MEMX!INCMAR,SELB!OUTDA2
  (1)           001772                  MICPC=MICPC+1
  (1)  015752   056223                  <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA2>>
  (1)
 1941  015754                           ALWAYS  RK8
  (1)           001773                  MICPC=MICPC+1
  (1)  015754   104641                  <JUMP!ALCOND!<RK8-INIT&3000*4>!<RK8-INIT&777/2>>
  (1)
 1942
 1943  015756                    20$:   LDMA    IMM,PRTST
  (1)           001774                  MICPC=MICPC+1
  (1)              001                  .IF IDN IMM,IMM
  (1)  015756   010162                  <MOVE!LDMAR!IMM!<PRTST&377>>
  (1)                                   .IFF
  (1)                                   <MOVE!LDMAR!IMM!<PRTST>>
  (1)              000                  .ENDC
  (1)
 1944  015760                           MEM     BR,SELA!SP13
  (1)           001775                  MICPC=MICPC+1
  (1)  015760   062613                  <MOVE!WRMEM!BR!<SELA!SP13>>
  (1)
 1945  015762                           ALWAYS  RM1
  (1)           001776                  MICPC=MICPC+1
  (1)  015762   114662                  <JUMP!ALCOND!<RM1-INIT&3000*4>!<RM1-INIT&777/2>>
  (1)
 1946  015764                           $ZERO
  (1)           001777                  MICPC=MICPC+1
  (1)  015764   000000                  000000
  (1)
 1947           000001                  .END

. ABS.  015766     000

ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

,DDCMP/CRF/DS:CRF←DMCNEW,LOW,DDCNEW
RUN-TIME: 5 9 0 SECONDS
RUN-TIME RATIO: 118/14=8.0
CORE USED:  7K  (13 PAGES)

 1623                              02700
```

```
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$:     MOV     #BIT10,(R1)     ;SET ROM0
1719  016264  010061  000004                      MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
1720  016270  010261  000006                      MOV     R2,6(R1)        ;LOAD SEL6 WITH WRITE DATA
1721  016274  052711  020000                      BIS     #BIT13,(R1)     ;WRITE SEL6 INTO CRAM
1722  016300  016104  000004                      MOV     4(R1),R4        ;READ CRAM INTO "FOUND"
1723  016304  020204                              CMP     R2,R4           ;IS DATA CORRECT?
1724  016306  001401                              BEQ     4$              ;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$:     MOV     R0,R2           ;SAVE R2 FOR TYPEOUT
1754  016376  012711  002000                   MOV     #BIT10,(R1)     ;SET ROM0
1755  016402  010061  000004                   MOV     R0,4(R1)        ;WRITE ADDRESS TO SEL4
1756  016406  010061  000006                   MOV     R0,6(R1)        ;LOAD SEL6 WITH WRITE DATA
1757  016412  052711  020000                   BIS     #BIT13,(R1)     ;WRITE CRAM
1758  016416  005061  000006                   CLR     6(R1)           ;CLEAR SEL 6
1759  016422  016104  000006                   MOV     6(R1),R4        ;SHOULD READ BACK OWN ADDRESS
1760  016426  020004                           CMP     R0,R4           ;IS DATA CORRECT?
1761  016430  001401                           BEQ     2$              ;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$,LOCK        ;NEW SCOP1
1769  016456  010[illegible]                   MOV     R0,R2           ;SAVE R2 FOR TYPEOUT
1770  016460  012[illegible]  002000           MOV     #BIT10,(R1)     ;SET ROM0
1771  016464  010061  000004                   MOV     R0,4(R1)        ;SEL4 = CRAM ADDRESS
1772  016470  016104  000006                   MOV     6(R1),R4        ;READ CRAM INTO "FOUND"
1773  016474  020004                           CMP     R0,R4           ;IS DATA CORRECT?
1774  016476  001401                           BEQ     4$              ;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  035562                          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$:     MOV     R2,4(R1)        ;WRITE CROM ADDRESS TO SEL4
1804  016572  012711  002000                          MOV     #BIT10,(R1)     ;SET CROM0
1805  016576  011005                                  MOV     (R0),R5 ;PUT "EXPECTED" IN R5
1806  016600  016104  000006                          MOV     6(R1),R4        ;PUT "FOUND" IN R4
1807  016604  020504                                  CMP     R5,R4   ;COMPARE HARD ROM TO SOFT DUPLICATE
1808  016606  001401                                  BEQ     2$      ;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  034664                          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  053737  034664  016734                  BISB    FLAG,66$                ;ADD ADDRESS TO INSTRUCTION
1839  016724  053737  034665  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
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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  034664                  INC     FLAG            ;NEXT ADDRESS
1861  017012  022737  002000  034664          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  034664                  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  034664  017124          BISB    FLAG,66$                ;ADD ADDRESS TO INSTRUCTION
1886  017114  153737  034665  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  034664                  INC     FLAG            ;NEXT ADDRESS
1909  017204  022737  002000  034664          CMP     #2000,FLAG      ;LAST ADDRESS?
1910  017212  001324                          BNE     1$              ;BR IF NO
1911  017214  104400                  2$:     SCOPE                   ;SCOPE THIS TEST
1912
1913
1914                                          ;*************************** TEST 10 ****************************
1915                                          ;*IOP MAIN MEMORY DUAL ADDRESSING TEST
1916                                          ;*LOAD EACH MEMORY LOCATION WITH ITS OWN ADDRESS
1917                                          ;*READ BACK EACH LOCATION TO VERIFY CORRECT ADDRESSING
1918                                          ;:************************************************************
1919
1920                                          ;  TEST 10
1921                                          ;--------------
1922  017216  012737  000010  001226  TST10:  MOV     #10,TSTNO
1923  017224  012737  017516  001[illegible]  MOV     #TST11,NEXT
1924  017232  012737  017256  001220          MOV     #1$,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  034664                  CLR     FLAG            ;START AT ADDRESS 0
1930  017256  013702  034664          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  034664  017314          BISB    FLAG,2$         ;ADD ADDRESS TO INSTRUCTION
1934  017304  153737  034665  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$:     SCOP1                   ;SW09=1?
1952  017360  005237  034664                  INC     FLAG            ;NEXT ADDRESS
1953  017364  022737  002000  034664          CMP     #2000,FLAG      ;LAST ADDRESS
1954  017372  001331                          BNE     1$              ;BR IF NO
1955  017374  012737  017406  001220          MOV     #4$,LOCK        ;NEW SCOPE 1
1956  017402  005037  034664                  CLR     FLAG            ;RESTART AT ADDRESS 0
1957  017406  013702  034664          4$:     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
```

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1960  017426  153737  034664  017444                BISB    FLAG,5$         ;ADD ADDRESS TO INSTRUCTION
1961  017434  153737  034665  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$:   SCOP1                   ;SW09=1?
1976  017500  005237  034664                       INC     FLAG            ;NEXT ADDRESS
1977  017504  022737  002000  034664                CMP     #2000,FLAG      ;IS IT THE LAST
1978  017512  001335                                BNE     4$              ;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$:
2042  017674  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2043  017676  121204                          121204                  ;PORT4=IBUS* 10
2044  017700  005005                          CLR     R5              ;R5="EXPECTED"
2045  017702  032702  000400                  BIT     #BIT8,R2        ;IS BIT8 SET IN MAR?
2046  017706  001402                          BEQ     .+6             ;BR IF NO
2047  017710  012705  000040                  MOV     #BIT5,R5        ;IF YES THEN SET BIT5
2048  017714  016104  000004                  MOV     4(R1),R4        ;R4="FOUND"
2049  017720  042704  177637                  BIC     #177637,R4      ;CLEAR UNWANTED BITS
2050  017724  020504                          CMP     R5,R4           ;BITS 5&6 SHOULD BE CLEAR
2051  017726  001401                          BEQ     .+4             ;BR IF OK
2052  017730  104007                          HLT     7               ;ERROR BITS 5&6 NOT CLEAR
2053  017732  104401                          SCOP1                   ;LOOP TO 11$ 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
```

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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$:     100400                  ;JUMP(I) TO ROM ADDRESS IN R2 & R3
2108  020130  012711  002000                  MOV     #BIT10,(R1)     ;SET ROM0
2109  020134  011005                          MOV     (R0),R5         ;PUT "EXPECTED" IN R5
2110  020136  016104  000006                  MOV     6(R1),R4        ;PUT "FOUND" IN R4
2111  020142  020504                          CMP     R5,R4           ;COMPARE ROM CONTENTS TO SOFT DUP
2112  020144  001414                          BEQ     3$              ;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  035410                  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  035502                  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  035410                  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  035502                  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  035410                  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  035502                  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
```

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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
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$:
2205  020454  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2206  020456  100400                          100400                  ;START AT ROM PC=0
2207  020460  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2208  020462  114777                          114377!<400*1>          ;JUMP TO ROM PC OF 1777
2209  020464  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2210  020470  003776                          3776                    ;INDEX
2211  020472  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2212  020474  001401                          BEQ     2$              ;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  035502                  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  035502                  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
```

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

                                        ;  TEST 16
                                        ;--------------
020574  012737  000016  001226  TST16:  MOV     #16,TSTNO
020602  012737  020764  001216          MOV     #TST17,NEXT
020610  012737  020630  001220          MOV     #1$,LOCK
                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
020616  104412                          MSTCLR          ;MASTER CLEAR DMC11
020620  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
020626  001055                          BNE     6$+2            ;SKIP TEST IF YES
020630                          1$:
020630  004737  035456                  JSR     PC,SETC ;SET THE C BIT'
020634  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020636  100400                          100400                  ;START AT ROM PC=0
020640  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020642  115377                          114377!<400*2>          ;JUMP TO ROM PC OF 1777
020644  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
020650  003776                          3776                    ;INDEX
020652  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
020654  001401                          BEQ     2$              ;BR IF YES
020656  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
020660  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
020662  012737  020670  001220          MOV     #3$,LOCK        ;NEW SCOP1
020670                          3$:
020670  004737  035456                  JSR     PC,SETC ;SET THE C BIT'
020674  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020676  100403                          100403                  ;START AT ROM PC=3
020700  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020702  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
020704  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
020710  000000                          0                       ;INDEX
020712  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
020714  001401                          BEQ     4$              ;BR IF YES
020716  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
020720  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
020722  012737  020730  001220          MOV     #5$,LOCK        ;NEW SCOP1
020730                          5$:
020730  004737  035456                  JSR     PC,SETC ;SET THE C BIT'
020734  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020736  100406                          100406                  ;START AT ROM PC=6
020740  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
020742  105125                          104125!<400*2>          ;JUMP TO ROM PC OF 525
020744  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
020750  001252                          1252                    ;INDEX
020752  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
020754  001401                          BEQ     6$              ;BR IF YES
020756  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
020760  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
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$:
2314  021020  004737  035474                 JSR     PC,SETZ ;SET THE Z BIT'
2315  021024  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2316  021026  100400                         100400                  ;START AT ROM PC=0
2317  021030  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2318  021032  115777                         114377!<400*3>          ;JUMP TO ROM PC OF 1777
2319  021034  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2320  021040  003776                         3776                    ;INDEX
2321  021042  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2322  021044  001401                         BEQ     2$              ;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  035474                 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  035502                 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  035474                 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  035502                 JSR     PC,ROMDAT       ;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
```

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

                                        ;  TEST 20
                                        ;--------------
021154  012737  000020  001226  TST20:  MOV     #20,TSTNO
021162  012737  021344  001216          MOV     #TST21,NEXT
021170  012737  021210  001220          MOV     #1$,LOCK
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
021176  104412                         MSTCLR                  ;MASTER CLEAR DMC11
021200  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
021206  001055                         BNE     6$+2            ;SKIP TEST IF YES
021210                          1$:
021210  004737  035426                 JSR     PC,SETBRO       ;SET THE BRO BIT'
021214  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021216  100400                         100400                  ;START AT ROM PC=0
021220  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021222  116377                         114377!<400*4>          ;JUMP TO ROM PC OF 1777
021224  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
021230  003776                         3776                    ;INDEX
021232  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
021234  001401                         BEQ     2$              ;BR IF YES
021236  104006                         HLT     6               ;ERROR, CROM PC IS WRONG
021240  104401                  2$:    SCOP1                   ;LOOP TO 1$ IF SW09=1
021242  012737  021250  001220        MOV     #3$,LOCK        ;NEW SCOP1
021250                          3$:
021250  004737  035426                 JSR     PC,SETBRO       ;SET THE BRO BIT'
021254  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021256  100403                         100403                  ;START AT ROM PC=3
021260  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021262  102000                         100000!<400*4>  ;JUMP TO ROM PC OF 0
021264  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
021270  000000                         0                       ;INDEX
021272  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
021274  001401                         BEQ     4$              ;BR IF YES
021276  104006                         HLT     6               ;ERROR, CROM PC IS WRONG
021300  104401                  4$:    SCOP1                   ;LOOP TO 3$ IF SW09=1
021302  012737  021310  001220        MOV     #5$,LOCK        ;NEW SCOP1
021310                          5$:
021310  004737  035426                 JSR     PC,SETBRO       ;SET THE BRO BIT'
021314  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021316  100406                         100406                  ;START AT ROM PC=6
021320  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021322  106125                         104125!<400*4>          ;JUMP TO ROM PC OF 525
021324  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
021330  001252                         1252                    ;INDEX
021332  020504                         CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
021334  001401                         BEQ     6$              ;BR IF YES
021336  104006                         HLT     6               ;ERROR, CROM PC IS WRONG
021340  104401                  6$:    SCOP1                   ;LOOP TO 5$ IF SW59=1
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$:
2426  021400  004737  035434                 JSR     PC,SETBR1       ;SET THE BR1 BIT'
2427  021404  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2428  021406  100400                         100400                  ;START AT ROM PC=0
2429  021410  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2430  021412  116777                         114377!<400*5>          ;JUMP TO ROM PC OF 1777
2431  021414  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2432  021420  003776                         3776                    ;INDEX
2433  021422  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2434  021424  001401                         BEQ     2$              ;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  035434                 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  035502                 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  035434                 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  035502                 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$:
2482  021570  004737  035442                 JSR     PC,SETBR4       ;SET THE BR4 BIT'
2483  021574  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2484  021576  100400                         100400                  ;START AT ROM PC=0
2485  021600  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2486  021602  117377                         114377!<400*6>          ;JUMP TO ROM PC OF 1777
2487  021604  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2488  021610  003776                         3776                    ;INDEX
2489  021612  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2490  021614  001401                         BEQ     2$              ;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  035442                 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  035502                 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  035442                 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  035502                 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$:
2538  021760  004737  035450                  JSR     PC,SETBR7       ;SET THE BR7 BIT'
2539  021764  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2540  021766  100400                         100400                  ;START AT ROM PC=0
2541  021770  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2542  021772  117777                         114377!<400*7>          ;JUMP TO ROM PC OF 1777
2543  021774  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2544  022000  003776                         3776                    ;INDEX
2545  022002  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2546  022004  001401                         BEQ     2$              ;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  035450                  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  035502                  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  035450                  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  035502                  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
```

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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$,LOCK
2590                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2591  022136  104412                         MSTCLR                  ;MASTER CLEAR DMC11
2592  022140  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2593  022146  001055                         BNE     6$+2            ;SKIP TEST IF YES
2594  022150                          1$:
2595  022150  004737  035410                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2596  022154  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2597  022156  100400                         100400                  ;START AT ROM PC=0
2598  022160  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2599  022162  115377                         114377!<400*2>          ;JUMP TO ROM PC OF 1777
2600  022164  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2601  022170  000002                         2                       ;INDEX
2602  022172  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2603  022174  001401                         BEQ     2$              ;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  035410                 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  035502                 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  035410                 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  035502                 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
2646  022320  012737  022340  001220          MOV     #1$,LOCK
2647                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2648  022326  104412                         MSTCLR                  ;MASTER CLEAR DMC11
2649  022330  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2650  022336  001055                          BNE     6$+2            ;SKIP TEST IF YES
2651  022340                          1$:
2652  022340  004737  035410                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2653  022344  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2654  022346  100400                         100400                  ;START AT ROM PC=0
2655  022350  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2656  022352  115777                         114377!<400*3>          ;JUMP TO ROM PC OF 1777
2657  022354  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2658  022360  000002                         2                       ;INDEX
2659  022362  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2660  022364  001401                         BEQ     2$              ;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  035410                  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  035502                  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  035410                  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  035502                  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
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 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$:
 2709  022530  004737  035410                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
 2710  022534  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2711  022536  100400                         100400                  ;START AT ROM PC=0
 2712  022540  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2713  022542  116377                         114377!<400*4>          ;JUMP TO ROM PC OF 1777
 2714  022544  004737  035502                 JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
 2715  022550  000002                         2                       ;INDEX
 2716  022552  020504                         CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
 2717  022554  001401                         BEQ     2$              ;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  035410                 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  035502                 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  035410                 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  035502                 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
```

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2744  022656  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2745  022660  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW09=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                                          ;--------------
2758  022664  012737  000027  001226  TST27:  MOV     #27,TSTNO
2759  022672  012737  023054  001216          MOV     #TST3C,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$:
2766  022720  004737  035410                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2767  022724  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2768  022726  100400                          100400                  ;START AT ROM PC=0
2769  022730  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2770  022732  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
2771  022734  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2772  022740  000002                          2                       ;INDEX
2773  022742  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2774  022744  001401                          BEQ     2$              ;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  035410                  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  035502                  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  035410                  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  035502                  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$:
2823  023110  004737  035410                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2824  023114  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2825  023116  100400                          100400                  ;START AT ROM PC=0
2826  023120  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2827  023122  117377                          114377!<400*6>          ;JUMP TO ROM PC OF 1777
2828  023124  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2829  023130  000002                          2                       ;INDEX
2830  023132  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2831  023134  001401                          BEQ     2$              ;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  035410                  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  035502                  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  035410                  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  035502                  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 SW9=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                                          ;  TEST 31
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$:
2880  023300  004737  035410                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2881  023304  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2882  023306  100400                          100400                  ;START AT ROM PC=0
2883  023310  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2884  023312  117777                          114377!<400*7>          ;JUMP TO ROM PC OF 1777
2885  023314  004737  035502                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2886  023320  000002                          2                       ;INDEX
2887  023322  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2888  023324  001401                          BEQ     2$              ;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  035410                  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  035502                  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  035410                  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  035502                  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 8 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  023620  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  035634                      JSR     PC,MEMSET       ;SET MEM AND RAM
2941  023474                              1$:
2942  023474  004737  035410                      JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2943  023500  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2944  023502  100400                              100400                  ;START AT ROM PC=0
2945  023504  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2946  023506  114377                              114377!<400*0>          ;JUMP TO ROM PC OF 1777
2947  023510  004737  035530                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
2948  023514  000001                              1                       ;EXPECTED DATA
2949  023516  120504                              CMPB    R5,R4           ;IS ROM PC CORRECT?
2950  023520  001401                              BEQ     2$              ;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  035410                      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  035530                      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  035410                      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  035530                      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 SW5=1
2979  023626  104400                              SCOPE                   ;SCOPE THIS TEST
2980
2981
2982                                              ;*************************** TEST 33 ****************************
2983                                              ;*CRAM TEST OF JUMP(I) ALWAYS MICRO-PROCESSOR INSTRUCTION.
2984                                              ;*PERFORM THE JUMP INSTRUCTION
2985                                              ;*VERIFY THE JUMP DID OCCUR BY CLOCKING THE INSRUCTION
2986                                              ;*IN THE LOCATION IT IS AT. THIS INSTRUCTION LOADS THE
2987                                              ;*BR WITH THE LOWEST 8 BITS OF THE CRAM PC. AT THIS POINT
2988                                              ;*THE BR DATA IS MOVED TO PORT4. IF THIS DATA IS CORRECT,
2989                                              ;*THE JUMP WAS SUCCESSFUL, IF THE JUMP WAS UNSUCCESSFUL
2990                                              ;*THEN PORT4 WILL CONTAIN A 37
2991                                              ;*****************************************************************
2992
2993                                              ;  TEST 33
2994                                              ;--------------
2995  023630  012737  000033  001226      TST33:  MOV     #33,TSTNO
2996  023636  012737  024010  001216              MOV     #TST34,NEXT
2997  023644  012737  023670  001220              MOV     #1$,LOCK
2998                                                                      ;R1 CONTAINS BASE DMC11 ADDRESS
2999  023652  104412                              MSTCLR                  ;MASTER CLEAR DMC11
3000  023654  032737  100000  001366              BIT     #BIT15,STAT1    ;IS IT CRAM?
3001  023662  001451                              BEQ     6$+2            ;SKIP TEST IF NO
3002  023664  004737  035634                      JSR     PC,MEMSET       ;SET MEM AND RAM
3003  023670                              1$:
3004  023670  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3005  023672  100400                              100400                  ;START AT ROM PC=0
3006  023674  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3007  023676  114777                              114377!<400*1>          ;JUMP TO ROM PC OF 1777
3008  023700  004737  035530                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3009  023704  000377                              377                     ;EXPECTED DATA
3010  023706  120504                              CMPB    R5,R4           ;IS ROM PC CORRECT?
3011  023710  001401                              BEQ     2$              ;BR IF YES
3012  023712  104005                              HLT     5               ;ERROR, CRAM PC IS WRONG
3013  023714  104401                      2$:     SCOP1                   ;LOOP TO 1$ IF SW0=1
3014  023716  012737  023724  001220              MOV     #3$,LOCK        ;NEW SCOP1
3015  023724                              3$:
3016  023724  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3017  023726  100403                              100403                  ;START AT ROM PC=3
3018  023730  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3019  023732  100400                              100000!<400*1>  ;JUMP TO ROM PC OF 0
3020  023734  004737  035530                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3021  023740  000000                              0                       ;EXPECTED DATA
3022  023742  120504                              CMPB    R5,R4           ;IS ROM PC CORRECT?
3023  023744  001401                              BEQ     4$              ;BR IF YES
```

```
3024  023746  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3025  023750  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
3026  023752  012737  023760  001220          MOV     #5$,LOCK        ;NEW SCOP1
3027  023760                          5$:
3028  023760  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3029  023762  100406                          100406                  ;START AT ROM PC=6
3030  023764  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3031  023766  104525                          104125!<400*1>          ;JUMP TO ROM PC OF 525
3032  023770  004737  035530                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3033  023774  000125                          125                     ;EXPECTED DATA
3034  023776  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3035  024000  001401                          BEQ     6$              ;BR IF YES
3036  024002  104005                          HLT     5               ;ERROR, CRAM PC IS WRONG
3037  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  035634                  JSR     PC,MEMSET       ;SET MEM AND RAM
3062  024050                          1$:
3063  024050  004737  035456                  JSR     PC,SETC ;SET THE C BIT'
3064  024054  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3065  024056  100400                          100400                  ;START AT ROM PC=0
3066  024060  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3067  024062  115377                          114377!<400*2>          ;JUMP TO ROM PC OF 1777
3068  024064  004737  035530                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3069  024070  000377                          377                     ;EXPECTED DATA
3070  024072  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3071  024074  001401                          BEQ     2$              ;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  035456                  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  035530                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  035456                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  035530                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  035634                JSR     PC,MEMSET       ;SET MEM AND RAM
3124  024244                          1$:
3125  024244  004737  035474                JSR     PC,SETZ ;SET THE Z BIT'
3126  024250  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3127  024252  100400                        100400                  ;START AT ROM PC=0
3128  024254  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3129  024256  115777                        114377!<400*3>          ;JUMP TO ROM PC OF 1777
3130  024260  004737  035530                JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3131  024264  000377                        377                     ;EXPECTED DATA
3132  024266  120504                        CMPB    R5,R4           ;IS ROM PC CORRECT?
3133  024270  001401                        BEQ     2$              ;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  035474                  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  035530                  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$,LOCK        ;NEW SCOP1
3150  024344                          5$:
3151  024344  004737  035474                  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  035530                  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  035634                  JSR     PC,MEMSET       ;SET MEM AND RAM
3186  024440                          1$:
3187  024440  004737  035426                  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  035530                        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  035426                        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  035530                        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  035426                        JSR     PC,SETBRO       ;SET THE BRO 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  035530                        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  035634                        JSR     PC,MEMSET       ;SET MEM AND RAM
```

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3248  024634                          1$:
3249  024634  004737  035434                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
3250  024640  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3251  024642  100400                          100400                  ;START AT ROM PC=0
3252  024644  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3253  024646  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
3254  024650  004737  035530                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3255  024654  000377                          377                     ;EXPECTED DATA
3256  024656  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3257  024660  001401                          BEQ     2$              ;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  035434                  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  035530                  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  035434                  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  035530                  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  024770  012737  000040  001226  TST40:  MOV     #40,TSTNO
3303  024776  012737  025164  001216          MOV     #TST41,NEXT
```

```
3304  025004  012737  025030  001220          MOV     #1$,LOCK
3305
3306  025012  104412                          MSTCLR                  ;R1 CONTAINS BASE DMC11 ADDRESS
3307  025014  032737  100000  001366          BIT     #BIT15,STAT1    ;MASTER CLEAR DMC11
3308  025022  001457                          BEQ     6$+2            ;IS IT CRAM?
3309  025024  004737  035634                  JSR     PC,MEMSET       ;SKIP TEST IF NO
3310  025030                          1$:     ;SET MEM AND RAM
3311  025030  004737  035442                  JSR     PC,SETBR4       ;SET THE BR4 BIT'
3312  025034  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3313  025036  100400                          100400                  ;START AT ROM PC=0
3314  025040  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3315  025042  117377                          114377!<400*6>          ;JUMP TO ROM PC OF 1777
3316  025044  004737  035530                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3317  025050  000377                          377                     ;EXPECTED DATA
3318  025052  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3319  025054  001401                          BEQ     2$              ;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  035442                  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  035530                  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  035442                  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  035530                  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  035634              JSR     PC,MEMSET       ;SET MEM AND RAM
3372  025224                        1$:
3373  025224  004737  035450              JSR     PC,SETBR7       ;SET THE BR7 BIT'
3374  025230  104414                       ROMCLK            ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3375  025232  100400                       100400            ;START AT ROM PC=0
3376  025234  104414                       ROMCLK            ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3377  025236  117777                       114377!<400*7>    ;JUMP TO ROM PC OF 1777
3378  025240  004737  035530              JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3379  025244  000377                       377               ;EXPECTED DATA
3380  025246  120504                       CMPB    R5,R4           ;IS ROM PC CORRECT?
3381  025250  001401                       BEQ     2$              ;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  035450              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  035530              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  035450              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  035530              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$,LOCK
3429                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
3430  025402  104412                         MSTCLR                  ;MASTER CLEAR DMC11
3431  025404  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
3432  025412  001457                         BEQ     6$+2            ;SKIP TEST IF NO
3433  025414  004737  035634                 JSR     PC,MEMSET       ;SET MEM AND RAM
3434  025420                          1$:
3435  025420  004737  035410                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3436  025424  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3437  025426  100400                         100400                  ;START AT ROM PC=0
3438  025430  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3439  025432  115377                         114377!<400*2>          ;JUMP TO ROM PC OF 1777
3440  025434  004737  035530                 JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3441  025440  000001                         1                       ;EXPECTED DATA
3442  025442  120504                         CMPB    R5,R4           ;IS ROM PC CORRECT?
3443  025444  001401                         BEQ     2$              ;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  035410                 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  035530                 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  035410                 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  035530                 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
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  035634                 JSR     PC,MEMSET       ;SET MEM AND RAM
3496  025614                          1$:
3497  025614  004737  035410                 JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3498  025620  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3499  025622  100400                         100400                  ;START AT ROM PC=0
3500  025624  104414                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3501  025626  115777                         114377!<400*3>          ;JUMP TO ROM PC OF 1777
3502  025630  004737  035530                 JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3503  025634  000001                         1                       ;EXPECTED DATA
3504  025636  120504                         CMPB    R5,R4           ;IS ROM PC CORRECT?
3505  025640  001401                         BEQ     2$              ;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  035410                 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  035530                 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  035410                 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  035530                      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$:     SCOP!                   ;LOOP TO 5$ 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
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  035634                      JSR     PC,MEMSET       ;SET MEM AND RAM
3558  026010                              1$:
3559  026010  004737  035410                      JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3560  026014  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3561  026016  100400                              100400                  ;START AT ROM PC=0
3562  026020  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3563  026022  116377                              114377!<400*4>          ;JUMP TO ROM PC OF 1777
3564  026024  004737  035530                      JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3565  026030  000001                              1                       ;EXPECTED DATA
3566  026032  120504                              CMPB    R5,R4           ;IS ROM PC CORRECT?
3567  026034  001401                              BEQ     2$              ;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  035410                      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  035530                      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$:
3585  026110  004737  035410                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3586  026114  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3587  026116  100406                          100406                  ;START AT ROM PC=6
3588  026120  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3589  026122  106125                          104125!<400*4>          ;JUMP TO ROM PC OF 525
3590  026124  004737  035530                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3591  026130  000007                          7                       ;EXPECTED DATA
3592  026132  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3593  026134  001401                          BEQ     6$              ;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
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  035634                  JSR     PC,MEMSET       ;SET MEM AND RAM
3620  026204                          1$:
3621  026204  004737  035410                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3622  026210  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3623  026212  100400                          100400                  ;START AT ROM PC=0
3624  026214  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3625  026216  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
3626  026220  004737  035530                  JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3627  026224  000001                          1                       ;EXPECTED DATA
3628  026226  120504                          CMPB    R5,R4           ;IS ROM PC CORRECT?
3629  026230  001401                          BEQ     2$              ;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  035410                  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  035530                  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  035410                            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  035530                            JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3653  026324  000007                                    7                       ;EXPECTED DATA
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  035634                            JSR     PC,MEMSET       ;SET MEM AND RAM
3682  026400                                      1$:
3683  026400  004737  035410                            JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
3684  026404  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3685  026406  100400                                    100400                  ;START AT ROM PC=0
3686  026410  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3687  026412  117377                                    114377!<400*6>          ;JUMP TO ROM PC OF 1777
3688  026414  004737  035530                            JSR     PC,RAMDAT       ;R4=CRAM PC (LSB 8 BITS)
3689  026420  000001                                    1                       ;EXPECTED DATA
3690  026422  120504                                    CMPB    R5,R4           ;IS ROM PC CORRECT?
3691  026424  001401                                    BEQ     2$              ;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  035410                      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  035530                      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  035410                      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  035530                      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  035634                      JSR     PC,MEMSET       ;SET MEM AND RAM
3744  026574                              1$:
3745  026574  004737  035410                      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  035530                      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  035410                  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  035530                  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  035410                  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  035530                  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  035562                JSR     PC,WROM         ;WRITE MAP IN CRAM
3810  027006  013700  034740                MOV     RCOUNT,R0       ;CLEAR RECEIVER BUFFER
3811  027012  062700  000002                ADD     #2,R0           ;CLEAR 2 MORE LOCATIONS
3812  027016  012702  034742                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  034666                CLR     TFLAG           ;SET TFLAG TO 0
3817  027034  005037  034670                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  035010  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 0 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 0 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
```

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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  034742  000004              MOV     #RBUF,4(R1)     ;LOAD REC BA
3872  027314  013761  034740  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$:   TSTB    (R1)            ;RDI SET?
3883  027360  100404                        BMI     .+12            ;BR IF YES
3884  027362  005237  001416                        INC     TEMP            ;INC DELAY
3885  027366  001373                        BR      6$              ;BR IF NOT DONE
3886  027370  104014                        HLT     14              ;ERROR RDI NOT SET
3887  027372  012761  034674  000004              MOV     #TBUF,4(R1)     ;LOAD XMIT BUFFER
3888  027400  013761  034672  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  034666                  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  034666              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  034674  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  034672  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  034670              13$:        TST     RFLAG           ;FIRST TIME HERE?
3926  027602  001401                                  BEQ     .+4             ;BR IF YES
3927  027604  104014                                  HLT     14              ;ERROR MULTIPLE REC DONES
3928  027606  012737  177777  034670                  MOV     #-1,RFLAG       ;SET RFLAG TO -1
3929  027614  132761  000001  000002                  BITB    #BIT0,2(R1)     ;IS IT CNTL 0
3930  027622  001401                                  BEQ     .+4             ;BR IF NO
3931  027624  104014                                  HLT     14              ;RECEIVE ERROR
3932  027626  022761  034742  000004                  CMP     #RBUF,4(R1)     ;REC BA CORRECT?
3933  027634  001401                                  BEQ     .+4             ;BR IF YES
3934  027636  104014                                  HLT     14              ;REC BA ERROR
3935  027640  023761  034740  000006                  CMP     RCOUNT,6(R1)    ;COUNT OK?
3936  027646  001401                                  BEQ     .+4             ;BR IF YES
3937  027650  104014                                  HLT     14              ;REC COUNT ERROR
3938  027652  013700  034740                          MOV     RCOUNT,R0       ;GET SET TO CHECK DATA
3939  027656  012702  034674                          MOV     #TBUF,R2        ;R2 POINTS TO GOOD DATA
3940  027662  012703  034742                          MOV     #RBUF,R3        ;R3 POINTS TO RECEIVE DATA
3941  027666  010337  001252              9$:         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  034670              15$:        TST     RFLAG           ;REC DONE?
3954  027730  001640                                  BEQ     16$             ;BR IF NO
3955  027732  005737  034666                          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  035562                        JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
3980  030020  004737  035762                        JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
3981  030024  004537  036252                        JSR     R5,XFRELD       ;LOAD XMIT BA/CC
3982  030030  034674                                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  035562                        JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4036  030246  004737  035762                        JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4037  030252  004537  036220                        JSR     R5,RFRELD       ;LOAD RECEIVE BA/CC
4038  030256  034742                                RBUF                    ;BA
4039  030260  000020                                20                      ;CC
4040  030262  004537  036252                        JSR     R5,XFRELD       ;LOAD XMIT BA/CC
4041  030266  034674                                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$             ;GOT BIT
4053  030326  132761  000001  000002                BITB    #BIT0,2(R1)     ;IS 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  035562                        JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4085  030440  004737  035762                        JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4086  030444  004537  036252                        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  035562                          JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4131  030622  004737  035762                          JSR     PC,BASELD               ;LOAD DMC BASE ADDRESS
4132  030626  004537  036220                          JSR     R5,RFRELD       ;LOAD RECEIVE BA/CC
4133  030632  177320                                  177320                  ;BA
4134  030634  140044                                  140044                  ;CC
4135  030636  004537  036252                          JSR     R5,XFRELD       ;LOAD XMIT BA/CC
4136  030642  034674                                  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  035562                  JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4180  031014  004737  035762                  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$:    SCOPE                   ;SCOPE THIS TEST
4202
4203
4204                                          ;*************************** TEST 56 ****************************
4205                                          ;*PROCESSOR ERROR TEST
4206                                          ;*IN FREE RUNNING MODE DO A RQI WITH AN ILLEGAL IO CODE
4207                                          ;*VERIFY THAT A PROCESSOR ERROR OCCURS
4208                                          ;:************************************************************
4209
4210                                          ;  TEST 56
4211                                          ;--------------
4212  031114  012737  000056  001226  TST56:  MOV     #56,TSTNO
4213  031122  012737  031272  001216          MOV     #TST57,NEXT
4214                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
4215  031130  104412                          MSTCLR                  ;MASTER CLEAR DMC11
4216  031132  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT A DMC?
4217  031140  001406                          BEQ     .+16            ;BR IF YES
4218  031142  032737  000001  001372          BIT     #BIT0,STAT3     ;KMC WITH BIT0 SET?
4219  031150  001002                          BNE     .+6             ;BR IF YES
4220  031152  000137  031270                  JMP     10$             ;SKIP TEST
4221  031156  032737  010000  001366          BIT     #BIT12,STAT1    ;LU PRESENT?
4222  031164  001372                          BNE     .-12            ;BR IF NO
4223  031166  004737  035562                  JSR     PC,WROM         ;WRITE MICRO-CODE IN CRAM
4224  031172  004737  035762                  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  035562                  JSR     PC,WROM           ;WRITE MICRO-CODE
4268  031350  004737  036100                  JSR     PC,BASELH         ;LOAD BASE AND HALF DUPLEX
4269  031354  004537  036220                  JSR     R5,RFRELD         ;LOAD RECEIVE BUFFER
4270  031360  034742                          RBUF                      ;BA
4271  031362  000044                          44                        ;CC
4272  031364  004537  036252                  JSR     R5,XFRELD         ;LOAD TRANSMIT BUFFER
4273  031370  034674                          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  032402                  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  035562                  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  032476  147630                MOV     #IISR,@DMRVEC   ;LOAD INPUT VECTOR
4319  031544  010077  147626                        MOV     R0,@DMRLVL      ;LOAD LEVEL
4320  031550  012777  033002  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  034666                MOV     #104,TFLAG      ;TFLAG CONTAINS COUNT
4326  031570  012700  033416                        MOV     #XMITBA+2,R0    ;R0 POINTS TO BA LIST
4327  031574  012703  033710                        MOV     #RBUFF,R3       ;R3 CONTAINS BUFFER ADDRESS
4328  031600  010320                        1$:     MOV     R3,(R0)+        ;LOAD BA LIST WITH REC BA
4329  031602  062703  000106                        ADD     #106,R3         ;UPDATE BUFFER ADDRESS
4330  031606  022700  033434                        CMP     #XMITBA+20,R0   ;END OF REC BUFFERS?
4331  031612  001372                                BNE     1$              ;NO LOAD NEXT ONE
4332  031614  012720  033452                2$:     MOV     #TBUFF,(R0)+    ;LOAD BA LIST WITH XMIT BA
4333  031620  022700  033452                        CMP     #XMITBA+36,R0   ;END OF XMIT BUFFERS?
4334  031624  001373                                BNE     2$              ;NO LOAD NEXT BUFFER
4335  031626  012700  033564                        MOV     #RCNTAB+2,R0    ;R0 POINTS TO COUNT LIST
4336  031632  013720  034666                3$:     MOV     TFLAG,(R0)+     ;LOAD COUNT OF 104
4337  031636  022700  033602                        CMP     #RCNTAB+20,R0   ;END OF REC COUNT LIST?
4338  031642  001373                                BNE     3$              ;BR IF NO
4339  031644  012737  000006  034664                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  033412                CLRTAB: CLR     RESUME          ;CLEAR RESUME FLAG
4346  031702  012705  033620                        MOV     #RDNTAB,R5      ;GET READY TO CLEAR ALL RECEIVE
4347  031706  005025                        2$:     CLR     (R5)+           ;BUFFERS
4348  031710  022705  034662                        CMP     #RBUFFE,R5      ;END OF BUFFER?
4349  031714  001374                                BNE     2$              ;BR IF NO
4350  031716  005737  034664                        TST     FLAG            ;VARIABLE COUNTS?
4351  031722  100407                                BMI     5$              ;BR IF YES(DON'T CHANGE THEM)
4352  031724  012704  033602                        MOV     #XCNTAB,R4      ;R4 POINTS TO XMIT COUNT LIST
4353  031730  013724  034666                4$:     MOV     TFLAG,(R4)+     ;LOAD XMIT CHAR COUNT
4354  031734  022704  033620                        CMP     #XCNTAB+16,R4   ;DONE?
4355  031740  001373                                BNE     4$              ;BR IF NO
4356  031742  005002                        5$:     CLR     R2              ;R2 IS OUTPUT DONE COUNTER
4357  031744  005004                                CLR     R4              ;R4 IS USED AS INDEX IN OISR
4358  031746  005711                                TST     (R1)            ;IS RUN SET?
4359  031750  100376                                BPL     .-2             ;WAIT FOR RUN
4360  031752  152761  000100  000002                BISB    #BIT6,2(R1)     ;SET IEO
4361  031760  022737  000006  034664                CMP     #6,FLAG ;FIRST TIME?
4362  031766  001003                                BNE     1$              ;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  034664      SCAN:   CMP     #1,FLAG         ;1 BYTE MESS?
4370  032026  001002                              BNE     1$              ;BR IF NO
4371  032030  000137  032440                      JMP     ENDEX3          ;BR IF YES
4372  032034  022700  000020              1$:     CMP     #20,R0          ;INPUT DONE?
4373  032040  001402                              BEQ     SCAN2           ;BR IF YES
4374  032042  000137  032446                      JMP     SCAN1           ;BR IF NO
4375  032046  022702  000034              SCAN2:  CMP     #34,R2          ;XMIT DONE FOR ALL MESSAGES?
4376  032052  001175                              BNE     SCAN1           ;BR IF NO
4377  032054  022704  000034                      CMP     #34,R4          ;REC DONE FOR ALL MESSAGES?
4378  032060  001172                              BNE     SCAN1           ;BR IF NO
4379  032062  012700  033620                      MOV     #RDNTAB,R0      ;GET FIRST REC BUFFER
4380  032066  012002                      5$:     MOV     (R0)+,R2        ;R2 POINTS TO BUFFER
4381  032070  005005                              CLR     R5              ;R5=EXPECTED
4382  032072  005003                              CLR     R3              ;R3 = COUNT
4383  032074  005737  034664                      TST     FLAG            ;CHECK FOR ODD XMIT BA'S
4384  032100  100012                              BPL     6$              ;ONLY FOR VARIABLE COUNTS
4385  032102  022710  000027                      CMP     #27,(R0)        ;IF 27 BUMP DATA BY 1 (ODD XMIT BA)
4386  032106  001406                              BEQ     7$              ;BR IF YES
4387  032110  022710  000042                      CMP     #42,(R0)        ;IF 42 THEN ODD XMIT BA ALSO
4388  032114  001403                              BEQ     7$              ;BR IF YES
4389  032116  022710  000103                      CMP     #103,(R0)       ;IF 103 THEN ODD XMIT BA ALSO
4390  032122  001001                              BNE     6$              ;SKIP IF NOT
4391  032124  005205                      7$:     INC     R5              ;START DATA AT 1 FOR ODD XMIT BA'S
4392  032126  010237  001252              6$:     MOV     R2,TEMP3        ;SAVE ADDRESS FOR TYPEOUT
4393  032132  112204                              MOVB    (R2)+,R4        ;GET RECEIVE DATA
4394  032134  120504                              CMPB    R5,R4           ;IS IT CORRECT?
4395  032136  001401                              BEQ     .+4             ;BR IF YES
4396  032140  104013                              HLT     13              ;DATA ERROR
4397  032142  005205                              INC     R5              ;NEXT CHARACTER
4398  032144  005203                              INC     R3              ;INC COUNT
4399  032146  021003                              CMP     (R0),R3         ;DONE YET?
4400  032150  001366                              BNE     6$              ;BR IF NO
4401  032152  062700  000002                      ADD     #2,R0           ;GET NEXT REC BUFFER
4402  032156  022700  033654                      CMP     #RDNTAB+34,R0   ;DONE YET?
4403  032162  001341                              BNE     5$              ;BR IF NO
4404  032164  012700  000001                      MOV     #1,R0           ;SET R0 TO 1
4405  032170  005737  034664                      TST     FLAG            ;VARIABLE COUNTS?
4406  032174  100004                              BPL     4$              ;BR IF NO
4407  032176  005237  034664                      INC     FLAG            ;FLAG IS NEGITIVE
4408  032202  001235                              BNE     CLRTAB          ;BR IF NOT DONE
4409  032204  000447                              BR      ENDEX           ;ALL DONE
4410  032206  032737  000001  034664      4$:     BIT     #BIT0,FLAG      ;CHANGE CHAR COUNT FOR NEXT LOOP
4411  032214  001003                              BNE     1$              ;BR TO SUB 40
4412  032216  005337  034666                      DEC     TFLAG           ;DEC BY ONE
4413  032222  000403                              BR      2$              ;CONTINUE
4414  032224  162737  000040  034666      1$:     SUB     #40,TFLAG       ;SUBTRACT 40 FRON XMIT COUNT
4415  032232  005337  034664              2$:     DEC     FLAG            ;DEC LOOP COUNT
4416  032236  001217                              BNE     CLRTAB          ;GO DO IT AGAIN
4417  032240  005004                              CLR     R4              ;R4 CONTAINS OFFSET
4418  032242  012702  033604                      MOV     #XCNTAB+2,R2    ;R2 POINTS TO XMIT COUNT LIST
4419  032246  062704  000013              3$:     ADD     #13,R4          ;INCREASE R4 BY 13
4420  032252  060422                              ADD     R4,(R2)+        ;MAKE COUNTS VARIABLE
4421  032254  022702  033620                      CMP     #XCNTAB+16,R2   ;DONE ALL 7?
4422  032260  001372                              BNE     3$              ;BR IF NO
4423  032262  012702  033426                      MOV     #RECBA+12,R2    ;R2 POINTS TO REC BA LIST
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4424  032266  005222                          INC     (R2)+           ;MAKE THIS REC BA ODD
4425  032270  005222                          INC     (R2)+           ;MAKE THIS REC BA ODD
4426  032272  005222                          INC     (R2)+           ;MAKE THIS REC BA ODD
4427  032274  062702  000004                  ADD     #4,R2           ;SKIP TO XMIT BA LIST
4428  032300  005222                          INC     (R2)+           ;MAKE THIS XMIT BA ODD
4429  032302  005222                          INC     (R2)+           ;MAKE THIS XMIT BA ODD
4430  032304  062702  000004                  ADD     #4,R2           ;SKIP TO NEXT ODD BA
4431  032310  005222                          INC     (R2)+           ;MAKE THIS XMIT BA ODD
4432  032312  012737  177772  034664          MOV     #-6,FLAG        ;MAKE FLAG NEGITIVE
4433  032320  000137  031676                  JMP     CLRTAB          ;LOOP WITH VARIABLE COUNTS
4434  032324  152711  000146          ENDEX:  BISB    #146,(R1)       ;SHUT DOWN DMC
4435  032330  005737  034664          1$:     TST     FLAG            ;HAS INTERRUPT OCCURED?
4436  032334  001775                          BEQ     1$              ;BR IF NO
4437  032336  012700  000003                  MOV     #3,R0           ;BASE ADDRESS OFFSET
4438  032342  105760  035010          2$:     TSTB    BASE(R0)        ;CHECK ERROR COUNT
4439  032346  001016                          BNE     ENDEX2          ;BR IF ERROR
4440  032350  005200                          INC     R0              ;BUMB INDEX
4441  032352  022700  000011                  CMP     #11,R0          ;DONE ALL ERROR COUNTERS YET?
4442  032356  001371                          BNE     2$              ;BR IF NO
4443  032360  122760  000013  035010          CMPB    #13,BASE(R0)    ;13 ERRORS BECAUSE OF RESUME
4444  032366  001006                          BNE     ENDEX2          ;BR IF NOT OK
4445  032370  005200                          INC     R0              ;NEXT BASE TABLE LOCATION
4446  032372  122760  000013  035010          CMPB    #13,BASE(R0)    ;13 ERRORS BECAUSE OF RESUME
4447  032400  001001                          BNE     ENDEX2          ;BR IF NOT OK
4448  032402  104400                  ENDEX1: SCOPE                   ;SCOPE THIS TEST
4449  032404  113737  035013  001250  ENDEX2: MOVB    BASE+3,TEMP2    ;STORE ALL ODD ADRESSES
4450  032412  113737  035015  001252          MOVB    BASE+5,TEMP3    ;FOR TYPEOUT
4451  032420  113737  035017  001254          MOVB    BASE+7,TEMP4
4452  032426  113737  035021  001256          MOVB    BASE+11,TEMP5
4453  032434  104017                          HLT     17              ;NON ZERO ERROR COUNT
4454  032436  000761                          BR      ENDEX1          ;GET OUT
4455  032440  022700  000017          ENDEX3: CMP     #17,R0          ;ALL DONE INPUT?
4456  032444  001600                          BEQ     SCAN2           ;BR IF YES
4457  032446  005337  001416          SCAN1:  DEC     TEMP            ;DECREMENT DELAY COUNTER
4458  032452  001402                          BEQ     1$              ;BR IF ZERO
4459  032454  000137  032020                  JMP     SCAN            ;BR IF NOT DONE DELAY
4460  032460  005337  001250          1$:     DEC     TEMP2           ;DEC DELAY COUNT
4461  032464  001402                          BEQ     2$              ;BR IF DONE DELAY
4462  032466  000137  032020                  JMP     SCAN            ;BR IF NOT DONE
4463  032472  104014                  2$:     HLT     14              ;ERROR HUNG
4464  032474  000742                          BR      ENDEX1          ;GET OUT
4465
4466                                          ;INPUT INTERRUPT SERVICE ROUTINE
4467
4468  032476  022700  000017          IISR:   CMP     #17,R0          ;PROC. ERROR DONE?
4469  032502  001421                          BEQ     12$             ;BR IF YES
4470  032504  005737  033412                  TST     RESUME          ;IS THIS A RESUME INTERRUPT
4471  032510  001432                          BEQ     8$              ;BR IF NO
4472  032512  032711  000002                  BIT     #BIT1,(R1)      ;CNTL OR BASE?
4473  032516  001407                          BEQ     13$             ;BR IF CNTL I
4474  032520  012761  035010  000004          MOV     #BASE,4(R1)     ;LOAD BASE ADDRESS
4475  032526  012761  010000  000006          MOV     #BIT12,6(R1)    ;WITH RESUME BIT SET
4476  032534  000404                          BR      12$             ;CONTINUE
4477  032536  005061  000006          13$:    CLR     6(R1)           ;SELECT FULL DUPLEX
4478  032542  005037  033412                  CLR     RESUME          ;CLEAR RESUME FLAG
4479  032546  142711  000040          12$:    BICB    #40,(R1)        ;CLEAR RQI
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4480  032552  105711                          TSTB    (R1)            ;IS RDI GONE?
4481  032554  100776                          BMI     .-2             ;BR IF NO
4482  032556  005737  033412                  TST     RESUME          ;BASE OR CNTL I?
4483  032562  001403                          BEQ     14$             ;BR IF IT WAS CNTL I
4484  032564  152711  000041                  BISB    #41,(R1)        ;ASK FOR CNTL I
4485  032570  000002                          RTI                     ;RETURN
4486  032572  105011                  14$:    CLRB    (R1)            ;CLEAR BSEL 0
4487  032574  000002                          RTI                     ;RETURN
4488  032576  005700                  8$:     TST     R0              ;FIRST TIME HERE?
4489  032600  100006                          BPL     7$              ;LOAD BASE IF MINUS
4490  032602  012761  035010  000004          MOV     #BASE,4(R1)     ;SET UP BASE ADDRESS
4491  032610  005061  000006                  CLR     6(R1)           ;CLEAR COUNT
4492  032614  000434                          BR      3$              ;CONTINUE
4493  032616  001003                  7$:     BNE     1$              ;CNTL I FULL DUPLEX IF 0
4494  032620  005061  000006                  CLR     6(R1)           ;SELECT FULL DUPLEX
4495  032624  000430                          BR      3$              ;CONTINUE
4496  032626  032700  000010          1$:     BIT     #BIT3,R0        ;XMIT?
4497  032632  001013                          BNE     2$              ;BR IF YES
4498  032634  000241                          CLC                     ;CLEAR CARRY
4499  032636  006100                          ROL     R0              ;MAKE R0 EVEN
4500  032640  016061  033414  000004          MOV     RECBA(R0),4(R1) ;LOAD REC BUFFER
4501  032646  016061  033562  000006          MOV     RCNTAB(R0),6(R1);LOAD COUNT
4502  032654  000241                          CLC                     ;CLEAR CARRY
4503  032656  006000                          ROR     R0              ;GET R0 BACK
4504  032660  000412                          BR      3$              ;CONTINUE
4505  032662  000241                  2$:     CLC                     ;CLEAR CARRY
4506  032664  006100                          ROL     R0              ;MAKE IT EVEN
4507  032666  016061  033414  000004          MOV     XMITBA(R0),4(R1);LOAD XMIT BUFFER
4508  032674  016061  033562  000006          MOV     RCNTAB(R0),6(R1);LOAD COUNT
4509  032702  000241                          CLC                     ;CLEAR CARRY
4510  032704  006000                          ROR     R0              ;PUT IT BACK
4511  032706  142711  000040          3$:     BICB    #40,(R1)        ;CLEAR RQI
4512  032712  105711                          TSTB    (R1)            ;WAIT FOR
4513  032714  100776                          BMI     .-2             ;RDI TO GO AWAY
4514  032716  005200                          INC     R0              ;INC COUNT
4515  032720  001003                          BNE     6$              ;IF 0 ASK FOR CNTL I
4516  032722  152711  000041                  BISB    #41,(R1)        ;ASK FOR CNTL I
4517  032726  000002                          RTI                     ;RETURN
4518  032730  022700  000017          6$:     CMP     #17,R0          ;DONE YET?
4519  032734  001411                          BEQ     4$              ;BR IF YES
4520  032736  032700  000010                  BIT     #BIT3,R0        ;XMIT?
4521  032742  001003                          BNE     5$              ;BR IF YES
4522  032744  152711  000044                  BISB    #44,(R1)        ;ASK FOR REC BA/CC
4523  032750  000002                          RTI                     ;RETURN
4524  032752  152711  000040          5$:     BISB    #40,(R1)        ;ASK FOR XMIT BA/CC
4525  032756  000002                          RTI                     ;RETURN
4526  032760  022737  000001  034664  4$:     CMP     #1,FLAG         ;1 BYTE MESS?
4527  032766  001403                          BEQ     15$             ;BR IF YES
4528  032770  152711  000046                  BISB    #46,(R1)        ;FORCE PROC. ERROR
4529  032774  000002                          RTI                     ;RETURN
4530  032776  105011                  15$:    CLRB    (R1)            ;CLR SEL0
4531  033000  000002                          RTI                     ;RETURN
4532
4533                                          ;OUTPUT INTERRUPT SERVICE ROUTINE
4534
4535  033002  032761  000001  000002  OISR:   BIT     #BIT0,2(R1)     ;IS THIS AN ERROR?
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4536  033010  001461                          BEQ   1$              ;BR IF NO
4537  033012  005737  034664                  TST   FLAG            ;IS THIS SHUT DOWN INTERRUPT?
4538  033016  001006                          BNE   9$              ;BR IF NO
4539  033020  005237  034664                  INC   FLAG            ;YES MAKE FLAG NON-ZERO
4540  033024  022761  001000  000006          CMP   #BIT9,6(R1)     ;SHUT DOWN BIT SET?
4541  033032  001516                          BEQ   10$             ;YES ALL IS OK
4542  033034  022700  000017          9$:     CMP   #17,R0          ;RESUME INTERRUPT?
4543  033040  001033                          BNE   11$             ;BR IF NO
4544  033042  022761  001000  000006          CMP   #BIT9,6(R1)     ;PROC. ERROR BIT SET?
4545  033050  001027                          BNE   11$             ;BR IF NO
4546  033052  005200                          INC   R0              ;BUMP COUNTER (TO 20)
4547  033054  012711  040000                  MOV   #BIT14,(R1)     ;MASTER CLEAR DEVICE
4548  033060  032737  100000  001366          BIT   #BIT15,STAT1    ;DMC OR KMC?
4549  033066  001405                          BEQ   .+14            ;BR IF DMC
4550  033070  012711  100000                  MOV   #BIT15,(R1)     ;SET RUN ON KMC
4551  033074  105227  000000                  INCB  #0              ;DELAY ON KMC
4552  033100  001375                          BNE   .-4
4553  033102  012737  177777  033412          MOV   #-1,RESUME      ;SET RESUME FLAG
4554  033110  005711                          TST   (R1)            ;RUN SET?
4555  033112  100376                          BPL   .-2             ;BR IF NO
4556  033114  012761  000100  000002          MOV   #BIT6,2(R1)     ;SET IEO
4557  033122  052711  004143                  BIS   #4143,(R1)      ;ASK FOR PORT(BASE REQ)
4558  033126  000002                          RTI                   ;RETURN
4559  033130  016137  000004  001252  11$:     MOV   4(R1),TEMP3     ;SAVE FOR ERROR TYPEOUT
4560  033136  016137  000006  001254          MOV   6(R1),TEMP4     ;SAVE FOR ERROR TYPEOUT
4561  033144  104016                          HLT   16              ;CNTL O ERROR
4562  033146  022626                          CMP   (SP)+,(SP)+     ;ADJUST STACK
4563  033150  000137  032402                  JMP   ENDEX1          ;GET OUT
4564  033154  032761  000004  000002  1$:     BIT   #BIT2,2(R1)     ;RECEIVE?
4565  033162  001046                          BNE   2$              ;BR IF YES
4566  033164  022761  033453  000004          CMP   #TBUFF+1,4(R1)  ;XMIT BA CORRECT?
4567  033172  001405                          BEQ   4$              ;BR IF OK
4568  033174  022761  033452  000004          CMP   #TBUFF,4(R1)    ;XMIT BA CORRECT?
4569  033202  001401                          BEQ   4$              ;BR IF YES
4570  033204  104014                          HLT   14              ;XMIT BA ERROR
4571  033206  005005                  4$:     CLR   R5              ;R5 IS INDEX REG
4572  033210  026561  033602  000006  5$:     CMP   XCNTAB(R5),6(R1);IS CHAR COUNT OK?
4573  033216  001406                          BEQ   6$              ;BR IF YES
4574  033220  062705  000002                  ADD   #2,R5           ;INC INDEX
4575  033224  022705  000016                  CMP   #16,R5          ;DONE LIST YET?
4576  033230  001367                          BNE   5$              ;BR IF NO
4577  033232  104014                          HLT   14              ;XMIT COUNT ERROR
4578  033234  016162  000004  033654  6$:     MOV   4(R1),XDNTAB(R2);STORE XMIT DONE BA
4579  033242  062702  000002                  ADD   #2,R2           ;INC INDEX
4580  033246  016162  000006  033654          MOV   6(R1),XDNTAB(R2);STORE XMIT DONE CC
4581  033254  062702  000002                  ADD   #2,R2           ;INC INDEX
4582  033260  142761  000207  000002          BICB  #207,2(R1)      ;CLEAR RDO
4583  033266  000002                          RTI                   ;RETURN
4584  033270  105011                  10$:    CLRB  (R1)            ;CLEAR SEL0
4585  033272  105061  000002                  CLRB  2(R1)           ;CLEAR SEL2
4586  033276  000002                          RTI                   ;RETURN
4587  033300  012705  000002          2$:     MOV   #2,R5           ;SET UP R5 AS INDEX
4588  033304  026561  033414  000004          CMP   RECBA(R5),4(R1) ;COMPARE WITH LIST OF CORRECT BA'S
4589  033312  001406                          BEQ   3$              ;BR IF OK?
4590  033314  062705  000002                  ADD   #2,R5           ;INCREMENT R5
4591  033320  022705  000020                  CMP   #20,R5          ;END OF LIST?
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4592  033324  001367                          BNE     2$+4            ;BR IF NO
4593  033326  104014                          HLT     14              ;REC BA ERROR
4594  033330  005005                  3$:     CLR     R5              ;R5 IS INDEX
4595  033332  026561  033602  000006  7$:     CMP     XCNTAB(R5),6(R1);CHECK FOR CORRECT REC COUNT
4596  033340  001406                          BEQ     8$              ;BR IF YES
4597  033342  062705  000002                  ADD     #2,R5           ;INCREMENT R5
4598  033346  022705  000016                  CMP     #16,R5          ;END OF LIST?
4599  033352  001367                          BNE     7$              ;BR IF NOT
4600  033354  104014                          HLT     14              ;REC COUNT ERROR
4601  033356  016164  000004  033620  8$:     MOV     4(R1),RDNTAB(R4)  ;STORE REC BA
4602  033364  062704  000002                  ADD     #2,R4           ;INC INDEX
4603  033370  016164  000006  033620          MOV     6(R1),RDNTAB(R4);STORE REC DONE CC
4604  033376  062704  000002                  ADD     #2,R4           ;INC INDEX
4605  033402  142761  000207  000002          BICB    #207,2(R1)      ;CLEAR RDO
4606  033410  000002                          RTI                     ;RETURN
4607
4608
4609                                          ;BUFFERS
4610
4611  033412  000000                  RESUME: 0
4612  033414                          RECBA:
4613  033414  000017                  XMITBA: .BLKW   17      ;REC & XMIT BA LIST
4614
4615  033452                          TBUFF:                  ;TRANSMIT DATA
4616  033452      000     001     002 .BYTE   0,1,2,3,4,5,6,7
4617  033455      003     004     005
4618  033460      006     007
4619  033462      010     011     012 .BYTE   10,11,12,13,14,15,16,17
4620  033465      013     014     015
4621  033470      016     017
4622  033472      020     021     022 .BYTE   20,21,22,23,24,25,26,27
4623  033475      023     024     025
4624  033500      026     027
4625  033502      030     031     032 .BYTE   30,31,32,33,34,35,36,37
4626  033505      033     034     035
4627  033510      036     037
4628  033512      040     041     042 .BYTE   40,41,42,43,44,45,46,47
4629  033515      043     044     045
4630  033520      046     047
4631  033522      050     051     052 .BYTE   50,51,52,53,54,55,56,57
4632  033525      053     054     055
4633  033530      056     057
4634  033532      060     061     062 .BYTE   60,61,62,63,64,65,66,67
4635  033535      063     064     065
4636  033540      066     067
4637  033542      070     071     072 .BYTE   70,71,72,73,74,75,76,77
4638  033545      073     074     075
4639  033550      076     077
4640  033552      100     101     102 .BYTE   100,101,102,103,104,105,106,107
4641  033555      103     104     105
4642  033560      106     107
4643
4644  033562  000010                  RCNTAB: .BLKW   10              ;RECEIVE COUNT TABLE
4645  033602  000007                  XCNTAB: .BLKW   7               ;TRANSMIT COUNT TABLE
4646
4647  033620  000016                  RDNTAB: .BLKW   16              ;RECEIVE DONE TABLE (BA/CC)
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4648  033654  000016                          XDNTAB: .BLKW   16              ;XMIT DONE TABLE (BA/CC)
4649
4650  033710                                  RBUFF:                          ;RECEIVER BUFFERS
4651  033710  000106                          RBUFF1:  .BLKB 106
4652  034016  000106                          RBUFF2:  .BLKB 106
4653  034124  000106                          RBUFF3:  .BLKB 106
4654  034232  000106                          RBUFF4:  .BLKB 106
4655  034340  000106                          RBUFF5:  .BLKB 106
4656  034446  000106                          RBUFF6:  .BLKB 106
4657  034554  000106                          RBUFF7:  .BLKB 106
4658  034662  000000                          RBUFFE: 0                       ;END OF RECEIVER BUFFERS
4659                                  09500
4660                                  09600
4661                                  09700
4662                                  09800           ;BUFFER AREA
4663                                  09900           ;-----------
4664                                  10000
4665  034664  000000                  10100   FLAG:   0
4666  034666  000000                  10200   TFLAG:  0
4667  034670  000000                  10300   RFLAG:  0
4668  034672  000044                  10400   TCOUNT: 44
4669  034674  041101  042103  043105  10500   TBUF:   .ASCII/ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789/
4670  034702  044107  045111  046113
4671  034710  047115  050117  051121
4672  034716  052123  053125  054127
4673  034724  055131  030460  031462
4674  034732  032464  033466  034470
4675                                  10600   .EVEN
4676  034740  000044                  10700   RCOUNT: 44
4677  034742  035010                  10800   RBUF:   .=.+46
4678                                  10900   .EVEN
4679  035010  035410                  11000   BASE:   .=.+256.
4680                                  00300
4681                                  00400
4682                                  00500   ;SUBROUTINES
4683                                  00600   ;-----------
4684                                  00700
4685  035410                          00800   CLRALL:
4686                                  00900           ;THIS SUBROUTINE CLEARS THE C&Z BITS AND THE BR
4687                                  01000
4688  035410  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4689  035412  000400                  01200   000400                  ;BR←0
4690  035414  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4691  035416  063220                  01400   063220                  ;SP(0)←BR
4692  035420  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4693  035422  060400                  01600   060400                  ;BR←SP(0)+BR
4694  035424  000207                  01700           RTS     PC
4695                                  01800
4696                                  01900
4697  035426                          02000   SETBRO:
4698                                  02100           ;THIS SUBROUTINE SETS BRO BIT
4699                                  02200
4700  035426  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4701  035430  000401                  02400   000401                  ;BR←001
4702  035432  000207                  02500           RTS     PC
4703                                  02600
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 4704                                                02700
 4705  035434                                        02800  SETBR1:
 4706                                                02900          ;THIS SUBROUTINE SETS BR1 BIT
 4707                                                03000
 4708  035434  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4709  035436  000402                                03200  000402                  ;BR←002
 4710  035440  000207                                03300  RTS     PC
 4711                                                03400
 4712                                                03500
 4713  035442                                        03600  SETBR4:
 4714                                                03700          ;THIS SUBROUTINE SETS BR4 BIT
 4715                                                03800
 4716  035442  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4717  035444  000420                                04000  000420                  ;BR←020
 4718  035446  000207                                04100  RTS     PC
 4719                                                04200
 4720                                                04300
 4721  035450                                        04400  SETBR7:
 4722                                                04500          ;THIS SUBROUTINE SETS BR7 BIT
 4723                                                04600
 4724  035450  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4725  035452  000600                                04800  000600                  ;BR←200
 4726  035454  000207                                04900  RTS     PC
 4727                                                05000
 4728                                                05100
 4729  035456                                        05200  SETC:
 4730                                                05300          ;THIS SUBROUTINE SETS THE C BIT
 4731                                                05400
 4732  035456  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4733  035460  000777                                05600  000777                  ;BR←377
 4734  035462  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4735  035464  063220                                05800  063220                  ;SP(0)←BR
 4736  035466  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4737  035470  060400                                06000  060400                  ;BR←SP(0)+BR
 4738  035472  000207                                06100  RTS     PC
 4739                                                06200
 4740                                                06300
 4741  035474                                        06400  SETZ:
 4742                                                06500          ;THIS SUBROUTINE SETS THE Z BIT
 4743                                                06600
 4744  035474  104414                                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4745  035476  000777                                06800  000777                  ;BR←377
 4746  035500  000207                                06900  RTS     PC
 4747                                                07000
 4748                                                07100
 4749  035502                                        07200  ROMDAT:
 4750                                                07300          ;THIS SUBROUTINE LOADS R5 WITH EXPECTED ROM CONTENTS
 4751                                                07400          ;AND LOADS R4 WITH ACTUAL ROM CONTENTS
 4752                                                07500
 4753  035502  017600  000000                        07600          MOV     @(SP),R0        ;INDEX FOR COMPARE
 4754  035506  062716  000002                        07700          ADD     #2,(SP)         ;ADJUST STACK
 4755  035512  012711  002000                        07800          MOV     #BIT10,(R1)     ;SET ROM0
 4756  035516  016005  011766                        07900          MOV     ROMMAP(R0),R5   ;PUT "EXPECTED" IN R5
 4757  035522  016104  000006                        08000          MOV     6(R1),R4        ;PUT "FOUND" IN R4
 4758  035526  000207                                08100          RTS     PC              ;RETURN
 4759                                                08200
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4760  035530                                  08300  RAMDAT:
4761                                          08400          ;THIS SUBROUTINE LOADS R4 WITH THE LOWEST
4762                                          08500          ;8 BITS OF THE CRAM PC.
4763                                          08600
4764  035530  017605  000000                  08700          MOV     @(SP),R5        ;GOOD DATA
4765  035534  062716  000002                  08800          ADD     #2,(SP)         ;ADJUST STACK
4766  035540  005011                          08900          CLR     (R1)            ;CLEAR BIT10
4767  035542  052711  000400                  09000          BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION IN CRAM THAT WAS
4768                                          09100                                  ;JUMPED TO, IT LOADS BR WITH ROM PC
4769  035546  005011                          09200          CLR     (R1)            ;CLR BIT8
4770  035550  104414                                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4771  035552  061225                          09400          061225                  ;MOV BR TO PORT 5
4772  035554  116104  000005                  09500          MOVB    5(R1),R4        ;PUT "FOUND" IN R4
4773  035560  000207                          09600          RTS     PC              ;RETURN
4774                                          09700
4775  035562                                  09800  WROM:
4776                                          09900          ;THIS SUBROUTINE WRITES THE ROMMAP INTO THE CRAM
4777                                          10000
4778  035562  032737  100000  001366          10100          BIT     #BIT15,STAT1    ;BE SURE DMC HAS CRAM
4779  035570  001420                          10200          BEQ     2$              ;SKIP IF NO CRAM
4780  035572  005000                          10300          CLR     R0              ;R0=CRAM ADDRESS
4781  035574  012702  011766                  10400          MOV     #ROMMAP,R2      ;R2 POINTS TO ROMMAP
4782  035600  012711  002000                  10500  1$:     MOV     #BIT10,(R1)     ;SET ROM0
4783  035604  010061  000004                  10600          MOV     R0,4(R1)        ;LOAD CRAM ADDRESS
4784  035610  012261  000006                  10700          MOV     (R2)+,6(R1)     ;LOAD WORD TO BE WRITTEN
4785  035614  052711  020000                  10800          BIS     #BIT13,(R1)     ;WRITE IT!
4786  035620  005200                          10900          INC     R0              ;NEXT ADDRESS
4787  035622  022700  002000                  11000          CMP     #2000,R0        ;DONE YET?
4788  035626  001364                          11100          BNE     1$              ;BR IF NO
4789  035630  005011                          11200          CLR     (R1)            ;CLEAR SEL0
4790  035632  000207                          11300  2$:     RTS     PC              ;RETURN
4791                                          11400
4792                                          11500
4793  035634                                  11600  MEMSET:
4794                                          11700          ;THIS SUBROUTINE LOADS CRAM WITH SPECIAL INSTRUCTIONS
4795                                          11800          ;FOR THE CRAM JUMP TEST. ALL CRAM LOCATIONS ARE LOADED
4796                                          11900          ;WITH INSTRUCTIONS THAT MOVE A 37 TO THE BR, EXCEPT THE
4797                                          12000          ;FOLLOWING CRAM ADDRESSES: 0,1,4,7,525,1777. THESE LOCATIONS
4798                                          12100          ;CONTAIN INTRUCTIONS WHICH LOAD THE BR WITH THE LOWEST
4799                                          12200          ;8 BITS OF THAT CRAM ADDRESS.
4800                                          12300
4801  035634  005000                          12400          CLR     R0              ;R0 = CRAM ADDRESS
4802  035636  012711  002000                  12500  1$:     MOV     #BIT10,(R1)     ;SET ROM0
4803  035642  010061  000004                  12600          MOV     R0,4(R1)        ;LOAD CRAM ADDRESS
4804  035646  012761  000437  000006          12700          MOV     #437,6(R1)      ;LOAD INSTRUCTION
4805  035654  052711  020000                  12800          BIS     #BIT13,(R1)     ;WRITE INSTRUCTION IN CRAM
4806  035660  005200                          12900          INC     R0              ;NEXT ADDRESS
4807  035662  022700  002000                  13000          CMP     #2000,R0        ;DONE YET?
4808  035666  001363                          13100          BNE     1$              ;BR IF NO
4809  035670  005000                          13200          CLR     R0              ;INDEX REGISTER
4810  035672  012711  002000                  13300  2$:     MOV     #BIT10,(R1)     ;SET ROM0
4811  035676  016061  035732  000004          13400          MOV     CRAMA(R0),4(R1) ;LOAD CRAM ADDRESS IN SEL4
4812  035704  016061  035746  000006          13500          MOV     INSTU(R0),6(R1) ;LOAD INSTRUCTIIN TO BE WRITTEN
4813  035712  052711  020000                  13600          BIS     #BIT13,(R1)     ;WRITE CRAM!
4814  035716  005720                          13700          TST     (R0)+           ;NEXT
4815  035720  022700  000014                  13800          CMP     #14,R0          ;DONE YET?
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  4816  035724  001362                  13900          BNE     2$              ;BR IF NO
  4817  035726  005011                  14000          CLR     (R1)            ;CLEAR ALL BITS
  4818  035730  000207                  14100          RTS     PC              ;RETURN
  4819                                  14200
  4820  035732  000000  000001  000004  14300  CRAMA:  .WORD   0,1,4,7,1777,525
  4821  035740  000007  001777  000525
  4822  035746  000400                  14400  INSTU:  000400          ;BR+0
  4823  035750  000401                  14500          000401          ;BR+1
  4824  035752  000404                  14600          000404          ;BR+4
  4825  035754  000407                  14700          000407          ;BR+7
  4826  035756  000777                  14800          000777          ;BR+377
  4827  035760  000525                  14900          000525          ;BR+125
  4828                                  15000
  4829                                  15100
  4830  035762                          15200  BASELD:
  4831                                  15300          ;THIS SUBROUTINE LOADS THE DMC WITH A BASE ADDRESS
  4832                                  15400          ;AND PUTS DMC INTO FULL-DUPLEX MODE
  4833                                  15500
  4834  035762  012711  040000          15600          MOV     #BIT14,(R1)     ;MASTER CLEAR
  4835  035766  032737  100000  001366  15700          BIT     #BIT15,STAT1    ;CRAM?
  4836  035774  001402                  15800          BEQ     .+6             ;BR IF NO
  4837  035776  012711  100000          15900          MOV     #BIT15,(R1)     ;IF CRAM SET RUN
  4838  036002  105227  000000          16000          INCB    #0              ;DELAY
  4839  036006  001375                  16100          BNE     .-4             ;BR IF NOT DONE DELAY
  4840  036010  005711                  16200  1$:     TST     (R1)            ;IS RUN SET?
  4841  036012  100376                  16300          BPL     1$              ;BR IF NO
  4842  036014  052711  004000          16400          BIS     #BIT11,(R1)     ;SET LU LOOP
  4843  036020  152711  000043          16500          BISB    #43,(R1)        ;BASE REQUEST
  4844  036024  105711                  16600  2$:     TSTB    (R1)            ;RDY I SET?
  4845  036026  100376                  16700          BPL     2$              ;BR IF NO
  4846  036030  012761  035010  000004  16800          MOV     #BASE,4(R1)     ;LOAD BASE ADDRESS
  4847  036036  005061  000006          16900          CLR     6(R1)           ;CLEAR CC
  4848  036042  142711  000040          17000          BICB    #40,(R1)        ;CLEAR RQI
  4849  036046  105711                  17100  3$:     TSTB    (R1)            ;RDY I CLEAR?
  4850  036050  100776                  17200          BMI     3$              ;BR IF NO
  4851  036052  152711  000041                         BISB    #41,(R1)        ;ASK FOR CNTL I
  4852  036056  105711                          64$:    TSTB    (R1)            ;WAIT FOR RDI
  4853  036060  100376                          BPL     64$             ;BR IF NOT SETY
  4854  036062  005061  000006                  CLR     6(R1)           ;SET FULL DUPLEX
  4855  036066  142711  000040                  BICB    #40,(R1)        ;CLEAR RQI
  4856  036072  105711                          65$:    TSTB    (R1)            ;RDI UP?
  4857  036074  100776                          BMI     65$             ;BR IF YES
  4858  036076  000207                  17400          RTS     PC              ;RETURN
  4859                                  17500
  4860  036100                          17600  BASELH:
  4861                                  17700          ;THIS SUBROUTINE LOADS THE DMC WITH A BASE ADDRESS
  4862                                  17800          ;AND PUTS DMC INTO HALF-DUPLEX MODE
  4863                                  17900
  4864  036100  012711  040000          18000          MOV     #BIT14,(R1)     ;MASTER CLEAR
  4865  036104  032737  100000  001366  18100          BIT     #BIT15,STAT1    ;CRAM?
  4866  036112  001402                  18200          BEQ     .+6             ;BR IF NO
  4867  036114  012711  100000          18300          MOV     #BIT15,(R1)     ;IF CRAM SET RUN
  4868  036120  105227  000000          18400          INCB    #0              ;DELAY
  4869  036124  001375                  18500          BNE     .-4             ;BR IF NOT DONE DELAY
  4870  036126  005711                  18600  1$:     TST     (R1)            ;IS RUN SET?
  4871  036130  100376                  18700          BPL     1$              ;BR IF NO
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4872  036132  052711  004000          18800          BIS     #BIT11,(R1)     ;SET LU LOOP
4873  036136  152711  000043          18900          BISB    #43,(R1)        ;BASE REQUEST
4874  036142  105711                  19000    2$:   TSTB    (R1)            ;RDY I SET?
4875  036144  100376                  19100          BPL     2$              ;BR IF NO
4876  036146  012761  035010  000004  19200          MOV     #BASE,4(R1)     ;LOAD BASE ADDRESS
4877  036154  005061  000006          19300          CLR     6(R1)           ;CLEAR CC
4878  036160  142711  000040          19400          BICB    #40,(R1)        ;CLEAR RQI
4879  036164  105711                  19500    3$:   TSTB    (R1)            ;RDY I CLEAR?
4880  036166  100776                  19600          BMI     3$              ;BR IF NO
4881  036170  152711  000041                         BISB    #41,(R1)        ;ASK FOR CNTL I
4882  036174  105711                          64$:   TSTB    (R1)            ;WAIT FOR RDI
4883  036176  100376                          64$    BPL     64$             ;BR IF NOT SETY
4884  036200  012761  002000  000006                 MOV     #BIT10,6(R1)    ;SET HALF DUPLEX
4885  036206  142711  000040                         BICB    #40,(R1)        ;CLEAR RQI
4886  036212  105711                          65$:   TSTB    (R1)            ;RDI UP?
4887  036214  100776                          65$    BMI     65$             ;BR IF YES
4888  036216  000207                  19800          RTS     PC              ;RETURN
4889                                    19900
4890  036220                          20000  RFRELD:
4891                                    20100          ;THIS SUBROUTINE LOADS THE DMC WITH A RECEIVE BA/CC
4892                                    20200
4893  036220  152711  000044          20300          BISB    #44,(R1)        ;REC BA/CC REQUEST
4894  036224  105711                  20400    1$:   TSTB    (R1)            ;RDY I SET?
4895  036226  100376                  20500          BPL     1$              ;BR IF NO
4896  036230  012561  000004          20600          MOV     (R5)+,4(R1)     ;LOAD REC BA
4897  036234  012561  000006          20700          MOV     (R5)+,6(R1)     ;LOAD REC CC
4898  036240  142711  000040          20800          BICB    #40,(R1)        ;CLEAR RQI
4899  036244  105711                  20900    2$:   TSTB    (R1)            ;IS RDY I CLEAR
4900  036246  100776                  21000          BMI     2$              ;BR IF NO
4901  036250  000205                  21100          RTS     R5              ;RETURN
4902                                    21200
4903  036252                          21300  XFRELD:
4904                                    21400          ;THIS SUBROUTINE LOADS THE DMC WITH A TRANSMIT BA/CC
4905                                    21500
4906  036252  152711  000040          21600          BISB    #40,(R1)        ;XMIT BA/CC REQUEST
4907  036256  105711                  21700    1$:   TSTB    (R1)            ;RDY I SET?
4908  036260  100376                  21800          BPL     1$              ;BR IF NO
4909  036262  012561  000004          21900          MOV     (R5)+,4(R1)     ;LOAD XMIT BA
4910  036266  012561  000006          22000          MOV     (R5)+,6(R1)     ;LOAD XMIT CC
4911  036272  142711  000040          22100          BICB    #40,(R1)        ;CLEAR RQI
4912  036276  105711                  22200    2$:   TSTB    (R1)            ;IS RDY I CLEAR
4913  036300  100776                  22300          BMI     2$              ;BR IF NO
4914  036302  000205                  22400          RTS     R5              ;RETURN
4915                                    00300
      036304  041777  040522  020115  00400  EM1:    .ASCIZ  <377>/CRAM DATA ERROR/
      036325     377  051103  046501  00500  EM2:    .ASCIZ  <377>/CRAM DUAL ADDRESSING ERROR/
      036361     377  051103  046517  00600  EM3:    .ASCIZ  <377>/CROM DATA ERROR/
      036402  045377  046525  020120  00700  EM4:    .ASCIZ  <377>/JUMP ERROR/
      036416  047777  052104  042440  00800  EM5:    .ASCIZ  <377>/ODT ERROR IN IBUS* REG10/
      036450  044777  050117  046440  00900  EM6:    .ASCIZ  <377>/IOP MAIN MEMORY TEST/
      036476  044777  050117  046440  01000  EM7:    .ASCIZ  <377>/IOP MAR TEST/
      036514  041377  020122  044522  01100  EM10:   .ASCIZ  <377>/BR RIGHT SHIFT TEST/
      036541     377  042522  042503  01200  EM11:   .ASCIZ  <377>/RECEIVE DATA ERROR/
      036565     377  051106  042505  01300  EM12:   .ASCIZ  <377>/FREE RUNNING ERROR/
      036611     377  047503  052116  01400  EM13:   .ASCIZ  <377>/CONTROL OUT ERROR/
      036634  044777  052116  051105  01500  EM14:   .ASCIZ  <377>/INTERNAL DDCMP ERROR COUNTS NON ZERO/
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                                                01600
036702  042777  050130  041505                01700   DH1:    .ASCIZ  <377>/EXPECTED  FOUND  ADDRESS/
036734  042777  050130  041505                01800   DH2:    .ASCIZ  <377>/EXPECTED  FOUND/
036755     377  051440  046105                01900   DH3:    .ASCIZ  <377>/ SEL4      SEL6/
036776  041377  051501  025505                02000   DH4:    .ASCIZ  <377>/BASE+3 THRU BASE+12 /
                                                02100   .EVEN
                                                02200
037024  000003                                02300   DT1:    3
037026     006      004                       02400           .BYTE   6,4
037030  001264                                02500           SAVR2
037032     006      004                       02600           .BYTE   6,4
037034  001270                                02700           SAVR4
037036     004      002                       02800           .BYTE   4,2
037040  001260                                02900           SAVR0
037042  000003                                03000   DT2:    3
037044     006      004                       03100           .BYTE   6,4
037046  001272                                03200           SAVR5
037050     006      004                       03300           .BYTE   6,4
037052  001270                                03400           SAVR4
037054     004      002                       03500           .BYTE   4,2
037056  001264                                03600           SAVR2
037060  000003                                03700   DT3:    3
037062     006      004                       03800           .BYTE   6,4
037064  001272                                03900           SAVR5
037066     006      004                       04000           .BYTE   6,4
037070  001270                                04100           SAVR4
037072     004      002                       04200           .BYTE   4,2
037074  001252                                04300           TEMP3
037076  000002                                04400   DT4:    2
037100     003      007                       04500           .BYTE   3,7
037102  001272                                04600           SAVR5
037104     003      002                       04700           .BYTE   3,2
037106  001270                                04800           SAVR4
037110  000002                                04900   DT5:    2
037112     006      004                       05000           .BYTE   6,4
037114  001272                                05100           SAVR5
037116     006      002                       05200           .BYTE   6,2
037120  001270                                05300           SAVR4
037122  000003                                05400   DT6:    3
037124     003      010                       05500           .BYTE   3,10
037126  001272                                05600           SAVR5
037130     003      004                       05700           .BYTE   3,4
037132  001270                                05800           SAVR4
037134     004      002                       05900           .BYTE   4,2
037136  034664                                06000           FLAG
037140  000003                                06100   DT7:    3
037142     003      010                       06200           .BYTE   3,10
037144  001272                                06300           SAVR5
037146     003      004                       06400           .BYTE   3,4
037150  001270                                06500           SAVR4
037152     004      002                       06600           .BYTE   4,2
037154  001264                                06700           SAVR2
037156  000003                                06800   DT10:   3
037160     003      007                       06900           .BYTE   3,7
037162  001272                                07000           SAVR5
037164     003      004                       07100           .BYTE   3,4
```

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037166  001270                  07200           SAVR4
037170      006     002         07300           .BYTE   6,2
037172  001252                  07400           TEMP3
037174  000002                  07500   DT11:   -2
037176      006     004         07600           .BYTE   6,4
037200  001252                  07700           TEMP3
037202      006     002         07800           .BYTE   6,2
037204  001254                  07900           TEMP4
037206  000010                  08000   DT12:   10
037210      003     002         08100           .BYTE   3,2
037212  001250                  08200           TEMP2
037214      003     002         08300           .BYTE   3,2
037216  035014                  08400           BASE+4
037220      003     002         08500           .BYTE   3,2
037222  001252                  08600           TEMP3
037224      003     002         08700           .BYTE   3,2
037226  035016                  08800           BASE+6
037230      003     002         08900           .BYTE   3,2
037232  001254                  09000           TEMP4
037234      003     002         09100           .BYTE   3,2
037236  035020                  09200           BASE+10
037240      003     002         09300           .BYTE   3,2
037242  001256                  09400           TEMP5
037244      003     002         09500           .BYTE   3,2
037246  035022                  09600           BASE+12
                                09700
037250                          09800   .ERRTAB:
037250  000000                  09900           0
037252  000000                  10000           0
037254  000000                  10100           0
037256  036304                  10200   EM1
037260  036702                  10300   DH1     ;HLT    1
037262  037024                  10400   DT1
037264  036325                  10500   EM2
037266  036702                  10600   DH1     ;HLT    2
037270  037024                  10700   DT1
037272  036304                  10800   EM1
037274  036702                  10900   DH1     ;HLT    3
037276  037042                  11000   DT2
037300  036361                  11100   EM3
037302  036702                  11200   DH1     ;HLT    4
037304  037060                  11300   DT3
037306  036402                  11400   EM4
037310  036734                  11500   DH2     ;HLT    5
037312  037076                  11600   DT4
037314  036402                  11700   EM4
037316  036734                  11800   DH2     ;HLT    6
037320  037110                  11900   DT5
037322  036416                  12000   EM5
037324  036734                  12100   DH2     ;HLT    7
037326  037076                  12200   DT4
037330  036450                  12300   EM6
037332  036702                  12400   DH1     ;HLT    10
037334  037122                  12500   DT6
037336  036476                  12600   EM7
037340  036702                  12700   DH1     ;HLT    11
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037342  037140                  12800   DT7
037344  036514                  12900   EM10
037346  036734                  13000   DH2     ;HLT    12
037350  037076                  13100   DT4
037352  036541                  13200   EM11
037354  036702                  13300   DH1     ;HLT    13
037356  037156                  13400   DT10
037360  036565                  13500   EM12
037362  000000                  13600   0       ;HLT    14
037364  000000                  13700   0
037366  036565                  13800   EM12
037370  036734                  13900   DH2     ;HLT    15
037372  037110                  14000   DT5
037374  036611                  14100   EM13
037376  036755                  14200   DH3     ;HLT    16
037400  037174                  14300   DT11
037402  036634                  14400   EM14
037404  036776                  14500   DH4     ;HLT    17
037406  037206                  14600   DT12
                                14700
                                14800
037410                          14900   CORMAX:
        000001                  15400   .END
```

```
ADRCNT= 004301   858*   894*   903#
AUDONE  002734   566    639#
AUSTRT  002446   565#   596    643
AUTO.S  010252   528    1343#
BASE    035010  3841    4438   4443   4446   4449   4450   4451   4452   4474   4490   4679#  4846   4876
                4915
BASELD  035762  3980    4036   4085   4131   4180   4224   4830#
BASELH  036100  4268    4860#
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   4410   4535
BIT1  = 000002    94#    533   1127   1133   1134   1503   4472
BIT10 = 002000    85#   1475   1486   1682   1718   1754   1770   1804   2108   4755   4782   4802   4810
                4884
BIT11 = 004000    84#   3833   4842   4872
BIT12 = 010000    83#   1427   1501   3807   3977   4033   4082   4128   4177   4221   4265   4308   4475
BIT13 = 020000    82#   1430   1478   1505   1685   1721   1757   4785   4805   4813
BIT14 = 040000    81#    761   1441   1443   1505   1516   3818   3831   4340   4547   4834   4864
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   4548   4550   4778   4835   4837   4865   4867
BIT2  = 000004    93#    533    692   1134   3908   3999   4564
BIT3  = 000010    92#   1507   1514   4496   4520
BIT4  = 000020    91#   1117   1140   1142   4057
BIT5  = 000040    90#   1618   2047
BIT6  = 000100    89#   1122   1123   1509   2062   4360   4556
BIT7  = 000200    88#   1123   1240   1618
BIT8  = 000400    87#   1485   1496   1498   1511   1513   1519   1522   1579   2045   4103   4152   4767
BIT9  = 001000    86#   1483   1485   1493   1519   1522   1577   1579   4196   4240   4540   4544
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  035410  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   4685#
CLRTAB  031676  4345#   4408   4416   4433
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  037410  4915#
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CRAM    006510          1165*  1405
CRAMA   035732          4811   4820*
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     036702          4915*
DH2     036734          4915*
DH3     036755          4915*
DH4     036776          4915*
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     037024           4915#
DT10    037156           4915#
DT11    037174           4915#
DT12    037206           4915#
DT2     037042           4915#
DT3     037060           4915#
DT4     037076           4915#
DT5     037110           4915#
DT6     037122           4915#
DT7     037140           4915#
EM1     036304           4915#
EM10    036514           4915#
EM11    036541           4915#
EM12    036565           4915#
EM13    036611           4915#
EM14    036634           4915#
```

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EM2     036325          4915#
EM3     036361          4915#
EM4     036402          4915#
EM5     036416          4915#
EM6     036450          4915#
EM7     036476          4915#
ENDEX   032324          4409    4434#
ENDEX1  032402          4307    4448#   4454    4464    4563
ENDEX2  032404          4439    4444    4447    4449#
ENDEX3  032440          4371    4455#
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    034664          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
                        4383    4405    4407*   4410    4415*   4432*   4435    4526    4537    4539*   4665#   4915
FLOAT   002536           582#    588
FY      002562           590#    594.
HALTS   005130          1012    1058#
HILIM   004274           855*    882     900#
ICOUNT  001222           159#    773     778*
IISR    032476          4318    4468#
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   035746          4812    4822#
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*
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                    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  035634      2940   3002   3061   3123   3185   3247   3309   3371   3433   3495   3557   3619   3681
                    3743   4793#
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    033002      4320   4535#
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*
PUSHR0= 010046             71#  1062
PUSH1S= 005746             69#
PUSH2S= 024646             73#
QV.FLG  001327            204#   484*  730*  770
RAMDAT  035530           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  4760#
RBUF    034742           3812   3871  3932  3940  4038  4270  4677#
RBUFF   033710           4327   4650#
RBUFFE  034662           4348   4658#
RBUFF1  033710           4651#
RBUFF2  034016           4652#
RBUFF3  034[illegible]   4653#
RBUFF4  034[illegible]   4654#
RBUFF5  [illegible]      4655#
RBUFF6  [illegible]      4656#
RBUFF7  [illegible]      4657#
RCNTAB  033[illegible]   4335   4337  4501  4508  4644#
RCOUNT  034[illegible]   3810   3872  3935  3938  4676#
RDNTAB  033620           4346   4379  4402  4601*  4603*  4647#
RECBA   033414           4423   4500  4588  4612#
RESREG  005126           1054   1057#
RESTAR  005252           1086   1092#
RESTRT  003444            729    733  741#
RESUME  033412           4345*  4470  4478*  4482  4553*  4611#
RESOS = 104407            229#  1057
RETURN  001214            156#   494*  700*  704   741*  779*  783  1071*  1073  1105  1320*  1330*  1332
RFLAG   034670           3817*  3925  3928*  3953  4667#
RFRELD  036220           4037   4132  4269  4890#
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    4688    4690    4692    4700    4708    4716    4724    4732    4734    4736    4744    4770
ROMDAT  035502      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    4749#
ROMMAP  011766      1622#   1801    2100    4756    4781
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    4915
SAVR1   001262       179#    609*    626     916*    923
SAVR2   001264       180#    915*    924    4915
SAVR3   001266       181#    914*    925
SAVR4   001270       182#    913*    926    4915
SAVR5   001272       183#    912*    927    4915
SAVSP   001274       184#
SAVOS = 104406       227#   1017
SCAN    032020      4369#   4459    4462
SCAN1   032446      4374    4376    4378    4457#
SCAN2   032046      4373    4375#   4456
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    4448
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  035426      2370    2383    2396    3187    3200    3213    4697#
SETBR1  035434      2426    2439    2452    3249    3262    3275    4705#
SETBR4  035442      2482    2495    2508    3311    3324    3337    4713#
SETBR7  035450      2538    2551    2564    3373    3386    3399    4721#
SETC    035456      2258    2271    2284    3063    3076    3089    4729#
SETZ    035474      2314    2327    2340    3125    3138    3151    4741#
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  4548  4778  4835
                       4865
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    034674         3887  3917  3939  3982  4041  4136  4273  4669*
TBUFF   033452         4332  4566  4568  4615*
TCOUNT  034672         3888  3920  4668*
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*  4457*
TEMP1   001246          173*   539*  1167  1570*  1571*  3897*  3902*
TEMP2   001250          174*   540*  1169  3905*  4367*  4449*  4460*  4915
TEMP3   001252          175*   542*   563*   599   608*  1171  1361  1364  1464*  2113*  2115*  2116*  2117*
                       2118*  3851*  3941*  4392*  4450*  4559*  4915
TEMP4   001254          176*   543*  1173  1374  1377  1383  1386  1450  1453  1459  1462  3852*  4451*
                       4560*  4915
TEMP5   001256          177*   544*  1175  1355*  1368*  1556  4452*  4915
TFLAG   034666         3816*  3910  3913*  3955  4325*  4336  4353  4412*  4414*  4666*
TIMER = 104416          243*
TKCSR   001204          148*   764   827  1234  1612
TKDBR   001206          149*   766   829   835  1192  1194  1236  1614
TLAST = 031432         1325  4680*
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*
```

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                    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#  4680
TST7     017024     1828   1873#
TTST     003522      695*   696*   698*   699*   762#
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                         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    035562           1800    3809    3979    4035    4084    4130    4179    4223    4267    4310    4775#
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XCSR    003456            718     743#
XDNTAB  033654           4578#   4580#   4648#
XERR    003500            724     752#
XFRELD  036252           3981    4040    4086    4135    4272    4903#
XHEAD   006126            537    1165#
XMITBU  033414           4326    4330    4333    4507    4613#
XPASS   003472            722     749#
XSTATQ  007230            546    1165#
XTSTN   005232           1039    1078#
XVEC    003464            720     746#
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X1    = 000101           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
X2    = 000102           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
X3    = 000103           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
X4    = 000104           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
X5    = 000105           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
X6    = 000106           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
X7    = 000107           4616#   4619#   4622#   4625#   4628#   4631#   4634#   4637#   4640#
ZERO    001300            186#
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                         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#
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                         3732#   3783#   3786    3794#   3958#   3961    3964#   4014#   4017    4020#   4063#   4066    4069#
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                         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#
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.INST1  003776       823#    843
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.TIMER  005520       244    1148#
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.TYPE   003674            220     801*
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J04


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          2392   2405   2435   2448   2461   2491   2504   2517   2547   2560   2573   2604   2617   2630   2661
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$GETPA       1#
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          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
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                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
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              3659    3670    3721    3732    3783    3794    3958    3964    4014    4020    4063    4069    4109    4115    4158
              4164    4202    4208    4246    4252    4286    4295

. ABS.  037410     000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

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 RUN-TIME: 16 22 1 SECONDS
 RUN-TIME RATIO: 809/40=20.2
 CORE USED:  29K  (57 PAGES)
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